QAD Adaptive Applications
YAB 1.19

Configuration and Administration Guide

QAD Adaptive

70-3346-YAB1.19

QAD Adaptive Applications

QAD Adaptive

November 2025

This document contains proprietary information that is protected by copyright and other intellectual property laws. No part of this document may be reproduced, translated, or modified without the prior written consent of QAD Inc. The information contained in this document is subject to change without notice.

QAD Inc. provides this material as is and makes no warranty of any kind, expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. QAD Inc. shall not be liable for errors contained herein or for incidental or consequential damages (including lost profits) in connection with the furnishing, performance, or use of this material whether based on warranty, contract, or other legal theory.

This document contains trademarks owned by QAD Inc. and other companies.

Copyright © 2025 by QAD Inc.

QAD Inc.
100 Innovation Place
Santa Barbara, California 93108
Phone (805) 566-6000
http://www.qad.com

Table of Contents

Administration Guide 7
Introduction 8
YAB Client 9
Packages 11
Commands 13
Configuration 16
File System Layout 18
Enterprise Edition 19
YAB Principles 20
System Administration 22
Starting and Stopping Environments 23
Controlling Financials Daemons 25
Schema Management 28
Data Management 30
Environment Backup 31
Environment Restore 32
Configuration Backups 34
Data (Native Format) 35
Data (XML Format) 36
Update Statistics 38
Compiling Source Code 39
Configuring Compiles 40
Compile for Developers 41
Locating Compile Resources 43
Generating XREF output 45
Generating DEBUG-LIST output 46
Compile Databases 47
Generating LISTING output 48
Auditing 50
Enable Auditing 51
Disable Auditing 52
Configuring Audit Permissions 53
Importing Policy Files 54
Archiving Records 55
Configure Archive Database Connection 58
Manage Archive Database Server 59
QXtend 60
Reapply QXtend Defaults 61
Key Commands 62
clean 63
code-mfg-customizations-update 64
code-mfg-update 65
config 66
database-storage-area-resolve 69
env-info 71

fin-sync-run 72
health 73
help 74
history 79
info 81
netui-pro-update 83
reconfigure 84
restart 85
shell 86
start 88
status 89
stop 90
system-diagnostics 91
system-find 92
system-package-create 93
system-process-list 95
system-updates-list 96
update 103
validate 104
System Configuration 105
General Information 106
Configuration Type System 107
Configuration Files 109
Distributing Settings 122
Configuration File Includes 123
Undefined Progress Parameters 124
Environment Identification 125
Reconfiguring Databases 126
Configuring Database Location 127
Configuring Database Structure 128
Configuring Primary Login Broker (4GL) 129
Configuring Secondary Login Broker (SQL) 130
Configuring Before Imaging 131
Configuring After Imaging 132
Configuring Codepage and Collation 134
Configuring Database Security 135
Defining Users and Administrator Privileges . . . 136
Blank User Access 137
Table Permissions 138
Schema Changes 139
Using Demo Data 142
Using Parameter Files 145
Reconfiguring Tomcat 148
Enabling the Manager Web Application 149
Reconfiguring Tomcat Startup Parameters 150
Configuring SSL Connections 151
Reconfiguring PROPATHs 153
Reconfiguring AdminServer 156
Reconfiguring Application Servers 157
Enabling and Disabling 4GLTrace 158

Migrating to a New Host 160
TCP/IP Ports 161
Adding Languages 162
Using AIA 164
SSH and Telnet Protocols 165
Bootstrap Files 166
QAD Reporting Framework Printers 168
Batch Jobs 169
Batch Jobs (Basic) 170
Batch Jobs (Enhanced) 171
Configuring Commands 173
Exec Commands 174
Progress Commands 175
ANT commands 176
Error Handling 177
Timeouts 178
Key Settings 179
catalogs setting 180
check-for-updates setting 181
clean setting 182
config.order setting 183
dependency settings 184
packages setting 185
ports setting 188
verify setting 189
Upgrades, Customizations, and Patches 191
Product Upgrades 192
Customizations 193
Operational Customizations 194
Integrate QAD source file archive into environment. 196
Financials Customization 198
Integrated Customization Toolkit 199
Install and Configure the Integrated Customization Toolkit 200
Desktop Customizations 202
Adding Custom Data 203
Metadata 204
Process Maps 205
Adding Custom Database 206
Adding Custom Application Server 208
Compiling EDI Functions 210
Adding Custom Directory Backup Processes 211
Patches 214
Operational Hotfixes (Patches/ECO) 215
Financials Hotfix 216
Package Patch 217
File Patch 218
qra.pl 219
Prepared Contexts 220

Using a context 221
Adding files to a context 223
Validating a context 224
Logging in a context 225
Context Guidelines 226
Limitations 228
Troubleshooting 229
Logging 230
Appserver Logging 232
Financials Logging 233
Temporary Files 234
Collecting Diagnostic Information 235
Disabling Commands 236
Refresh & Clean Options 237
Validation Settings 238
Defining Java Startup Parameters 239
Adding Packages to Local Catalog 240
Control Process Execution 241
Interactive Execution 242
Non-interactive Execution 244
Appendix 246
Parallel Execution 247
Command Expressions 249
Selecting Files 251
Extensions 252
Rebuild 254
Managing Progress Data 255
Creating Tomcat Security Patches 267

Administration Guide

This is the Administration Guide for QAD Enterprise Edition and QAD Adaptive using Your Application Builder (YAB).

YAB is used to administer QAD releases starting with *QAD Enterprise Edition 2015 (QAD Cloud)* and is a functional replacement for the *QAD Deployment Toolkit (QDT)*. This guide documents relevant information regarding the configuration and administration of the QAD Enterprise Edition and QAD Adaptive. It is oriented towards system administrators with a basic understanding of QAD Enterprise Edition and QAD Adaptive.

Documentation Conventions

To provide the clearest exposition of the subject matter, the examples in the guide are written from the following perspective:

- The yab client is available on the PATH.
- The working directory is the installation directory.
- The default file system layout is used.

Introduction

The *Introduction* section introduces the key concepts behind YAB.

- YAB Client
- Packages
- Commands
- Configuration
- File System Layout
- Enterprise Edition
- YAB Principles

YAB Client

A QAD Enterprise Edition environment is administered with the program *yab*.

Executing the program without any arguments (or with the "-?" option) will display the version of the YAB client and its help.

```
> yab
YAB Console, 1.10.0.45


 Usage: yab <options> [COMMAND ...]

 Options:

 -a:arg          Locates the application to manage.

                 Default: current working directory

 -v              Writes log messages to the console.

 -p:arg          A FILE|URL locating a configuration document to integrate into 'build/config
/system'. (multiple allowed)

 -i:arg          A FILE locating a package to integrate into 'build/catalog'. (multiple allowed)

 -r              Forces the evaluation of settings (-r or -r:true) or prevents the evaluation of
settings (-r:false). By default settings will automatically be evaluated as needed.

 -clean          Used to force certain updates.

 -log-level:arg  Sets a logging threshold [TRACE|DEBUG|INFO|WARN|ERROR|OFF]

                 Default: DEBUG

 -log-copy       Records a copy of all log messages in a file, or if a file is not specified, in
a timestamp file in the log directory.

 -?              Prints this help (or -?? for additional options).

 Arguments:

 COMMAND         A command to execute.
```


The version that is displayed (e.g. "YAB Console, 1.10.0.45") is the version of the YAB client, which may be different from the version of YAB in an environment. The info command displays the version of components in an environment, where the entry `yab-ee-app` records the version of YAB.

When QAD Enterprise Edition is installed or YAB is updated, the installer installs the YAB client into the *build/client* directory. If the YAB client is not on the PATH it will, as a convenience, create a script named `yab.[bat]` in the installation directory to launch the YAB client. It is recommended that you add the YAB client to the PATH so YAB commands can be submitted from any directory.

```
export PATH=[INSTALLATION DIRECTORY]/build/client:$PATH
```

A single installation of the YAB client may be used to administer multiple QAD Enterprise Edition environments, where the environment to administer is selected using the (-a) option. Alternatively the "active" environment can be implicitly determined by navigating to the installation directory of the environment (or a subdirectory of the installation directory).

```
> yab -a:/dr01/qadapps/devl info
> yab -a:/dr01/qadapps/test info
> cd /dr01/qadapps/devl
> yab info
> cd /dr01/qadapps/devl/build/config
> yab info
```

If the client cannot locate the environment to administer, the following error is raised.

```
> yab info
ERROR - Unable to locate an application.
Use (-a:PATH) option to locate an application.
```

The YAB client is a Java application that requires Java 8 or higher. The *java* program is located using the PATH environment variable, unless the JAVA_HOME environment variable locates an alternative Java installation to use. If Java is not installed or configured correctly you will get an error similar to this:

```
> yab
/users/wtb/programs/yab/yab: line 38: java: command not found
```

If an older version of Java is configured you will get an error similar to this:

```
> yab
Exception in thread "main" java.lang.UnsupportedClassVersionError: Bad version number in .class
file
```

Show Java Version

The following command displays the version of Java resolved from the PATH:

```
java -version
```

Packages

An environment is composed of *packages*. Packages are read-only versioned releases of application and management software.

Software Catalogs

A software catalog is a structured collection of packages. A catalog may contain compressed or uncompressed packages. Every QAD Adaptive ERP environment is associated with a local catalog that contains uncompressed packages.

Ex. List contents of local catalog

```
> ll build/catalog
total 8
-rw-rw-r--  1 mfg qad    0 Mar 23 17:23 expanded
drwxrwxr-x 79 mfg qad 8192 Mar 23 17:30 packages/

> ll build/catalog/packages/fin-src-proxy/2016/0/80/5/
total 124
drwxrwxr-x   3 mfg qad   4096 Mar 23 17:28 com/
-rw-rw-r--   1 mfg qad     12 Mar 23 17:28 fin-src-proxy.version
-rw-rw-r--   1 mfg qad    313 Mar 23 17:27 metadata.xml
drwxrwxr-x 469 mfg qad 110592 Mar 23 17:28 proxy/
drwxrwxr-x   3 mfg qad   4096 Mar 23 17:28 us/
```

Packages should never be directly modified.

The *catalogs setting* can used to configure additional catalogs (listed in order of precedence).

```
catalogs=/dr01/qadapps/catalog,/dr01/3rdparty/catalog
```

Downloading Packages

The environment must have read access to all configured packages in uncompressed format. If a package is only available in a catalog accessed through the HTTP protocol or in a catalog that stores packages in compressed format, the package will be downloaded and installed into the local catalog.

Usage

The files in a catalog are referenced by YAB and also by the Enterprise Edition. For example, the default configuration references Tomcat binaries from the *tomcat* package.

Listing Packages

The info command lists the packages configured in an environment.

```
> yab info

INSTANCE

/dr01/qadapps/ci

MODULES

|- assistance-help-ee                          2018.0.0.0     local
|- base-app                                    2.4.0.8        local
|- costing-app                                 2.4.0.6        local
|- custrelmgmt-app                             1.0.0.83       local
|- demo-data                                   2019.0.19.787  local
|- distribution-app                            1.3.0.5        local
|- ee-pre-conversion-reports                   1.0.0.2        local
|- engineering-app                             2.4.0.5        local
|- enterprise-financials-app                   2019.1.1.2     local
|- fhd-data-fix                                1.0.0.5        local
|- financials-qra-app                          2.20191.0.385  local
|- fixed-assets-app                            2.2.0.126      local
|- inventory-app                               2.4.0.13       local
...
```

Creating Packages

The system-package-create command is used to create a custom package.

See:

Info

Clean

Product Upgrades

system-package-create

Commands

Commands are executed through the YAB client:

```
> yab [COMMAND] [COMMAND]...
```

Detailed information is recorded in the YAB log file:

```
build/logs/yab.log
```

Use the verbose (-v) option to also print log messages to the console:

```
> yab -v ...
```

Use the (-log-copy) option to write log messages to a file as well as to the YAB log file, replacing existing content:

```
yab -log-copy:request.log ...
```

Many commands are aggregated. For example there are commands to start a single database server, all database servers, and the environment.

Ex. Starts the QADDB database.

```
> yab database-qaddb-start
```

Ex. Starts all databases.

```
> yab database-start
```

Ex. Starts the environment (including databases).

```
> yab start
```

The product configuration will have an influence on the commands that are available in an environment. For example, when Customer Relationship Management is added to an environment, additional commands are defined.

Ex. Starts the CRM application server

```
> yab appserver-crm-start (OE11)
> yab pas-crm-start (OE12)
```

The help command is used to show the help for specific commands and to query the available commands.

```
> yab help config

PROCESS
     config - Prints configuration settings.

DESCRIPTION
     yab config [KEY] [KEY] [KEY]...

     KEY
     The key of the setting(s) to print. The meta character '*' is used to match 0 or more
characters.
     If no keys are defined, all configuration settings with a value are printed, and when (-all)
is
     defined, settings without a value are included as well. When using meta characters, quote the
     argument to prevent the shell from evaluating the meta character.
...

> yab help database-qaddb

PROCESSES

     database-qaddb-ai-archiver-disable       Disables the AI archiver for the 'qaddb' database.
     database-qaddb-ai-archiver-enable        Enables the AI archiver for the 'qaddb' database.
     database-qaddb-ai-archiver-start         Starts the AI archiver daemon for the 'qaddb'
database.
     database-qaddb-ai-archiver-stop          Stops the AI archiver daemon for the 'qaddb'
database.
     database-qaddb-ai-disable                Disables AI on the 'qaddb' database.
     database-qaddb-ai-enable                 Enables AI on the 'qaddb' database.
     database-qaddb-ai-list                   Lists AI extents on the 'qaddb' database.
     database-qaddb-ai-status                 Checks whether AI is enabled for the 'qaddb'
database.
     database-qaddb-ai-switch                 Switches to the next AI extent on the 'qaddb'
database.
     database-qaddb-auditing-archive          Moves audit records in the 'qaddb' database to the
archive database.
     database-qaddb-auditing-disable          Disables auditing on the 'qaddb' database.
     database-qaddb-auditing-enable           Enables auditing on the 'qaddb' database.
     database-qaddb-backup                    Creates a backup of the 'qaddb' database.
     database-qaddb-backup-list               Lists the backup tags containing backups of the
qaddb database.
     database-qaddb-backup-mark               Marks 'qaddb' database as backedup.
     database-qaddb-create                    Creates the 'qaddb' database.
     database-qaddb-data-update               Loads data into the 'qaddb' database.
     database-qaddb-index-deactivate          Perform an index deactivate.
     database-qaddb-index-rebuild             Perform an index rebuild.
...
```

The `help` command also shows the help for configuration settings. Sometimes this is distracting when commands and settings are named similarly. The `command-help` command only shows help for commands and the `config-help` command only shows help for configuration settings.

Piping output from `config` or `help` to the UNIX "grep" command is a powerful technique for quickly finding what you are looking for.

For example, the following command lists the commands with"restore" in their name:

```
> yab command-help | grep restore
```

The system-process-list command lists the commands that are aggregated (implied) by a command and the order in which they would be executed if the parent command was executed.

```
> yab system-process-list database-qaddb-update

1. database-qaddb-structure-file-update
2. database-qaddb-structure-validate
3. database-qaddb-create
4. database-qaddb-structure-update
5. qxtend-stage
6. database-qaddb-schema-update
7. database-qaddb-schema-index-rebuild
8. oid-code-update
9. data-customizations-default-dotd-qaddb-update
10. data-customizations-default-xml-qaddb-update
11. data-ee-data-qaddb-update
12. data-ee-data-qadfin-update
13. data-ee-system-data-qaddb-update
14. data-ee-system-data-patch-delete-qaddb-update
15. data-ee-system-data-patch-qaddb-update
16. data-options-qaddb-update
17. data-patches-default-dotd-qaddb-update
18. data-patches-default-xml-qaddb-update
19. data-qrabridge-qaddb-update
20. data-qxtend-qaddb-update
21. module-archiving-stage
22. data-xml-archiving-qaddb-overwrite-update
23. languages-mark-installed
24. database-qaddb-data-update
25. tlc-create
26. database-qaddb-jta-enable
27. database-qaddb-update
```

Occasionally the term *process* is used instead of *command* to capture the idea that a command describes a process flow. The two terms are interchangeable.

See:

help

system-process-list

Configuration

The configuration of the environment is distributed across multiple configuration files residing in the *build/config* directory. To change a configuration setting the setting should be added to or updated in the *build/config/configuration.properties* file, where it will override the default setting.

For example, to increase the maximum number of concurrent sessions a multi-session agent can run concurrently to 15 in the MFG Appserver, the following setting would be added in an OE12 environment:

build/config/configuration.properties

```
pas.mfg.openedge.session-mgr.maxABLSessionsPerAgent=15
```

Certain basic configuration changes can be applied by executing the *reconfigure* command.

```
> yab reconfigure
```

Other configuration changes require the environment to be restarted and are applied with the *update* command.

```
> yab update
```

A setting that is defined at the command line will be used only for the duration of the request.

```
> yab -threads:3 stop
```

Layout

Type	Location	Description
Instance Document	build/config/configuration.properties	Used to make changes to the standard configuration.
System Documents	build/config/system	Documents that define a standard configuration of the QAD Enterprise Edition. When the environment is created using the QAD Enterprise Edition installer the following configuration documents are created. build/config/product.properties — The packages that were installed. build/config/environment.properties — The *install.conf* file used for the installation. WARNING: The system will process any file in this directory that ends with ".properties" as a configuration file. If you create a backup of a configuration file, copy the backup into a different directory (or better still use the *system-config-backup* command to make the backup). WARNING: In general, these files should not be edited.
Package Documents	build/config/packages	Factory default settings defined by packages. WARNING: These files are generated and should never be edited.

Query

The config command is used to query configuration settings:

```
> yab config pas.mfg.*
pas.mfg.archivelogsonstartup=true
pas.mfg.base=/dr01/qadapps/systest/servers/pas-mfg
pas.mfg.catalina.psc.as.http.port=22121
pas.mfg.catalina.psc.as.https.compress=off
pas.mfg.catalina.psc.as.https.keyalias=qad-wildcard
pas.mfg.catalina.psc.as.https.keypass=changeit
pas.mfg.catalina.psc.as.https.keystorefile=/dr01/certificates/keystore.jks
pas.mfg.catalina.psc.as.https.port=22115
pas.mfg.catalina.psc.as.https.storeType=JKS
pas.mfg.connectionprotocol=https
pas.mfg.defaultsessionmodel=Session-managed
pas.mfg.dir=/tech/progress/dlc1289/servers/pasoe
pas.mfg.hostname=qltdcc2erp8td6.qad.com
pas.mfg.httpport=22121
pas.mfg.jvm.maxheap=/^-Xmx.*$/-Xmx128m
pas.mfg.jvm.minheap=/^-Xms.*$/
pas.mfg.logging-pas.psc.as.logging.maxhistory=30
pas.mfg.logging-pas.psc.as.logging.totalsizecap=100MB
pas.mfg.logging-tomcat.psc.as.logging.maxhistory=30
pas.mfg.logging-tomcat.psc.as.logging.totalsizecap=100MB
pas.mfg.managelogarchiveonstartup=true
...
```

The system maintains a single file enumerating the current, fully resolved configuration settings:

`build/work/system/config/current/application.properties`

The help command shows the help for configuration settings.

The `help` command also shows the help for command settings. Sometimes this is distracting when commands and settings are named similarly. The `command-help` command only shows help for commands and the `config-help` command only shows help for configuration settings.

See:

config

help

update

validate

Configuration Files

File System Layout

The default configuration creates an environment with resources nested within the installation directory.

```
> ll
total 44
drwxrwxr-x  6 mfg qad  4096 Mar 17 17:23 build/
drwxrwxr-x 11 mfg qad  4096 Mar 17 19:03 config/
drwxrwxr-x  9 mfg qad  4096 Mar 17 17:32 customizations/
drwxrwxrwx  4 mfg qad 12288 Mar 17 05:56 databases/
drwxrwxr-x 13 mfg qad  4096 Mar 17 08:10 dist/
drwxrwxr-x  2 mfg mfg  4096 Mar 17 05:33 extensions/
drwxrwxr-x  7 mfg qad  4096 Mar 17 17:32 patches/
drwxrwxr-x  2 mfg qad  8192 Mar 17 13:31 scripts/
drwxrwxr-x  3 mfg qad  4096 Mar 17 17:32 servers/
drwxrwxr-x. 4 mfg mfg  4096 Mar 17 09:22 storage/
```

The location of some resources can be configured but the location should be configured when the environment is created.

Factory Default Path	Configuration Setting	Configurable	Description
	appdir	Yes	The installation directory that was chosen when the application was installed. This is equivalent to the installation variable (install-instance).
build	appdir.build	No	Used by the management components.
build/catalog	appdir.catalog	No	The local software catalog.
build/config	appdir.config	No	The management configuration settings.
build/work	appdir.work	No	A work area for the management components.
build/logs	appdir.logs	Yes	The environment log files.
customizations	customizations.dir	Yes	Application customizations.
databases	db._base.dir	Yes	The databases.
dist	dist.dir	Yes	The compiled application binaries.
extensions	extensions.dir	Yes	Application extensions.
patches	patches.dir	Yes	Application patches.
scripts	scripts.dir	Yes	Scripts to start and stop servers.
servers	n/a	No	Configuration for servers.
storage	qad-qracore.qra.attachment.storage	No	Storage for attachments.

Enterprise Edition

The environment should be started before running an Enterprise Edition client.

```
> yab start
```

Character

The character client is started by executing a (language specific) script in the installation directory:

Start a character session.

```
> scripts/client-[LANG]
```

Ex.

```
> scripts/client-us
```

.NET

The .NET client must be installed on a Windows host. The .NET client installation is started by navigating to the Home Server in a web browser. Use the config (or env-info) command to print the Home Server URL:

```
> yab config webapp.homeserver.url webapp.homeserver.secureurl
webapp.homeserver.url=http://vmwtb02.qad.com:22000/qadhome
webapp.homeserver.secureurl=https://vmwtb02.qad.com:22077/qadhome
```

Products with changes for the .NET client are installed on the server with the update command. When a client starts up, it checks the server for updates and downloads and applies any updates, before starting.

YAB Principles

YAB has two main objectives:

- Increase the efficiency of Enterprise Edition administrators.
- Provide a safe and consistent approach to reconfiguring, upgrading, and administering the Enterprise Edition.

These objectives are promoted by certain design decisions (e.g. catalogs and packages) embedded in the fabric of how YAB works, but they are also forwarded by other principles that require the participation of administrators. In many cases, these principles have deep roots and correspond to how Enterprise Edition has been administered in the past. In a few cases, a conscious decision was made to improve upon historical practices.

Principles

Automation

Change should be automated. Automated changes are more efficient than manual changes and produce consistent results that can be reproduced. Automated changes record evidence in log files that can be analyzed for root cause analysis.

Declarative

Configuration should describe the desired state of the environment. It should be possible to reproduce this state at any point in time, which means that all files referenced from the configuration (e.g. schema files, source code, etc) must always be available. The update command is responsible for ensuring that the environment corresponds to the configuration.

Fault Tolerant

An administrator should be able to start and stop the environment even if YAB is broken. YAB generates scripts to control the environment and uses these scripts internally when starting and stopping the environment.

YAB Best Practices

Use Multiple Environments

A common practice is to have one or more environments dedicated to development and testing which closely resemble the production environment. Changes are validated in advance before they are applied to the production environment.

Avoid Manual Changes

It is very difficult to obtain consistent outcomes when manual (and in many cases undocumented) changes are applied to an environment. If the manual changes DO NOT overlap with the automated changes applied by YAB, they will remain as potentially mysterious reasons that some functionality works in one environment but not in another. Worse still are the scenarios where the manual changes DO overlap with automated changes. When a program is manually compiled in the Progress editor and written into the r-code directory or a table is added manually added through the Progress data dictionary, it will not necessarily be reverted by the next update. In fact, the change may be reverted much later when a seemingly unrelated change is made in the environment. Consider a table added manually into the "qaddb" database in an environment where an update is run weekly. Every week the update determines that the configured schema files have not changed and there is nothing to do. Eventually several years later a product is installed into the environment and this product requires some changes to the "qaddb" database schema. At that point, the manually added table is dropped because it is not configured (see Schema Changes for further details). This scenario can occur in other areas where manual changes are mixed with automated changes.

Minimize Differences

Any change to the standard product configuration should be carefully considered. The standard product configuration is the subject of thousands of hours of testing and use and has been designed to support product upgrades without manual intervention. Overrides increase the cost of upgrades by requiring additional up front analysis and sometimes post upgrade corrections.

Segregate Differences

Having a clear separation between the standard product configuration and overrides, is valuable from the standpoint of clearly describing the environment, and in some cases, this separation can be leveraged for troubleshooting as well. The environment is organized to support this separation. The `build/config/configuration.properties` file is used to record differences from the standard product configuration and the `customizations` and `patches` directories to store customization and patch artifacts. If custom schema is required you can add the schema in a custom database.

Do Not Avoid Update

An update restarts the environment and can take significant time to run. There is a temptation to avoid the update and instead to selectively run steps from the update that are deemed appropriate for the pending change, in an attempt to speed things up and/or to avoid the environment restart. This is a risky strategy, because it is not easy to determine the complete scope of a change, or to accurately map that scope back to individual steps, or to understand the subtle dependencies between steps. The resulting custom fit procedure will invariably leave out important steps. Even with the best analysis, the custom procedure deviates from what has been tested and can result in problems that are hard to diagnose.

When an update is eventually run in an environment managed this way it can result in a "big bang" effect where multiple pending changes unrelated to the current change are applied at the same time.

The fundamental risk in not bringing down the environment before it is updated is that the running application may see and react to the partially updated system with unforeseen consequences. This follows simply from the fact that the pending change is applied to the system over time and that some of these changes will be "immediately" visible to the running application, whereas others will not, until the system is restarted. It is very hard to estimate the risk of an online update without taking that specific risk many times in actively used environments and tracking the outcomes. With luck you will get away with it most of the time, but other times you will be chasing strange errors for which there is no simple explanation, and in a worst case scenario, corrupting or losing data that cannot be recovered.

Use Comments

On occasion it may be necessary to define configuration or temporarily skip commands as part of a workaround or possibly configuration is added to reflect certain preferences. All configuration files support comments by prefixing the line with the hash (#) symbol. A simple description of the reason for the change, the user introducing the change, and the date the change was introduced, can be invaluable when evaluating upgrades and patches and understanding the background of an environment.

System Administration

System Administration covers day-to-day administrative tasks such as starting and stopping environments, backing up and restoring databases, and recompiling code.

- Starting and Stopping Environments
- Schema Management
- Data Management
- Compiling Source Code
- Auditing
- QXtend
- Key Commands

Starting and Stopping Environments

The commands start, stop, and status are used to start, stop, and check the status of servers in the environment. The restart command is a convenience command to stop and then start the environment.

Scripts

The commands to start and stop servers typically execute a script of the same name in the scripts directory. For example, the command to start the Tomcat WebUI is *tomcat-webui-start* which executes the script *scripts/tomcat-webui-start*.

scripts/tomcat-webui-start

```
#!/tech/python/3.12.1/bin/python3

# Starts the 'webui' Tomcat server.
# Generated: 2025-09-05T09:20-0700

import os
from control import *

os.environ['CATALINA_PID'] = '/dr01/qadapps/systest/servers/tomcat-webui/catalina.pid'
os.environ['JAVA_HOME'] = '/tech/java/openjdk17.0.7.7'
os.environ['JRE_HOME'] = '/tech/java/openjdk17.0.7.7'
os.environ['CATALINA_BASE'] = '/dr01/qadapps/systest/servers/tomcat-webui'
os.environ['CATALINA_HOME'] = '/dr01/qadapps/systest/build/catalog/packages/tomcat/9/0/104/0'


if not 'QAD_KMS_ACCESS_TOKEN' in os.environ:
    if os.path.isfile('/dr01/qadapps/systest/servers/kms/kms-init.properties'):
        os.environ.update(dict(line.strip().split('=') for line in open('/dr01/qadapps/systest
/servers/kms/kms-init.properties')))
    else:
        raise Exception('KMS is not initialized correctly.')

if os.path.isfile(r'/dr01/qadapps/systest/build/work/tomcat-run-once-properties/run-once-webui.
properties') and os.path.getsize(r'/dr01/qadapps/systest/build/work/tomcat-run-once-properties
/run-once-webui.properties') > 0:
    data = ''
    with open(r'/dr01/qadapps/systest/build/work/tomcat-run-once-properties/run-once-webui.
properties', 'r') as property_file:
        for line in property_file:
            data = data + '-D' + line.rstrip('\r\n') + ' '
            os.environ['JAVA_OPTS'] = data
    os.remove(r'/dr01/qadapps/systest/build/work/tomcat-run-once-properties/run-once-webui.
properties')
exec_process(['/dr01/qadapps/systest/build/catalog/packages/tomcat/9/0/104/0/bin/startup.sh'],
cwd='/dr01/qadapps/systest/servers/tomcat-webui')
```

These scripts should not be directly edited. They are re-generated by executing the *script-update* (or *reconfigure* or *update*) command from the YAB console. The scripts are generated by the system so the environment can be started even if YAB has failed (and for better transparency). The YAB commands should be used in preference to direct execution of the scripts because the request will then be recorded in the YAB log file (build/logs/yab.log). Also some commands will first check the status of the managed resource before calling the script. For example not executing a script to start a server that is already running. Some servers will raise an error if they receive a request to start a server that is already running or to stop a server that is already stopped.

The scripts maintained by the system are implemented in Python to provide consistent behavior across different platforms and to leverage the extensive Python standard libraries. Custom scripts can be implemented in any language.

Manual Setting

The *manual* setting of each server configures whether the server will (false) or will not (true) be controlled by the environment start, stop, and status commands:

Server	Setting	Default
Database Server	`dbserver.[INSTANCE].manual`	False
Application Server	`appserver.[INSTANCE].manual (OE11)` `pas.[INSTANCE].manual (OE12)`	False

WebSpeed Server	`ws.[INSTANCE].manual`	False
Tomcat Server	`tomcat.[INSTANCE].manual`	False
Financials Daemons	`fin.daemons.manual`	False

A "manual" server can still be controlled using server specific commands. For example, a custom database with the following configuration:

```
db.custom.physicalname=custom
db.custom.manual=true
...
```

Could be controlled with the following commands:

```
> yab database-custom-start
> yab database-custom-stop
> yab database-custom-status
```

Controlling Financials Daemons

The Financials component is associated with background processes called *daemons*. Daemon processes are stopped after initial installation and will remain stopped until they are configured. Daemon setup is described in the *QAD System Administration User Guide*.

The following commands start, stop, and get the status of the daemons:

```
daemon-start
daemon-stop
daemon-status
```

By default the daemon processes are started and stopped when the environment is started and stopped. To disable the automatic start of the daemon processes define the following setting:

```
fin.daemons.manual=true
```

Each daemon listed by the *fin.daemons.names* setting will also have commands to individually control the daemon:

```
daemon-[DAEMON]-start
daemon-[DAEMON]-stop
daemon-[DAEMON]-status
```

Unsetting fin.daemon.names will prevent any daemon commands from being defined.

```
> yab help daemon-

PROCESSES

     daemon-balancedaemon-start           Starts the balancedaemon.
     daemon-balancedaemon-status          Checks the status of the balancedaemon.
     daemon-balancedaemon-stop            Stops a Financials daemon.
     daemon-budgetdaemon-start            Starts the budgetdaemon.
     daemon-budgetdaemon-status           Checks the status of the budgetdaemon.
     daemon-budgetdaemon-stop             Stops a Financials daemon.
     ...
```

The prefix "fin.daemons" groups additional settings to fine tune how Financials daemons are managed.

```
> yab help fin.daemons

SETTINGS

     fin.daemons.names              A comma-delimited list of Financials daemons for which
individual control processes (start, stop, status)
                                    should be provided.
                                    Ex. XmlDaemon,BalanceDaemon,BudgetDaemon,CrossCompanyDaemon,
EventDaemon,HistoryDaemon,ReplicationDaemon,ScanDaemon,TimeoutDaemon,CubeDaemon,ReportDaemon

     fin.daemons.manual             When true the Financials daemons will not be associated with
the commands:

                                    start
                                    stop
                                    status

                                    But must be manually controlled and queried using the
commands:

                                    daemon-start or fin-application-start
                                    daemon-stop or fin-application-stop
                                    daemon-status

                                    See: fin.daemons.status

                                    Default: false

     fin.daemons.status             When true the Financials daemons will be associated with the
following command,
                                    even if 'fin.daemons.manual' is true:

                                    status

                                    See: fin.daemons.manual

                                    Default: false

     fin.daemons.propath            The PROPATH to use when calling the Financials API to
control daemons.

     fin.daemons.startallaction     The action to submit when starting all daemons.

     fin.daemons.stopallaction      The action to submit when stopping all daemons.

     fin.daemons.statusallaction    The action to submit when getting the status of all daemons
(currently this is not used).

     fin.daemons.startaction        The action to submit when starting a specific daemon.

     fin.daemons.stopaction         The action to submit when stopping a specific daemon.

     fin.daemons.statusaction       The action to submit when getting the status of a specific
daemon.

     fin.daemons.logdir             DEPRECATED
                                    Please see 'fin.daemon.INSTANCE.logdir'

     fin.daemons.workdir            DEPRECATED
                                    Please see 'fin.daemon.INSTANCE.workdir'
```

The prefix "fin.daemon" is used to configure individual daemons where the INSTANCE is the name of the daemon (e.g. eventdaemon, historydaemon,scandaemon, etc):

```
> yab help fin.daemon.INSTANCE

SETTINGS

     fin.daemon.INSTANCE.debuglevel            The debug level for a specific daemon. The valid
range is 0-31.
                                               Default: 0

     fin.daemon.INSTANCE.propath               The extra daemon propath for a specific daemon.

     fin.daemon.INSTANCE.extraparams           The extra daemon progress parameters for a
specific daemon.

     fin.daemon.INSTANCE.logdir                The log directory for daemons.

     fin.daemon.INSTANCE.workdir               The work directory for daemons.

     fin.daemon.INSTANCE.user                  Daemon User.

     fin.daemon.INSTANCE.password              Daemon Password.

     fin.daemon.INSTANCE.interval              Specify the time interval in seconds before the
daemons check the queue for new requests.

     fin.daemon.INSTANCE.maxinstances          Maximum number of instances that can be started
for this daemon.

     fin.daemon.INSTANCE.numrequestsinloop     The daemon process will pause each time this
number of tasks has been processed.

     fin.daemon.INSTANCE.oscommand             Command line to start a daemon process.

     fin.daemon.INSTANCE.keepprocesseditems    When set to true, records in the fcdaemonqueue
table will not be deleted.
                                               When set to false, records with status 'PROCESSED-
OK' will be deleted.

     fin.daemon.INSTANCE.xmldaemondir          The directory that the daemon scans for XML
files. Applies to the XmlDaemon only.
```

For example, to get more verbose logging from the Event Daemon define the following configuration:

```
fin.daemon.eventdaemon.debuglevel=31
```

Reconfigure and then restart the Event Daemon:

```
> daemon-configure
> daemon-eventdaemon-stop
> daemon-eventdaemon-start
```

Report Daemon

The report daemon runs on a Windows host and is not directly controlled by YAB. To make it easier to start and stop the report daemon when the environment starts and stops, YAB defines a set of "placeholder" commands (*daemon-reportdaemon-start, daemon-reportdaemon-stop*) that can be extended to call a script that starts and stops the daemon on the Windows host when the environment is started and stopped.

Ex. Execute an rd-start script when the environment starts and an rd-stop script when the environment is stopped.

```
process.reportwin-start.id=daemon-reportdaemon-start
process.reportwin-start.impl=exec
process.reportwin-start.args=/dr01/qadapps/qea/rd-start
process.reportwin-stop.id=daemon-reportdaemon-stop
process.reportwin-stop.impl=exec
process.reportwin-stop.args=/dr01/qadapps/qea/rd-stop
```

When the report daemon on the Windows host communicates back to the server another daemon is automatically spawned on the UNIX host. The command *daemon-reportdaemon-status* shows the status of this UNIX daemon.

Schema Management

There are several commands that may be used to create and compare schema files. The Schema Changes page discusses separately the commands that are used to load schema files into a database.

Ad-hoc Commands

The following commands provide support for dumping and comparing schema files. Review the help to see how they work (yab help <command>).

Command	Description
schema-dump	Dump schema from a database.
schema-diff	Compares two schema files for differences.

Snapshot Based Commands

There are other commands that are designed to support the development and redistribution of schema (but that also may be useful in assessing the impact of installing modules into the environment). Review the help to see how they work (yab help <command>).

Command	Description
dev-schema-snapshot	Creates a "snapshot" by dumping the schema of all databases or the selected databases to a new timestamped directory.

dev-schema-diff	Compares two snapshots.
	
	The diff can be used to see pending schema changes (changes configured but not applied) as well as schema changes that are not associated with a configured schema file.
	
	Ex. Show pending schema changes.
	
	`yab -configured dev-schema-snapshot`
	`yab dev-schema-snapshot`
	`yab dev-schema-list`
	`yab -snapshot1:[TIMESTAMP] -snapshot2:configured dev-schema-diff`
	
	Ex. Show manually applied schema changes.
	
	`yab -configured dev-schema-snapshot`
	`yab dev-schema-snapshot`
	`yab dev-schema-list`
	`yab -snapshot1:configured -snapshot2:[TIMESTAMP] dev-schema-diff`

dev-schema-list	Lists the snapshots.
dev-schema-clear	Deletes all snapshots.

Snapshots will always be created after a schema change. Use the `dev-schema-list` command to list the snapshots in the environment.

Locating

The `database-INSTANCE-schema-locate` command may be used to locate the schema files that distribute schema for a table for sequence.

Ex.

```
> yab database-qaddb-schema-locate pt_mstr
Table    Active   SchemaFile
-----    -------  -----------
pt_mstr  true     /qad/local/sandbox/cache/packages/base/2/1/0/282/qad.base/schema/progress/qaddb
/qaddb.df
pt_mstr  false    /qad/local/sandbox/cache/packages/mfg/2017/0/17/536/schema/qaddb/mfgempty.df
```

Data Management

- Environment Backup
- Environment Restore
- Configuration Backups
- Data (Native Format)
- Data (XML Format)
- Update Statistics

Environment Backup

The `environment-offline-backup` and the `environment-online-backup` commands are used to perform an environment-wide backup of all system components. The offline command stops the environment before taking the backup whereas the online command does not, though it may temporarily take components offline that do not support an online backup. The offline backup is the recommended approach to ensure data consistency across components. Note, the behavior of an offline backup may differ depending on the status of an environment; a data cleanup step `event-service-backup-clean` has a dependency on the QRA Application Server, as a result, if the server is stopped prior to executing the offline backup, processed EventRaw records will not be deleted.

```
> yab environment-offline-backup
```

Backups are located in subdirectories of the directory configured by the `dbbackup.dir` setting. When `dbbackup.timestamp` is true, the subdirectory names encode the time of the backup using the format ([YEAR][MONTH][DAY][HOUR][MINUTE][SECOND]). The `dbbackup.timestampmax` setting can be configured to specify a maximum number of backups to retain, where the oldest backup will be discarded to make way for a new backup. This ensures backups do not accumulate. When `dbbackup.timestamp` is false, the name of the directory is controlled using the (-tag:NAME) option, where NAME is the name of the subdirectory where the backups should be written. If the (-tag) option is not defined, backups are written to a subdirectory named "default." If the subdirectory contains a backup for the component, it will be overwritten.

Use the `environment-backup-list` command to list the backups.

Progress Databases

The Progress databases are included in the environment backup. Additional "dbbackup" settings can be used to fine tune the configuration of the Progress database backups, as well as process-level options for enabling after imaging and replication:

```
> yab help dbbackup
> yab help database-backup
```

Compression

Database compression is enabled by default:

```
dbbackup.compress=true
```

On non-Windows platforms, the backup is compressed as it is written. This compression conserves disk space but increases the time it takes to back up the database, including the time required to back up the before image and the time that database operations are suspended when the system is online. The compression can be delayed until after the backup has completed to reduce this delay but requires additional disk space usage.

```
dbbackup.delaycompression=true
```

Compression can be completely disabled:

```
dbbackup.compress=false
```

Environment Restore

An environment restore will include all or some of the following activities:

Order	Command	Description	Environment State	Required
1	environment-data-restore	Restores data from a backup. Backups are located in subdirectories of the directory configured by the `dbbackup.dir` setting. Use the `environment-backup-list` command to list the backups. To restore a specific backup, choose the appropriate subdirectory name using the (-tag:NAME) option, where NAME is the name of the backup subdirectory to restore. If the (-tag) option is not defined, the backup in a subdirectory named "default" will be restored if it exists, otherwise an error will be raised. A backup may include data for multiple components and the `environment-restore` will restore all of the components.	Stopped ** Stops the environment if it is started.	Always
2	(none)	Rolls forward Progress AI extents. When After Imaging is enabled on a Progress database, the database can be restored to a point in time after the restored backup using roll forward recovery. Roll forward recovery must be done immediately after restoring the data from a backup to prevent changes to the database that would invalidate the recovery. If the After Imaging archiver is used to archive AI extents, YAB will move archived AI files from the directory configured by `dbbackup.INSTANCE.archivaldir` to the backup to which they belong when backups are taken (use 'dbbackup.movearchivedaifiles=false' to disable moving archived AI files). YAB does not provide commands to perform roll forward recovery. Consult the Progress documentation for instructions on restoring AI extents.	Stopped	Optional Use roll forward recovery to restore a database to a point in time after the backup.
3	database-security-reapply	Applies Progress database security configuration.	Stopped ** Starts database servers temporarily to apply SQL security configuration.	Optional Use *database-security-reapply* to apply the Progress database security configuration to the restored databases. This step can be skipped when a full update will be run because *database-security-reapply* is a subset of an *update*.
4	environment-data-sync	Synchronizes data to ensure components are in a consistent state.	Started ** Starts the environment if it is stopped.	Always
5	update	Applies all configuration.	Stopped/Started ** Stops the environment if it is started and then starts the environment.	Recommended Use *update* to apply the application configuration to the restored application components. For example, an update must be run if the OS account configured for the .NET UI (netui.telnet.user) is different from what is recorded in the restored backup. Running an *update* is required if the backup being restore is from another environment/host or if the environment configuration may have changed since the backup was made.

This is an example of restoring an environment from a timestamped backup (20161121141126) that includes activity 1, 4, and 5:

```
> yab -tag:20161121141126 environment-data-restore
> yab environment-data-sync
> yab update
```

If the backup is from another environment and was copied to the destination environment you can use "dbbackup.dir" as a request parameter to help locate the backup. For example, if the backup was stored in the directory "/dr01/backups /production/20161121141126" use (-dbbackup.dir) to locate the base directory that contains the backup (/dr01/backups /production) and then (-tag) to specify the backup within that directory (20161121141126):

```
> yab -dbbackup.dir:/dr01/backups/production -tag:20161121141126 environment-data-restore
> yab environment-data-sync
> yab update
```

As a convenience, the *environment-restore* process combines an *environment-data-restore* (activity 1) and an *environment -data-sync* (activity 4) and could be used in situations where you know that a backup accurately reflects the current application configuration, for example, when restoring a backup that was recently taken in the same environment.

```
> yab -tag:20161121141126 environment-restore
```

Configuration Backups

The system automatically creates backups of the configuration when it changes and passes validation. The backups are stored in the work directory:

```
> ls -lt build/work/system/config/
total 80
drwxr-xr-x. 3 wtb devel 4096 Mar 26 11:43 current/
drwxr-xr-x. 3 wtb devel 4096 Mar 26 11:43 2018-03-26T11-43-36/
drwxr-xr-x. 3 wtb devel 4096 Mar 26 11:39 2018-03-26T11-39-20/
drwxr-xr-x. 3 wtb devel 4096 Mar 22 12:36 2018-03-22T12-36-39/
drwxr-xr-x. 3 wtb devel 4096 Mar 22 11:44 2018-03-22T11-44-46/
drwxr-xr-x. 3 wtb devel 4096 Mar 22 08:21 2018-03-22T08-21-03/
drwxr-xr-x. 3 wtb devel 4096 Mar 13 11:25 2018-03-13T11-25-42/
drwxr-xr-x. 3 wtb devel 4096 Mar 12 15:36 applied/
drwxr-xr-x. 3 wtb devel 4096 Mar 12 15:36 2018-03-12T15-36-31/
```

The "current" backup represents the last known good configuration. When a new backup is created, the files in the "current" backup are moved into a timestamp directory to make way for the new backup. The "applied" backup stores the configuration of the system during the last successful update. The `system-config-list` command provides a convenient way to list all of the backups (excluding "current" and "applied").

```
> yab system-config-backup-list
2018-03-26T11-43-36
2018-03-26T11-39-20
2018-03-22T12-36-39
2018-03-22T11-44-46
2018-03-22T08-21-03
2018-03-13T11-25-42
2018-03-12T15-36-31
```

The `system-config-restore` command can be used to restore a configuration backup, but it is not useful if the configuration is so broken that a YAB session cannot be started. For this reason, it is recommended that backups should be restored using the YAB client startup option (-config-restore) which can repair the configuration before starting a YAB session.

When used without a value, it will restore the last known good configuration backup (current).

```
> yab -config-restore
```

Alternatively a specific backup to restore can be specified by name:

```
> yab -config-restore:2018-03-26T11-43-36
```

If any configuration files are updated or removed by restoring the backup, copies of the files are stored in an archive in the current working directory.

```
> yab -v -config-restore:2018-03-26T11-43-36
...
2018-03-26 12:24:21,435 DEBUG [main] Main - Restored [/qad/sbox/004/user/wtb/01/sm1/build/work
/system/config/2018-03-26T11-43-36/system/loader.properties] to [/qad/sbox/004/user/wtb/01/sm1
/build/config/system/loader.properties].
2018-03-26 12:24:21,454 DEBUG [main] Main - Restored the configuration from [/qad/sbox/004/user
/wtb/01/sm1/build/work/system/config/2018-03-26T11-43-36] and archived modified and removed
configuration files to [config-20180326122421.zip].
```

Data (Native Format)

Overview

Data that is dumped using the Progress Data Dictionary in text (*.d) or binary (*.bd) format can be loaded into the environment using the `data` configuration type.

Loading Data

Loading a set of .d format data files is as easy as selecting the data files to load and the destination database.

Ex. Configure the environment to load the .d data files in the test directory.

build/config/configuration.properties

```
data.test.dir=/qad/sandbox/user/wtb/02/sc2-whole/test
data.test.includes=*.d
data.test.database=db.qadadm
data.test.format=dotd
```

With the preceding configuration, the .d data files would be processed during the `database-qadadm-data-dotd-update` step in an `update`.

To load binary format data set the `binary` setting on the data instance to true.

build/config/configuration.properties

```
data.test.binary=true
```

Data (XML Format)

Overview

Traditionally Progress data is dumped to the file system using the Progress Data Dictionary in text (*.d) or binary (*.bd) format. These "DOTD" files can be loaded back into the same environment or into another environment using the Progress Data Dictionary again to do the work. Progress also supports dumping and loading data in XML format by leveraging ProDataSets. Whereas the DOTD data format is still the format of choice for large data sets, redistributing data in XML format has certain advantages for small and medium size data sets.

Advantages of XML Data

Update/Delete Support

A DOTD file can only be used to add records to the database. If a record exists, the Progress Data Dictionary will raise an error and subsequent records in the file will not be processed (unless the error threshold is configured to ignore these errors). Likewise there is no way to remove a set of records using the Progress Data Dictionary. In YAB an XML data file can be processed in a mode where it will add records that do not exist and update records that do exist, a mode where they will be added but not updated, and a mode where the corresponding records will be removed from the database if they exist.

Portability

XML data files are always dumped/loaded using a standard encoding (UTF-8). Date values and decimal values are represented using standard XML Schema Definition types, so there is no concern over differences in the Progress startup parameters (mdy, yy, numsep, numdec) used to dump and to load the data.

Flexibility

The Progress Data Dictionary dumps all records and all fields from a single table into a DOTD file. In YAB it is possible to join tables (e.g Order to Order Lines), filter records, and select fields to dump into an XML data file.

Human Readable

XML data files are easier to read and edit because the document format includes schema information whereas the dotd format is positional.

Diff/Patch Support

YAB provides support for comparing XML data files to show differences in terms of record adds and deletes and field updates (diff). These differences can be merged into another XML data file (patch).

Loading Data

The `data` configuration type is used to configure data to be loaded into an environment. This type can be used to load XML as well as binary and text dotd files. Loading a set of XML data files produced in a YAB environment is as easy as selecting the data files to load and the destination database.

Ex. Configure the environment to load the XML data files in the test directory.

build/config/configuration.properties

```
data.test.dir=/qad/sandbox/user/wtb/02/sc2-whole/test
data.test.includes=*.xml
data.test.database=db.qadadm
data.test.format=xml
```

With the preceding configuration, the XML data files would be processed during the `database-qadadm-data-xml-update` step in an `update`.

Managing Data

YAB provides the following commands for working directly with XML data. Review the help to see how they work (yab help <command>).

Command	Description
data-xml-dump	Dumps data from a database into XML data files.

data-xml-load	Loads XML data files into a database.
data-xml-diff	Compares two data files for differences.
data-xml-patch	Applies a diff to a data file.

Managing System Data

YAB also provides a set of commands that are designed to support the development and redistribution of system data. The definition of system data entities is configured by the `dev-data` configuration type and comes pre-configured with support for the standard system data entities.

Command	Description
dev-data-snapshot	Creates a "snapshot" by dumping all system entities to a new timestamped directory.
dev-data-diff	Compares the most recent snapshot to the database or any two snapshots.
dev-data-patch	Compares the most recent snapshot to the database or any two snapshots and applies the differences to a directory of data files.
dev-data-list	Lists the snapshots.
dev-data-clear	Deletes all snapshots.
dev-data-entity-list	Lists the configured data entities.

To add support for an additional table/entity create a new dump request (see the help for data-xml-dump) and then append the dump request to the configured system data entities.

Ex. Adding support to dump records from the table *chui_det*.

dump-chui_det.xml

```
 <Entity>
    <Dataset>
        <DatasetName>chui_det</DatasetName>
        <Table>
            <TableName>chui_det</TableName>
        </Table>
    </Dataset>
</Entity>
```

build/config/configuration.properties

```
# @append
dev-data.databases.qadadm=/qad/sandbox/user/wtb/ee/dump-chui_det.xml
```

Update Statistics

All Progress databases that support SQL clients have a command to call the Progress UPDATE STATISTICS program to generate statistical data that can help the SQL query optimizer make more intelligent choices.

```
yab database-INSTANCE-update-statistics
```

The command should be called periodically as the underlying data changes.

The behavior of the command can be fine tuned with database settings.

```
yab config-help db.updatestatistics
```

Compiling Source Code

Progress source code is compiled using *code* commands where the INSTANCE identifies a specific compile configuration:

`code-INSTANCE-update`

To list the compile instances:

```
yab -instances config code
```

Ex. Compile standard operational source code:

```
> yab code-mfg-update
```

Ex. Compile customized operational source code:

```
> yab code-mfg-customizations-update
```

The compile is an *incremental compile* which means files will only be recompiled if they have changed, or a resource on which they depend, has changed. When a file is recompiled a message is written to the log explaining why the file was recompiled.

The incremental compile uses Progress compile XREF files to understand program dependencies, however Progress does not support generating XREF files for encrypted programs. The default configuration will recompile a file if it is encrypted or if it depends on a file that is encrypted. This strict approach to correctness ensures that all source code changes are processed. (Consider an example where the unencrypted program A includes the encrypted file B. We know if A or B has changed, but we do not know that B depends on the changed file C, because we cannot get dependency information for B.)

See Compile for Developers for techniques to streamline compiles in development environments.

You can force a full recompile using the (-force) option:

```
> yab -force code-mfg-update
```

The (-nocompile) option can be used to see what programs would be compiled without actually compiling the programs:

```
> yab -nocompile code-mfg-update
```

The r-code will be written into the directory configured by the "dir" setting, with the same propath relative directory structure as the source file.

```
code.mfg.dir=/dr01/qadapps/qea/dist/mfg
code.mfg.propath=/dr01/qadapps/qea/build/catalog/packages/mfg/2019/0/19/819/src,...
```

So for example when the source file "/dr01/qadapps/qea/build/catalog/packages/mfg/2019/0/19/819/src/us/mp/mpmpmt.p" is compiled, the r-code is written to the file "/dr01/qadapps/qea/dist/mfg/us/mp/mpmpmt.r".

The "removeorphanedrcode" option on the compile will automatically delete r-code that cannot be associated with any source code when the code is compiled. For example is "someprogram.p" was compiled into "someprogram.r" at some point in time and then later "someprogram.p" was removed, "someprogram.r" would be deleted the next time the code was compiled.

```
code.mfg.removeorphanedrcode=true
```

If you are on a system with multiple cores, the performance of the compile may be improved by allocating more threads to the compile.

```
code.mfg.threads=4
```

Configuring Compiles

Progress source code compilation is configured through instances of the *code* configuration type:

`code.INSTANCE`

Ex. Configuration of the standard operational compile:

```
> yab config "code.mfg.*"
code.mfg.databases=db.qadcpl,db.qadadm,db.qadhlp,db.qadrcode
code.mfg.defaultincludes=**/*.p,**/*.w,**/*.t,**/*.cls
code.mfg.dir=/qad/sbox/001/user/wtb/rfrd-4117/dist/mfg
code.mfg.failonerror=true
code.mfg.languages=us
code.mfg.params=-T /tmp -d mdy -yy 1950 -s 32768 -mmax 8192 -inp 32000 -rereadnolock -c 30 -D
1000 -Bt 350 -nb 200 -h 25 -tok 4096 -tmpbsize 8 -TB 31 -TM 32 -cpstream utf-8 -cpinternal utf-8 -
cprcodeout utf-8 -cpcoll ICU-UCA -cpcase basic
code.mfg.propath=/qad/sbox/001/user/wtb/rfrd-4117/patches/fin/proxypatch,/qad/sbox/001/user/wtb
/rfrd-4117/patches/mfg/default/src,/qad/sbox/001/user/wtb/rfrd-4117/build/work/archiving/mfg
/progress/xrc,/qad/local/sandbox/cache/packages/mfg-ee2016-patch/2016/0/16/440/src,/qad/local
/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src,/qad/local/sandbox/cache/packages/mfg-ee2016
/2016/0/16/209/src/validation,/qad/local/sandbox/cache/packages/base-api/1/1/0/79/src,/qad/local
/sandbox/cache/packages/mfgcoreplus-api/2/17/0/15/src,/qad/local/sandbox/cache/packages/qracore-
api/2/17/0/32/src,/qad/local/sandbox/cache/packages/requisition-api/1/1/0/91/src,/qad/local
/sandbox/cache/packages/fin-src-proxy/2016/0/80/18
code.mfg.removeorphanedrcode=true
code.mfg.sources.archiving.dir=/qad/sbox/001/user/wtb/rfrd-4117/build/work/archiving/mfg/progress
/xrc
code.mfg.sources.main.dir=/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src
code.mfg.sources.main.excludes=**/gpsc02.p,**/urltempl.p,**/utdznnc.p,**/wbqu01.p,**/wbqu02.p,**
/wbqu03.p,**/utsequp1.p,**/lvcntora.p,**/gpbrncha.p
code.mfg.sources.main.extra.excludes=encoding.dat,locale.dat
code.mfg.sources.main.extra.includes=*.dat,*.ini,version.mfg,**/*.i
code.mfg.sources.mfg-patch.dir=/qad/local/sandbox/cache/packages/mfg-ee2016-patch/2016/0/16/440
/src
code.mfg.sources.mfg-patch.excludes=**/gpsc02.p,**/urltempl.p,**/utdznnc.p,**/wbqu01.p,**/wbqu02.
p,**/wbqu03.p,**/utsequp1.p,**/lvcntora.p,**/gpbrncha.p
code.mfg.sources.patches-default.dir=/qad/sbox/001/user/wtb/rfrd-4117/patches/mfg/default/src
code.mfg.threads=1
```

To print the documentation for all *code* settings:

```
> yab config-help "code"
```

Compile for Developers

The default compile configuration chooses strict correctness over efficiency. In development environments, the default configuration can slow down iterative development as developers wait for compiles. This penalty is much greater when compiling source code that is encrypted or partially encrypted. In development environments, the balance between correctness and efficiency can be adjusted to boost developer productivity, while also providing the ability to more completely validate a change at the end of a development cycle before promoting the change to non-development environments.

Enabling Developer Optimizations

The dev setting on the code instance is used to enable developer optimizations.

Ex. Configure the compile of customized operational source code for development.

```
code.mfg-customizations.dev=true
```

The dev setting is a "convenience" setting that implies the following settings (see yab help "code." for details on each of these settings) :

```
forceencrypted=false
scan=false
removeorphanedrcode=false
skipbeforeimagetruncation=true
nometa=true
```

Developers on multi-core servers might also experiment with the threads setting to see if it improves performance.

The dev option disables the incremental compile (nometa=true). The compile will recompile ALL source code unless the scope of the compile is defined (see below).

Controlling Compile Scope

The developer has two options to control the scope of a compile.

Single Source Compile

A compile is associated with one or more "sources" (see yab -instances config code.INSTANCE.sources). Commands are provided to compile each source individually.

Ex. List the compile commands associated with the customized operational source code compile:

```
> tree -d -L 2 customizations/mfg/
customizations/mfg/
|-- another |
|-- data |
    `-- src
    `-- default
|-- data
    `-- src

> yab -all help code-mfg-customizations

PROCESSES

     code-mfg-customizations-customizations-default-update     Recompiles 'mfg-customizations:
customizations-default' source code.
     code-mfg-customizations-locate                            Locates files associated with a
compile.
     code-mfg-customizations-rebuild                           Removes and recompiles all 'mfg-
customizations' code.
     code-mfg-customizations-remove                            Removes all 'mfg-customizations'
compiled code.
     code-mfg-customizations-update                            Recompiles all 'mfg-
customizations' source code.
```

Following the previous example, if the "default" source and the "another" source do not contain overlapping files then the following commands can be used to limit the scope of the compile to either source:

Source	Command
default	code-mfg-customizations-customizations-default-update
another	code-mfg-customizations-customizations-another-update

These compile commands can be quite long. You can define an "alias" for any command to shorten the name.

build/config/configuration.properties

```
process.alias1.id=cpld
process.alias1.depends=code-mfg-customizations-customizations-default-update
process.alias2.id=cpla
process.alias2.depends=code-mfg-customizations-customizations-another-update
```

```
> yab cpld

                                cpld (1 task)
-------------------------------------------------------------------------------
1/1 code-mfg-customizations-customizations-default-update   OK (0.406 s)
-------------------------------------------------------------------------------

BUILD SUCCESSFUL (9.373 s)
```

The Progress compile must be invoked using PROPATH relative paths to locate the files to compile (compiling with absolute paths produces different results). A single source compile may reference a file outside of the source if another source has a different version of the file and is higher on the compile PROPATH.

Compile List

A compile list may be provided to define the scope of the compile using the `devlist` setting.

The compile list may be configured:

```
code.mfg-customizations.devlist=${customizations.mfg.dir}/dev-compile.lst
```

Or defined on a per request basis:

```
yab -code.mfg-customizations.devlist:dev-compile.lst code-mfg-customizations-update
```

The compile list should enumerate the source code files to compile (one per line) using relative paths resolved against the compile PROPATH.

When the `devlist` setting is defined, the `compilelist` and `sources` settings associated with the compile are ignored.

Validating Changes

Changes that are validated with developer optimizations enabled should be re-verified with developer optimizations disabled and without any limitations on the scope of the compile. This validation ensures that the state of the system can be reliably reproduced in non-development environments and is not dependent on partial or incomplete compilation of the source code. If the `devlist` setting was configured it should be disabled for this verification.

Ex. Compile the customized operational source code with development optimizations disabled.

```
> yab -code.mfg-customizations.dev:false code-mfg-customizations-update
```

Locating Compile Resources

Every compile has a locate command to locate compile resources. The command lists resources alphabetically ordered by their relative path from the compile propath and secondarily in the order in which they are located on the compile propath. Files with the same relative path (overrides) are listed together, and in the case of source code files, the first file listed is the file that will be compiled.

Ex. Locate all standard/patched operational source code files.

```
> yab code-mfg-locate
File
Modified             Hash                              Enc
----
--------             ----                              ---
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/applhelp.
p                                                      2016-02-26 02:01 AM
ed641e4af8dc9beadb95ee3653a15e    No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/com/qad/data/BufferFieldMap.
cls                                 2016-02-26 02:01 AM  d8b01e1b613831dcba3e7a1023f97     No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/com/qad/data/BufferMap.
cls                                      2016-02-26 02:01 AM  7db1375cb2cab19ca5e370ed3b32f77   No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/com/qad/data/CamelCaseMap.
cls                                    2016-02-26 02:01 AM  3022bd84e174b96c195c22ad3e13db7   No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/com/qad/data/DatasetFieldMap.
cls                                  2016-02-26 02:01 AM  dd355c363bbe811e57e71a05b44268e   No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/com/qad/data/IBufferFieldMap.
cls                                  2016-02-26 02:01 AM  55e41a7edd8d4ddf2dcb244e82ae1f8   No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/com/qad/data/IBufferMap.
cls                                      2016-02-26 02:01 AM  3d70a402d24d218b650db70b92da848   No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/com/qad/data/IDatasetFieldMap.
cls                                 2016-02-26 02:01 AM  58189519c8294e7d5122a45f9e57633a  No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/com/qad/data/PassThruFieldMap.
cls                                 2016-02-26 02:01 AM  c230af26d9fab58d98a0f529e4cb542   No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/com/qad/erp/Logger.
cls                                           2016-02-26 02:01 AM
687f329856a9a11e3257cb83a05a70e3  No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/com/qad/erp/api/APIDispatcher.
p                                   2016-02-26 02:01 AM  4c92a1f73780cf8dbeb1243a18b22f31  No
...
```

Ex. List all standard/patched versions of the operational file 'us/lv/lvgenpl.p'.

```
> yab code-mfg-locate us/lv/lvgenpl.p
File
Modified             Hash                              Enc
----
--------             ----                              ---
/qad/local/sandbox/cache/packages/mfg-ee2016-patch/2016/0/16/390/src/us/lv/lvgenpl.p  2016-08-15
03:00 PM  70dcebdf43f54a6a87d1c309ce34b5c   No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/us/lv/lvgenpl.p        2016-02-26
02:01 AM  efedbbd6be2539ee85de2317f77d4543  No
```

Ex. Compare files where there is a mixture of encrypted and unencrypted versions.

```
> yab -xcode code-mfg-customizations-locate us/gp/gpumxr.p
File
Modified             Hash (X)                         Enc
----
--------             --------                         ---
/qad/sandbox/user/wtb/02/sc2/customizations/mfg/default/src/us/gp/gpumxr.p      2016-09-07 09:16
AM  f550e03f398f91865eeac72432cf4c   Yes
/qad/local/sandbox/cache/packages/qrabridge-erp/1/2/0/60010/src/us/gp/gpumxr.p  2016-08-18 05:01
AM  f550e03f398f91865eeac72432cf4c   No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/us/gp/gpumxr.p   2016-02-26 02:01
AM  9e5aa3b1570e18a9e29d63fb23c8259  No
```

Ex. List all overridden standard/patched operational source code files.

```
> yab -overrides code-mfg-locate
File
Modified            Hash (X)                        Enc
----
--------            --------                        ---
/qad/local/sandbox/cache/packages/qrabridge-erp/1/2/0/60010/src/mfaspl.p              2016-08-18
05:01 AM  1ebae0fda23174c011f158b8b3f55ab   No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/mfaspl.p               2016-02-26
02:01 AM  1890d46f68d68fc11d81754dd7461e4e  No
/qad/local/sandbox/cache/packages/qrabridge-erp/1/2/0/60010/src/mfinitpl.p            2016-08-18
05:01 AM  ff7090368537cec049e61b111fd77     No
/qad/local/sandbox/cache/packages/mfg-ee2016-patch/2016/0/16/390/src/mfinitpl.p       2016-08-15
03:00 PM  c343d68da2b5e82a43892add57614f4   No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/mfinitpl.p             2016-02-26
02:01 AM  eb1277faca8f9e7c2b0a6c51abf1e5b   No
/qad/local/sandbox/cache/packages/qrabridge-erp/1/2/0/60010/src/mflg01.p              2016-08-18
05:01 AM  fb76dfb98491c9d9e776855b7c2b      No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/mflg01.p               2016-02-26
02:01 AM  a32453afead3b5f47918648844825484  No
/qad/local/sandbox/cache/packages/qrabridge-erp/1/2/0/60010/src/mfsessmg.p            2016-08-18
05:01 AM  5425640156b5b6860bb575a9a24686d   No
/qad/local/sandbox/cache/packages/mfg-ee2016-patch/2016/0/16/390/src/mfsessmg.p       2016-08-15
03:00 PM  d03ebf11851b7f2cfcd4b8691dbaf619  No
/qad/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/mfsessmg.p             2016-02-26
02:01 AM  57b3b2a79c1a51465460d55ef839de    No
...
```

Ex. List overridden standard/patched operational source code files, where the overriding file (the file that has won) is not distributed in a package.

```
> yab code-mfg-locate -overrides -skip-packages
File
Modified            Hash (X)                        Enc
----
--------            --------                        ---
/dr01/qadapps/sm2/patches/mfg/default/src/us/wo/wotrantt.
i                                                                 2019-01-14 11:53 AM
ffe51d3e7d8297237588704eeddc6ab2  No
/dr01/qadapps/sm2/build/catalog/packages/pushproduction/1/2/0/189/qad.pushproduction/code/progress
/mfg/us/wo/wotrantt.i  2018-09-25 03:09 PM  8a214e78837878e76e395ec6eb2dd     No
/dr01/qadapps/sm2/build/catalog/packages/mfg/2018/0/18/711/src/us/wo/wotrantt.
i                                       2015-01-16 12:57 PM  82af8ce259d671fd9e17cdf2eebb50
No
```

Ex. Record a specific override as resolved.

```
> yab -resolve code-mfg-customizations-locate us/gp/gpumxr.p
```

Ex. Record all overrides as resolved.

```
> yab -resolve code-mfg-customizations-locate
```

The command help has further information.

```
> yab help code-mfg-locate
```

It is also possible to search for a file in all compiles by not specifying an instance.

```
> yab code-locate foo.p
```

Generating XREF output

Progress XREF files in XML format are produced when a program is compiled to support the incremental compiler. Normally the XREF files are deleted after they are processed to conserve on disk space usage. The `keepxref` setting instructs the compiler to not delete the XREF files.

Ex. Retain XREF files generated during the operational compile.

build/config/configuration.properties

```
code.mfg.keepxref=true
```

Ex. Recompile all operational code to force the generation of XREF files for all programs.

```
> yab -force code-mfg-update
```

The XREF files are generated into the directory where the rcode is written.

`[RCODE DIRECTORY]/.meta/xref`

Ex. XREF for the operational source us/bm/bmasiq.p

`dist/mfg/.meta/xref/us/bm/bmasiq.p`

XREF output will only be generated for programs that are not encrypted.

Generating DEBUG-LIST output

You can configure DEBUG-LIST output to be generated when a specific set of programs are compiled or when all programs are compiled.

Ex. Configure DEBUG-LIST output for the operational program 'us/bm/bmasiq.p'.

```
code.mfg.debuglist.includes=us/bm/bmasiq.p
```

Ex. Configure DEBUG-LIST output for all the operational programs in the 'us/bm' directory.

```
code.mfg.debuglist.includes=us/bm/*
```

Ex. Configure DEBUG-LIST output for all operational programs.

```
code.mfg.debuglist.includes=**/*
```

Ex. Compile the operational code

```
> yab code-mfg-update
```

The DEBUG-LIST files will be generated into the directory where the rcode is written.

`[RCODE DIRECTORY]/.meta/debug`

Ex. DEBUG-LIST output for the operational source us/bm/bmasiq.p

`dist/mfg/.meta/debug/us/bm/bmasiq.p`

DEBUG-LIST output will only be generated for programs that are not encrypted. All selected programs will be recompiled (even if they have not changed.)

Optional configuration:

Changing the output file extension:

It is also possible to modify the output file extension. The default extension is .p and it can be modified with the following setting:

```
code.mfg.listing.output.extension=.i
```

Compile Databases

The *db.qadcpl* and *db.qadrcode* databases have a special role in some compiles.

Compile Database (db.qadcpl)

The *db.qadcpl* database has the same schema as the *db.qaddb* database, but without any tables or sequences belonging to the QAD Reference Architecture (QRA). Compiles connect the *db.qadcpl* database instead of the *db.qaddb* database to ensure that programs use QRA APIs to access QRA data, and not direct table access. Additionally, the compile database avoids (ambiguous reference) compile errors that may occur when compiling legacy programs with unqualified references to tables, indexes, and fields.

The system will automatically mirror schema configured for the *db.qaddb* database to the *db.qadcpl* database. To prevent this mirroring set "schema.INSTANCE.qra=true".

RCode Database (db.qadrcode)

The r-code database is part of a solution to create a single set of r-code to support all languages, instead of separate r-code for each language.

Generating LISTING output

You can configure LISTING output to be generated when a specific set of programs are compiled or when all programs are compiled.

Ex. Configure LISTING output for the operational program 'us/bm/bmasiq.p'.

```
code.mfg.listing.includes=us/bm/bmasiq.p
```

Ex. Configure DEBUG-LIST output for all the operational programs in the 'us/bm' directory.

```
code.mfg.listing.includes=us/bm/*
```

Ex. Configure LISTING output for all operational programs.

```
code.mfg.listing.includes=**/*
```

Ex. Compile the operational code

```
> yab code-mfg-update
```

The LISTING files will be generated into the directory where the rcode is written.

`[RCODE DIRECTORY]/.meta/listing`

Ex. LISTING output for the operational source us/bm/bmasiq.p

`dist/mfg/.meta/listing/us/bm/bmasiq.p`

LISTING output will only be generated for programs that are not encrypted. All selected programs will be recompiled (even if they have not changed.)

Optional configuration:

When generating the LISTING output file, Progress allows 3 parameters to be passed into the compiler:

APPEND:

Appends the current listing to the contents of the listing file. If you do not use the APPEND option, a new listing file will be created, replacing any file of the same name.

```
code.mfg.listing.append=true
```

PAGE-SIZE:

Identifies the number of lines to a page in the listing file. The value should be an Integer and the default page size is 55. The value must be between 10 and 127, inclusive.

```
code.mfg.listing.page.size=70
```

PAGE-WIDTH

Identifies the number of page columns in the listing file. The value should be an Integer the default page width is 80. The value must be between 80 and 255, inclusive. **The YAB default is set to 92**. If any other value for page width is needed, this can be overwritten with the following property:

```
code.mfg.listing.page.width=90
```

Changing the output file extension:

It is also possible to modify the output file extension. The default extension is .p and it can be modified with the following setting:

```
code.mfg.listing.output.extension=.i
```

Auditing

The topics in this section cover the setup and management of database auditing. Consult the *Auditing* chapter in the *QAD Security Administration Guide* for more information on the configuration of auditing in QAD Enterprise Edition.

- Enable Auditing
- Disable Auditing
- Configuring Audit Permissions
- Importing Policy Files
- Archiving Records
- Configure Archive Database Connection
- Manage Archive Database Server

Some of the steps described in the *Auditing* chapter have been pre-configured as noted below:

QAD Security and Controls Section	Notes
Enabling Auditing for the Database	The databases are all pre-configured with database areas to store auditing data and indexes. See Enable Auditing to enable auditing on databases.
Configuring Database Options and Audit Permissions	The default setup grants audit permissions to the operating system account that created the instance. In a production environment, the guidance in this section would be followed.
Importing Audit Policy	Audit policy files are loaded as described in the *QAD Security and Controls* documentation, but the location of the audit policy files has changed. See Importing Policy Files for more details.
Creating Optional Archive Database	The system is pre-configured with an archive database (qadarc).
Setting Archive Database Connection	See Configure Archive Database Connection and Manage Archive Database Server for more information on connecting to the archive database.
Customizing Archive /Load Scripts	The scripts have been replaced by the commands described in Archiving Records.
Disabling Auditing	See Disable Auditing to disable auditing on databases.
Loading Electronic Signature Initial Data	The data files to load with program E-Sig Initial Data Load (36.12.14.13) are available in the *config/electronic-signature* directory.

Enable Auditing

The preferred way to enable auditing is using the database setting `db.INSTANCE.audit`.

```
db.qaddb.audit=true
```

If auditing is not enabled it will be enabled during an update (or directly by running `database-[INSTANCE]-auditing-update` when the environment is offline). When auditing is enabled on a database, non-primary indexes on auditing tables will be deactivated, except for archive databases (databases whose configuration name contains "qadarc" as in "db.qadarc"), to improve performance and limit the growth of storage areas used by audit data, while supporting reporting on the audit data in the archive database.

Historically YAB supported enabling auditing with an ad-hoc request and continues to do so for backwards compatibility:

```
yab database-[INSTANCE]-auditing-enable
```

YAB will use storage areas named AUDIT_DATA and AUDIT_IDX to store the auditing data and indexes when auditing is enabled. When a database is created by YAB these storage area names are automatically added to the structure of the database. Alternative storage areas may be used by configuring the areas for each database (and ensuring the database has the storage areas defined using Progress *prostrct add*).

```
db.qaddb.audit.area=AUDIT_DATA
db.qaddb.audit.indexarea=AUDIT_IDX
```

Disable Auditing

The preferred way to disable auditing is using the database setting `db.INSTANCE.audit`.

```
db.qaddb.audit=false
```

If auditing is enabled it will be disabled during an update (or directly by running `database-[INSTANCE]-auditing-update` when the environment is offline).

Historically YAB supported disabling auditing with an ad-hoc request and continues to do so for backwards compatibility:

```
yab database-[INSTANCE]-auditing-disable
```

Configuring Audit Permissions

Audit permissions are configured through `db.INSTANCE.audit.auth.NAME` settings.

```
> yab help db.INSTANCE.audit.auth.NAME

SETTINGS

     db.INSTANCE.audit.auth.NAME                Used to assign audit permissions to users.

     db.INSTANCE.audit.auth.NAME.users          A comma-delimited list of users.

     db.INSTANCE.audit.auth.NAME.permissions    A comma-delimited list of audit permissions to
assign to the users.

                                                Accepts: audit-administrator, application-audit-
event-inserter, audit-data-archiver, audit-data-reporter
```

Ex. Grant "Audit Administrator" permission to two users and "Audit Archiver" permission to another user.

```
db.qaddb.audit.auth.admin.users=audit-admin1,audit-admin2
db.qaddb.audit.auth.admin.permissions=audit-administrator
db.qaddb.audit.auth.archiver.users=audit-archiver
db.qaddb.audit.auth.archiver.permissions=audit-data-archiver
```

Audit permissions are applied during an update (or directly by running `database-[INSTANCE]-auditing-update`). When permissions are applied, YAB will ensure that the permissions in the database exactly match what is configured, revoking permissions that do not match the configuration. If no permissions are configured, permissions must be manually set up using the Progress data dictionary. Some permissions like "Audit Data Reporter" are used within the application and may be granted to application users.

Importing Policy Files

The *Importing Audit Policy* section in the *QAD Security* documentation has instructions for loading auditing policy files using the program Audit Policy Import (36.12.13.1).

The policy files are available at:

```
config/auditing/policies.xml
config/auditing/qadmainpolicy.xml
```

Archiving Records

Before auditing records can be moved from a source database into the archive database, both the source database and the archive database must have auditing enabled and the user must have the "Audit Data Archiver" permission. The archive will export all audit data in the source database, load the exported data into the archive database, and then delete the exported data from the source database.

To move auditing records from all databases enabled for auditing, execute the command:

```
> yab database-auditing-archive
```

Alternatively to move auditing records out of a specific database, execute the following command, where INSTANCE is the name of the source database:

```
> yab database-[INSTANCE]-auditing-archive
```

Configuration settings that begin with "audit" are used to configure how audit records are handled.

```
> yab config-help audit

SETTINGS

     audit.user                    The Progress database user to archive and report on audit data.

                                   -- Archiving --
                                   The audit user must be defined in the source database and in
the archive database and granted the 'Audit Data Archiver'
                                   permission in each database. For example, the command
'database-qaddb-auditing-archive' moves audit records from the
                                   QADDB database into the archive database (configured by the
'audit.archive.database' setting), requiring (in the
                                   factory default configuration) that the audit user is setup in
the 'db.qaddb' and 'db.qadarc' databases.

                                   -- Reporting --
                                   The system maintains a connection record for the archive
database in Audit DB Maintenance (36.12.13.11). This connection
                                   may be used in application programs such as Audit Trail Report
(36.12.2) to report on audit data. The connection uses
                                   the 'audit.user' and 'audit.password' for the (-U) and (-P)
parameters. The application user that runs the report must
                                   have 'Audit Data Reporter' permissions in the archive
database. The application user does not need to be a Progress
                                   database user.

                                   -- Not Configured --
                                   The 'audit.user' must be configured in an environment where
'db.INSTANCE.security.authentication' is enabled to archive
                                   and report on audit data using the system managed connection.
Otherwise, when the 'audit.user' is not configured, the
                                   'Audit Administrator', 'Audit Data Archiver', and 'Audit Data
Reporter' permissions will automatically be granted to
                                   the OS user when a database is created.

     audit.password                The password for the 'audit.user' account.

     audit.archive.database        The database where archived audit records will be stored.

     audit.archive.dir             The directory where exported audit records will be stored.

     audit.keep.exported.files     Keeps the exported (*.abd) audit records.
                                   NOTE: 'audit.archive.dir' must be configured to retain
exported audit records.

     audit.checkseal               True to verify that the seal of each audit data record matches
the database MAC key prior to writing it to the audit archive file.
                                   This option requires that the audit policies in effect when
writing the audit data records have specified a Data Security Level of DB Passkey.
                                   For more information on creating audit policies and data
security, see OpenEdge Getting Started: Core Business Services - Security and Auditing.

     audit.validate.indexes        When true checks the auditing indexes in the archive database
for corruption and attempts to fix the corruption if any is detected.
```

The help associated with the archive command includes these options as well as a few additional options which typically would be be defined as part of a specific request (e.g. -audit.daterange:"09-07-2005 17:00:00.000-04:00").

```
> yab help database-qaddb-auditing-archive

PROCESS
     database-qaddb-auditing-archive - Moves audit records in the 'qaddb' database to the archive
database.

OPTIONS

     Name                      Description
     -----                     -----------
     audit.daterange           Used to limit the records that will be archived.

                               If one date is specified, all audit records in the database with
a date equal to or earlier than the specified date will be archived.
                               If two dates are specified (separated by a space), all audit
records with a date between the two dates specified, inclusively,
                               will be archived. If a date range is not specified, the system
will archive all audit records equal to or earlier than the current date and time.

                               Dates must be specified using the format "mm-dd-yyyy hh:mm:ss.
sss+hh:mm". For example, to specify 5:00 P.M. on September 7, 2005 EDT, enter "09-07-2005 17:00:
00.000-04:00".

     audit.recs                Specifies the number of records to delete in a single
transaction. The archive executes a transaction for every num-recs records it deletes. The
default for num-recs is 100,
                               and the maximum is your current Lock Table Entries (-L) setting.
The multi-user default for -L is 8192.
...
```

Configure Archive Database Connection

The system maintains a connection record for the archive database in Audit DB Maintenance (36.12.13.11). This connection may be used in application programs such as Audit Trail Report (36.12.2) that report on audit data. The connection uses the *audit.user* and *audit.password* when configured. The application user that runs an auditing report must have "Audit Data Reporter" permission.

Manage Archive Database Server

The database server for the archive database is not configured to start and stop when the environment is started and stopped.

To manually start the archive database server:

```
> yab database-qadarc-start
```

To manually stop the archive database server:

```
> yab database-qadarc-stop
```

This default can be changed with the following configuration setting:

build/config/configuration.properties

```
dbserver.qadarc.manual=false
```

QXtend

- Reapply QXtend Defaults

Reapply QXtend Defaults

An environment is created with the QXtend default configuration. Afterwards specific settings like application server ports may be adjusted during an update but the default configuration is not reapplied because reapplying the default configuration would overwrite any subsequent configuration.

To force the re-application of the default configuration:

```
> yab -qxtend.reconfigure start qxo-services-stop qxtend-default-configuration
```

Key Commands

- clean
- code-mfg-customizations-update
- code-mfg-update
- config
- database-storage-area-resolve
- env-info
- fin-sync-run
- health
- help
- history
- info
- netui-pro-update
- reconfigure
- restart
- shell
- start
- status
- stop
- system-diagnostics
- system-find
- system-package-create
- system-process-list
- system-updates-list
- update
- validate

clean

The *clean* command performs cleanup activities.

- Fixes package corruption problems in the local catalog.
- Removes orphaned packages from the local catalog.
- Clears all restrictions that prevent a package from being re-added to the local catalog.
- Reclaims disk space consumed by deleted packages in the local catalog.
- Removes orphaned package configurations.
- Removes orphaned lock and PID files.

code-mfg-customizations-update

Compiles the operational source code customizations.

Displays the configuration of the operational customizations compile:

```
> yab config code.mfg-customizations.*
```

code-mfg-update

Compiles the standard operational source code including patches.

Displays the configuration of the compile:

```
> yab config code.mfg.*
```

config

The *config* command is used to query configuration settings. The command shows the current configuration and will reflect recent changes even if they have not been applied yet.

```
> yab config adminserver.adminport
adminserver.adminport=22092

> yab config | more
adminserver.adminport=22092
adminserver.conmgr=/dr01/qadapps/qea/build/work/generated/conmgr.properties
adminserver.plugins=/dr01/qadapps/qea/build/work/generated/plugins.properties
adminserver.plugins.jvmargs.property=jvmargs
adminserver.plugins.jvmargs.section=PluginPolicy.Progress.AdminServer
adminserver.plugins.jvmargs.value=-Xmx256m -Djava.awt.headless=true -Dsun.lang.ClassLoader.
allowArra
ySyntax=true -Dserver.start.retryCount=10 -Dserver.start.retryInterval=3
adminserver.port=22001
adminserver.ubroker=/dr01/qadapps/qea/build/work/generated/ubroker.properties
aia._base.controllingnameserver=ns-default
aia._base.host=vmdvr02
aia._base.logfile=/dr01/qadapps/qea/build/logs/.log
aia._base.logginglevel=3
aia.default.allowaiacmds=1
aia.default.context=aia
...

> yab config | grep ssh
netui.connmgr.protocol=ssh
netui.protocol=ssh
netui.telnet.protocol=ssh
qxtend.connmgr.protocol=ssh
```

The (-trace) option is used to understand how a setting was resolved to its current value.

```
> yab -trace config languages
languages

    [1: build/config/configuration.properties]
    languages=us,ge

    [2: build/config/packages/yab-ee-foundation/1/5/0/16/important/yab-ee-foundation.properties]
    languages=us
```

The (-x) option enables a "single line" format where each setting is limited to a single line of the output.

```
yab -x config code.mfg.*
code.mfg.databases=db.qadcpl,db.configurator,db.qadadm,db.qadhlp,db.qadrcode
code.mfg.defaultincludes=**/*.p,**/*.w,**/*.t,**/*.cls
code.mfg.dir=/dr01/qadapps/systest/dist/mfg
code.mfg.failonerror=true
code.mfg.languages=ro,us,ch,cs,cz,du,fr,ge,it,jp,ko,ls,pl,po,tw,us,us
code.mfg.params=-T /tmp -d mdy -yy 1950 -s 32768 -mmax 20408 -inp 32000 -rereadnolock -c 30 -D
1000 -Bt ...
code.mfg.propath=/dr01/qadapps/systest/patches/mfg/default/src,/dr01/qadapps/systest/patches/fin
/proxypa...
code.mfg.removeorphanedrcode=true
code.mfg.sources.advancedselfbilling.dir=/dr01/qadapps/systest/build/work/stage
/advancedselfbilling/qad...
```

The (-instances) option is used to print the instances of a configuration type.

```
> yab -instances config db
db.qadadm
db.qadarc
db.qadcpl
db.qaddb
db.qadhlp
db.qadrcode
db.qxevents
db.qxodb


> yab -instances config appserver
appserver.fin
appserver.mfg
appserver.qra
appserver.qxosi
appserver.qxoui
appserver.qxtnative
```

The search phrase may contain a "*" wildcard to match zero or more characters (and it is generally a good idea to put the phrase in quotes to prevent the shell from interpreting the wildcard character). Here are some additional commands for frequently queried resources:

Command	Description
`yab config openedge.dir`	Display the Progress Runtime (DLC).
`yab config environment.id`	Display the environment ID.
`yab config "package.*"`	Display package settings.
`yab config "*port"`	Display the TCP-IP ports configured.
`yab config "db.*"`	Display database settings.
`yab config "dbserver.*"`	Display database server settings.
`yab config "adminserver.*"`	Display admin server settings.
`yab config "ns.*"`	Display name server settings.
`yab config "appserver.*"`	Display application server settings.
`yab config "ws.*"`	Display webspeed server settings.
`yab config "wsa.*"`	Display web services adapter settings.
`yab config "aia.*"`	Display application internet adapter settings.
`yab config "tomcat.*"`	Display tomcat server settings.
`yab config "webapp.*"`	Display web application settings.
`yab config "code.*"`	Display code compilation settings.
`yab config "*work*dir"`	Display the work directory settings.

The (-show-validation) option is used to list the validation rule that applies to the configuration.

```
> yab -show-validation config code.mfg.dir
code.mfg.dir=/qad/sbox/004/user/sji/01/whole2017/dist/mfg
    (code.mfg.dir: req)


> yab -show-validation config aia.*.logfile
aia._base.logfile=/qad/sbox/004/user/sji/01/whole2017/build/logs/${name}.log

aia.default.logfile=/qad/sbox/004/user/sji/01/whole2017/build/logs/aia-default.log
    (aia.default.logfile: req)    (?aia.default.logfile: parentdir)
```

database-storage-area-resolve

Introduction

The command database-<instance>-storage-area-resolve can provide user an approach to check whether the storage areas assigned to progress database objects matches the configuration and optionally resolve the inconsistencies.

This command can resolve table, index and CLOB/BLOB field storage area inconsistencies between configured schema definition and actual installed database. It will apply the specified configured storage area definition to the installed database after executing with -resolve option.

The table and index storage area are defined in schema definition file(.df) as "AREA <STORAGE_AREA>" under the table or index definition.

The CLOB/BLOB fields storage area are defined in schema definition file(.df) as "LOB-AREA <STORAGE_AREA>" under the field definition.

Furthermore for the storage area, you can find the definitions in the structure file(.st).

Storage Object Type	Need Dump /Load	Comment
table	no	The table storage area inconsistency can be resolved both online and offline.
index	no	The index storage area inconsistency can be resolved both online and offline
CLOB/BLOB field	yes	The CLOB/BLOB field storage area inconsistency must be resolved with offline

For the processing flow, the process will use the existing schema what is in use to create a temporary database(just structure without data loading). Then to use the progress query to compare temporary database and the installed database to list all the inconsistencies as a result.

If the -resolve option is explicitly defined in the command, the process will continue to resolve the inconsistencies as the following processing steps.

For the case resolving CLOB/BLOB fields storage area, it needs dump the current data in the database first. Then drop the table which contains the CLOB/BLOB fields. The schema update process will recreate all the table includes storage area changes after dropping the target table. After the recreation, load back the backup data. Since this scenario needs to dump/drop/load, offline is pre-requisite.

For the case resolving only table storage area, the process will use progress command ***tablemove*** to applied the storage area changes.

For the case resolving only index storage area, the process will use progress command ***idxmove*** to applied the storage area changes.

For the hybrid case(contains both table and index area change), it depends on the target index area is single or multiple. If the target index area is single, we can apply both table and index storage area changes in single one ***tablemove*** comman d instead of processing them separately. If the target index area is multiple, we need to apply all the indexes changes one by one first, then apply table storage area changes after the index area changes applied.

Options

```
Name        Description
-----       -----------
resolve     Correct the inconsistencies listed in report.
            Default: false

tables      A comma-delimited list of tables to evaluate and optionally correct.
            Default: all tables
            Ex. table1,table2
```

Usage & Examples

Default

Option	Default value	Description
`resolve`	false	Only report the inconsistencies. For resolving the inconsistencies, explicitly specified is necessary.
`tables`	all tables	-

Examples

The following examples are using qadhlp as a sample for instance.

In the output report, "Installed" means the object storage area in use and "Configured" means the storage area configured in the schema definition file which maybe still not be applied.

1.only report without applying for all tables.

```
yab database-qadhlp-storage-area-resolve
```

output

```
$ yab database-qadhlp-storage-area-resolve

Table                   Object          Type  Installed  Configured   Dump/Load
-----                   ------          ----  ---------  ----------   ---------
flhd_det                flhd_det        Tbl   HELP       Schema Area  No
flhk_mstr               flhk_keyword    Idx   HELP_IDX   HELP         No
flhk_mstr               flhk_lang       Idx   HELP_IDX   HELP         No
flhm_mst                flhm_call_pg    Idx   HELP_IDX   Schema Area  No
flhm_mst                flhm_lang       Idx   HELP_IDX   HELP         No
qadhlp_ver              oid_qadhlp_ver  Idx   HELP_IDX   Schema Area  No
xd_mstr                 xd_exec         Idx   HELP_IDX   HELP         No
xd_mstr                 xd_nbr          Idx   HELP_IDX   HELP         No
xf_mstr                 xf_field        Idx   HELP_IDX   Schema Area  No
xf_mstr                 xf_pgm          Idx   HELP_IDX   HELP         No


BUILD SUCCESSFUL (47.542 s)
```

2.resolve specified tables storage area inconsistencies.

```
yab database-qadhlp-storage-area-resolve -resolve -tables:flhm_mst,flhd_det
```

output

```
$ yab database-qadhlp-storage-area-resolve -resolve -tables:flhm_mst,flhd_det

Table                   Object          Type  Installed  Configured   Dump/Load
-----                   ------          ----  ---------  ----------   ---------
flhd_det                flhd_det        Tbl   HELP       Schema Area  No
flhm_mst                flhm_call_pg    Idx   HELP_IDX   Schema Area  No
flhm_mst                flhm_lang       Idx   HELP_IDX   HELP         No

All changes applied.


BUILD SUCCESSFUL (5.455 s)
```

env-info

The `env-info` command reports information about the environment.

```
> yab env-info

USER INTERFACES
    Web                                 https://vmlwtb0002.qad.com/clouderp
    Windows                             http://vmlwtb0002.qad.com:22000/qadhome
    Character                           scripts/client-[us,ch,cs,cz,du,fr,ge,it,jp,ko,ls,pl,
po,tw]

LAYOUT
    Logs                                /dr01/qadapps/systest/build/logs
    Databases                           /dr01/qadapps/systest/databases
    Scripts                             /dr01/qadapps/systest/scripts
    Backups                             /dr01/dbs/backup
    Customizations                      /dr01/qadapps/systest/customizations
    Patches                             /dr01/qadapps/systest/patches

ENVIRONMENT
    Name                                test
    Type                                development
    Created                             2020-02-07
    Last Update                         2020-02-07
    Last Configuration Change           2020-03-27
    Online                              yes

PREREQUISITES
    Console                             /dr01/qadapps/yab                       1.11.0.21
    OpenEdge                            /tech/progress/dlc1175_009              11.7.5.9
    Java                                /tech/java/jdk1.8.0_221                 1.8.0.221
    Python                              /tech/python/centos-69/2.7.14/bin/python  2.7.14.0

SERVICES
    CSS                                 http://vmlwtb0002.qad.com:22000/qadcss/cgi-bin/cgiip
/WService=ws-css/lg/lg_login.html
    Desktop                             http://vmlwtb0002.qad.com:22000/qadui
    Platform API Help                   http://vmlwtb0002.qad.com:22000/platform-api
    QXtend Inbound                      http://vmlwtb0002.qad.com:22171/qxi
    QXtend Outbound                     http://vmlwtb0002.qad.com:22171/qxo
    WebSpeed Workshop                   http://vmlwtb0002.qad.com:22000/qadui/cgi-bin/cgiip
/WService=ws-default/workshop

SYSTEM
    Host                                vmlwtb0002.qad.com
    IP                                  167.3.190.30
    CPU                                 4
    OS                                  Linux-3.10.0-693.2.2.el7.x86_64-x86_64-with-centos-
7.4.1708-Core
    /dev/sdd1                           56.62 GB / 68.78 GB (82.3%)
    /dev/sda1                           1.86 GB / 9.71 GB (19.1%)
    /dev/sdb1                           46.76 GB / 98.30 GB (47.6%)
```

fin-sync-run

The *fin-sync-run* command runs Financials synchronization.

Ex. Runs a full synchronization

```
> yab fin-sync-run
```

Ex. Runs a specific topic.

```
> yab -topic:Topic15 fin-sync-run
```

health

The *health* command checks the health of application services.

Health is an extended version of status that includes all status checks, as well as additional in-depth checks. The expectation is that when the environment is started all checks should show a PASS status.

You can check on the health of specific services.

```
> yab health webui
-------------------------------------------------------
1/4  tomcat-webui-status                          PASS
2/4  tomcat-webui-webapp-webshell-external-login  PASS
3/4  tomcat-webui-webapp-webshell-internal-login  PASS
4/4  tomcat-webui-webapp-webshell-status          PASS
-------------------------------------------------------

4 passed 0 failed

BUILD SUCCESSFUL (12.957 s)
```

help

The *help* command displays documentation for commands and configuration settings.

The (-command) option restricts the output to commands and the (-setting) option restricts the output to settings. As a convenience, the `command-help` and `config-help` commands are available to search either domain exclusively.

Attention

The (-command) and (-setting) option are not implemented before YAB 1.9, so if the YAB client version is lower than 1.9. Those options should still be (-c) for command and (-s) for setting.

When executed without any arguments the most important commands are displayed:

```
> yab help

PROCESSES

     clean           Removes temporary files.
     config          Prints configuration settings.
     env-info        Prints environment information.
     help            Prints help for configuration settings and processes.
     info            Prints diagnostic information.
     reconfigure     Updates the environment configuration files.
     start           Starts the environment.
     status          Checks the status of servers.
     stop            Stops the environment.
     update          Updates the environment.
     validate        Validates the environment.
```

If an argument is supplied and it exactly matches the name of a process or a configuration setting, the documentation for that resource will be displayed.

```
> yab help config
 PROCESS
     config - Prints configuration settings.

 DESCRIPTION
     yab config [KEY] [KEY] [KEY]...
     KEY
     The key of the setting(s) to print. The meta character '*' is used to match 0 or more
characters.
     If no keys are defined, all configuration settings with a value are printed, and when (-all)
is
     defined, settings without a value are included as well. When using meta characters, quote the
     argument to prevent the shell from evaluating the meta character.

     Ex. Print the version of the 'qracore' package.

     yab config "packages.qracore.version"

     Ex. Print the version of all packages.

     yab config "packages.*.version"

     Ex. Print all package settings.

     yab config "packages.*"

     Ex. Print all database instances.

     yab -instances config "db"


OPTIONS

     Name                Description
     -----               -----------
     all                 When true includes settings without a value.
                         Default: false

     skip-resolution     When true references are not resolved.
                         Default: false
     remove-unresolved   When true unresolved references are removed.
                         Default: false
     skip-value          When true values will not be printed.
                         Default: false

     instances           When true the "instances" of the key are printed.
                         NOTE: When enabled, meta characters are ignored and the
                         following options are forced (all=true, skip-value=true,trace=false).
                         Default: false

     trace               When true additional information is printed to show how a configuration
setting was resolved.
                         Default: false

     listorder           Used to control how trace output is ordered. By default, trace output is
ordered to match the
                         precedence of configuration files, such that settings defined in higher
precedence files
                         are printed before settings defined in lower precedence files.
                         When (-listorder) is true the output is ordered by the setting.
                         List order is typically useful when tracing on a setting that contains a
list of items,
                         where the order of the items is mainly a function of meta information
(group, grouporder annotations)
                         and not the precedence of the files in which it is defined.
                         Default: false
```

```
> yab help appserver.crm.srvrlogginglevel

SETTINGS

     appserver.srvrlogginglevel     Logging level for messages into the server log file.
                                    0 - No log file written
                                    1 - Error only
                                    2 - Basic
                                    3 - Verbose
                                    4 - Extended
                                    This property can be dynamically updated.  Dynamic changes
affect
                                    both current and new brokers and/or agents.
```

Summary help is displayed for all commands and configuration settings that start with the argument.

```
> yab help database-qaddb

PROCESSES

     database-qaddb-ai-archiver-disable     Disables the AI archiver for the 'qaddb' database.
     database-qaddb-ai-archiver-enable      Enables the AI archiver for the 'qaddb' database.
     database-qaddb-ai-archiver-start       Starts the AI archiver daemon for the 'qaddb'
database.
     database-qaddb-ai-archiver-stop        Stops the AI archiver daemon for the 'qaddb' database.
     database-qaddb-ai-disable              Disables AI on the 'qaddb' database.
     database-qaddb-ai-enable               Enables AI on the 'qaddb' database.
     database-qaddb-ai-list                 Lists AI extents on the 'qaddb' database.
     database-qaddb-ai-status               Checks whether AI is enabled for the 'qaddb' database.
     database-qaddb-ai-switch               Switches to the next AI extent on the 'qaddb'
database.
     database-qaddb-auditing-archive        Moves audit records in the 'qaddb' database to the
archive database.
     database-qaddb-auditing-disable        Disables auditing on the 'qaddb' database.
     database-qaddb-auditing-enable         Enables auditing on the 'qaddb' database.
     database-qaddb-backup                  Creates a backup of the 'qaddb' database.
     database-qaddb-backup-list             Lists the backup tags containing backups of the qaddb
database.
     database-qaddb-backup-mark             Marks 'qaddb' database as backedup.
     database-qaddb-create                  Creates the 'qaddb' database.
     database-qaddb-data-update             Loads data into the 'qaddb' database.
     database-qaddb-index-deactivate        Perform an index deactivate.
     database-qaddb-index-rebuild           Perform an index rebuild.
     database-qaddb-jta-enable              Enable the JTA feature to the 'qaddb' database
     database-qaddb-log-print               Prints the 'qaddb' log.
     database-qaddb-rebuild                 Rebuilds the 'qaddb' database.
     database-qaddb-remove                  Removes the 'qaddb' database.
     database-qaddb-restore                 Restores a backup of the 'qaddb' database.
     database-qaddb-schema-update           Applies schema to the 'qaddb' database.
     database-qaddb-start                   Starts the 'qaddb' database.
     database-qaddb-status                  Checks the status of the 'qaddb' database.
     database-qaddb-stop                    Stops the 'qaddb' database.
     database-qaddb-structure-file-update   Generates the default structure for the 'qaddb'
database.
     database-qaddb-structure-list          Prints the structure of the 'qaddb' database.
     database-qaddb-structure-update        Applies new areas to the 'qaddb' database.
     database-qaddb-structure-validate      Validates the structure configuration for the 'qaddb'
database.
     database-qaddb-table-info              Prints table names and (optionally) the number of
records they contain.
     database-qaddb-truncate                Truncates the before image of the 'qaddb' database.
     database-qaddb-update                  Updates the 'qaddb' database.
     database-qaddb-users                   Lists users connected to the 'qaddb' database.
```

```
> yab help appserver.mfg

SETTINGS

     appserver.agentdetailtimeout                Specifies the timeout value in seconds used for
the asbman

                                                 -agentdetail command. This timeout value will
prevent the asbman /

                                                 wtbman utility from waiting forever for the
agent to respond when

                                                 agent is busy processing a request. Minimum
value is 3 seconds.

     appserver.aia                               The AIA instance to service AIA connections.

     appserver.aiaurl                            The connection URL when AIA is used.

     appserver.allowruntimeupdates               0 - to not allow certain properties to be
dynamically updated

                                                 1 - to allow certain properties to be
dynamically updated

     appserver.appserverkeepalivecapabilities    A comma separated list of keepalive
capabilities the SonicMQ Broker

                                                 Connect Adapter responds with when a client
connects to the Adapter and

                                                 requests the keepalive feature.  Both client
and server must specify

                                                 "allow" to enable the feature.
                                                 denyServerASK  - disables server initiated
keepalive

                                                 allowServerASK - enables server initiated
keepalive

                                                 denyClientASK  - currently unused - for future
development

                                                 allowClientASK - currently unused - for future
development
...
```

To display all commands regardless of visibility use the (-all) option.

```
> yab -all help | more

PROCESSES

     adminserver-log-print                                          Prints the AdminServer log.
     adminserver-plugins-configure                                  Configures the
AdminServerPlugins.property file.
     adminserver-rebuild                                            Rebuilds the AdminServer.
     adminserver-remove                                             Removes the AdminServer.
     adminserver-script                                             Generates scripts to
control the AdminServer.
     adminserver-start                                              Starts the AdminServer.
     adminserver-status                                             Checks the status of the
AdminServer.
     adminserver-stop                                               Stops the AdminServer.
     adminserver-update                                             Updates the AdminServer.
     aia-default-log-print                                          Prints a file.
     aia-default-rebuild                                            Rebuilds the 'default'
internet adapter.
     aia-default-remove                                             Removes the 'default'
internet adapter.
     aia-default-status                                             Checks the status of the
'default' internet adapter.
     aia-default-update                                             Updates the 'default'
internet adapter.
     aia-log-print                                                  Prints the log of all
internet adapters.
     aia-rebuild                                                    Rebuilds all internet
adapters.
     aia-remove                                                     Removes all internet
adapters.
     aia-status                                                     Checks the status of all
internet adapters.
     aia-update                                                     Updates all internet
adapters.
     aim-client-us-update                                           (Re)generates a file.
...
```

history

The *history* command reports on the YAB command history.

The history command parses the *build/logs/yab.log* file and is limited to reporting on the commands recorded in the log file.

Ex. Show recent commands

```
> yab history | tail
122513 2020-01-22 10:33 > yab -v qdoc-qxi-descriptors-update
122525 2020-01-22 10:33 > yab -v -clean qdoc-qxi-descriptors-update
122634 2020-01-22 10:35 > yab -v qxtend-default-configuration
122699 2020-01-22 10:35 > yab config qxtend-
122710 2020-01-22 10:35 > yab help qxtend-
122721 2020-01-22 10:36 > yab qxtend-config-update -v
122788 2020-01-22 10:36 > yab help qxtend-
122799 2020-01-22 10:36 > yab system-process-list qxtend-update
122810 2020-01-22 10:39 > yab config qxtend.stage.dir
```

Help for the command shows additional ways to filter the data by timespan and date.

```
> yab help history

PROCESS
     history - Shows commands from the YAB log file.

DESCRIPTION
     yab history
     yab history [TIMESPAN]

     TIMESPAN
     A timespan of interest (e.g. "2 days" to print commands from the last two days).

     Supports the following time units (upper or lower case):

     MS,MILLISECOND,MILLISECONDS
     S,SECOND,SECONDS
     M,MINUTE,MINUTES
     H,HOUR,HOURS
     D,DAY,DAYS
     W,WEEK,WEEKS

     The date filters expect an ISO date matching the format in the log file.

     Ex. Print all commands.
     yab history

     Ex. Print commands within the last 5 hours.
     yab history 5 hours

     Ex. Print commands from '2020-01-28'.
     yab -date:2020-01-28 history

     Ex. Print commands from '2020-01-28' at 1:00 PM.
     yab -date:"2020-01-28 13" history

     Ex. Print commands starting from '2020-01-28'.
     yab -start-date:2020-01-28 history

     Ex. Print commands starting from '2020-01-28' until '2020-01-31'.
     yab -start-date:2020-01-28 -end-date:2020-01-31 history

OPTIONS

     Name                        Description
     -----                       -----------
     date                        A specific date (or time) to show commands from (e.g. '2020-01-
28' or '2020-01-28 13:09').

     start-date                  The date (or time) at which to start showing commands (e.g.
'2020-01-28' or '2020-01-28 13:09').

     end-date                    The date at which to stop showing commands (e.g. '2020-01-28'
or '2020-01-28 13:09').

     s                           Shows the summary log entries for commands (e.g. 'BUILD
SUCCESSFUL' or 'BUILD FAILED').

     x                           Filters out "noise" commands like "config" and "help" that can
get in the way of analysis.

     h                           Highlight important commands like "install" and "update".

     file                        The log file to report on.

                                 Default: build/logs/yab.log

     system-history.exclude      A comma-delimited list of command arguments to filter out
commands when (-x) is enabled.

     system-history.highlight    A comma-delimited list of command arguments to highlight when (-
h) is enabled.
```

info

The *info* command displays the packages configured in an environment. The command shows the current configuration and will reflect recent changes even if they have not been applied yet.

The main display includes the following columns:

Column	Description
1	The package name.
2	The product version.
3	The location of the package. local — Local software catalog remote — Remote software catalog disabled — A disabled package. devel — An unreleased developer package.
4	Will have the value of *(new)* for all configured packages that have not been applied with a successful update .

```
> yab info

INSTANCE

/dr01/qadapps/qea

MODULES

|- archiving                                          1.0.0.78       local
|- assistance-help-ee                                 2017.0.0.3     local
|- base-api                                           1.1.0.79       local
|- fin                                                2017.0.17.536  local
|- fin-apidoc                                         2017.1.80.5    local
|- fin-bin64-proxy                                    2017.1.80.5    local
...
```

Use the (-depth) option to show the sub-components of an app.

```
> yab info

INSTANCE

/dr01/qadapps/qea

MODULES

...
|- yab-ee-app                                         1.6.0.18       local
   |- yab-conv                                        1.6.0.8        local
   |- yab-core                                        1.6.0.17       local
      |- dde-ant                                      2.5.0.1        local
      |- dde-build                                    2.5.0.122      local
      |- dde-core                                     2.5.0.4        local
      |- dde-registry                                 2.5.0.3        local
      |- qpm                                          3.0.0.10       local
      |- yab                                          1.6.0.56       local
      |- yab-client                                   1.6.0.56       local
      |- yab-install                                  1.6.0.35       local
      |- yab-test                                     1.6.0.1        local
   |- yab-ee-foundation                               1.6.0.116      local
   |- yab-qra                                         1.6.0.52       local
   |- yab-qxtend                                      1.6.0.48       local
```

The output when a sub-component is overridden with a different version (dde-build-2.5.0.122 => dde-build-2.5.0.122).

```
> yab info

INSTANCE

/dr01/qadapps/qea

MODULES

...
|- yab-ee-app*                                  1.6.0.18       local
   |- yab-conv                                  1.6.0.8        local
   |- yab-core*                                 1.6.0.17       local
      |- dde-ant                                2.5.0.1        local
      |- dde-build* (2.5.0.122)                 2.5.0.123      local  (new)
      |- dde-core                               2.5.0.4        local
      |- dde-registry                           2.5.0.3        local
      |- qpm                                    3.0.0.10       local
      |- yab                                    1.6.0.56       local
      |- yab-client                             1.6.0.56       local
      |- yab-install                            1.6.0.35       local
      |- yab-test                               1.6.0.1        local
   |- yab-ee-foundation                         1.6.0.116      local
   |- yab-qra                                   1.6.0.52       local
   |- yab-qxtend                                1.6.0.48       local
```

The -more option will include more detailed information.

Ex.

```
> yab -more info
```

netui-pro-update

Compiles the Desktop source code including customizations and patches.

Displays the configuration of the Desktop compile:

```
> yab config netui.pro.*
```

reconfigure

The *reconfigure* command may be used to apply some configuration changes as an alternative to an update. The *reconfigure* command is significantly faster than an *update* and will not restart the environment, but some configuration changes may not have an effect until the environment is restarted.

```
yab reconfigure
```

Unfortunately there is not a simple rule describing when *reconfigure* may be used instead of an *update* and like an *update*, the activities associated with a *reconfigure* are continually evolving. In general, a *reconfigure* is reserved for pushing out small configuration changes (i.e regenerating scripts after increasing the value of a setting) and not major structural changes like adding a new database, applying schema, or upgrading a product.

One technique for understanding where reconfigure can be used is to compare the processes associated with each command.

```
> yab system-process-list reconfigure
> yab system-process-list update
```

Test the use of *reconfigure* to apply a specific change in a non-production environment first.

Changes that can only be applied when a service is running may not be applied when the environment is offline.

restart

The *restart* command executes an environment stop followed by an environment start.

shell

The *shell* command starts an interactive shell in which commands can be entered and executed with TAB auto-completion. The shell is useful for learning commands.

Starting Shell

```
> yab shell
** CTRL-D to exit the shell **
enterprise-edition>
```

The shell prompt (test in the example) is set to the value of the *environment.id* setting:

```
enterprise-edition> config environment.id
environment.id=enterprise-edition
0.705 s
enterprise-edition>
```

Executing Commands

In the shell the TAB key will show possible completions for the text entered and when only one possible completion exists will automatically fill in the remaining characters.

```
enterprise-edition> m
metadata-fincore-update          metadata-mfgcoreplus-update      metadata-qracore-update
metadata-update                  metadata-validate                module-adg-stage
module-adg-update                module-archiving-stage           module-archiving-update
module-cmr-stage                 module-cmr-update                module-ctd-stage
module-ctd-update                module-fin-stage                 module-fin-update
module-fincore-update            module-fss-stage                 module-fss-update
module-grs-stage                 module-grs-update                module-kanban-stage
module-kanban-update             module-ltwb-stage                module-ltwb-update
module-mfg-stage                 module-mfg-update                module-mfgcoreplus-update
module-mrc-stage                 module-mrc-update                module-mswpsw-stage
module-mswpsw-update             module-periodic-costing-stage    module-periodic-costing-update
module-productstructure-stage    module-productstructure-update   module-qracore-update
module-uca-stage                 module-uca-update                module-uig-stage
module-uig-update                module-wms-stage                 module-wms-update
mongodb-backup                   mongodb-backup-list              mongodb-backup-remove
mongodb-rebuild                  mongodb-remove                   mongodb-restore
mongodb-script                   mongodb-start                    mongodb-status
mongodb-stop                     mongodb-update                   mongodbreplica-initiate


test> mo
module-adg-stage                 module-adg-update                module-archiving-stage
module-archiving-update          module-cmr-stage                 module-cmr-update
module-ctd-stage                 module-ctd-update                module-fin-stage
module-fin-update                module-fincore-update            module-fss-stage
module-fss-update                module-grs-stage                 module-grs-update
module-kanban-stage              module-kanban-update             module-ltwb-stage
module-ltwb-update               module-mfg-stage                 module-mfg-update
module-mfgcoreplus-update        module-mrc-stage                 module-mrc-update
module-mswpsw-stage              module-mswpsw-update             module-periodic-costing-stage
module-periodic-costing-update   module-productstructure-stage    module-productstructure-update
module-qracore-update            module-uca-stage                 module-uca-update
module-uig-stage                 module-uig-update                module-wms-stage
module-wms-update                mongodb-backup                   mongodb-backup-list
mongodb-backup-remove            mongodb-rebuild                  mongodb-remove
mongodb-restore                  mongodb-script                   mongodb-start
mongodb-status                   mongodb-stop                     mongodb-update
mongodbreplica-initiate          mongodbreplica-update-scripts

enterprise-edition>
```

Command arguments are defined in the same manner as from the OS shell.

```
enterprise-edition> config -trace tomcat.default.httpport
tomcat.default.httpport

    [build/config/packages/yab-ee-foundation/1/5/0/16/default/yab-ee-foundation.properties]
    # @port +0
    tomcat.default.httpport=

1.050 s
enterprise-edition>
```

The UP/DOWN arrow keys will cycle through the command history.

Exiting Shell

Ctrl+D exits the shell.

start

The *start* command starts the environment.

```
> yab start

                            start (29 tasks)
------------------------------------------------------------------------------
1/29  adminserver-start                                  STARTED (5.664 s)
2/29  nameserver-start                                   OK (0.000 s)
3/29  database-alerts-start                              STARTED (4.196 s)
4/29  database-bisgen-start                              STARTED (3.980 s)
5/29  database-bisgmenu-start                            STARTED (3.004 s)
6/29  database-configurator-start                        STARTED (4.652 s)
7/29  database-dataaccess-start                          STARTED (2.862 s)
8/29  database-dataexch-start                            STARTED (2.947 s)
9/29  database-qadadm-start                              STARTED (3.117 s)
10/29 database-qadcss-start                              STARTED (3.267 s)
11/29 database-qaddb-start                               STARTED (4.861 s)
12/29 database-qadeam-start                              STARTED (3.435 s)
13/29 database-qadhlp-start                              STARTED (2.578 s)
14/29 database-qxevents-start                            STARTED (2.858 s)
15/29 database-qxodb-start                               STARTED (2.764 s)
16/29 database-tmsdb-start                               STARTED (5.381 s)
17/29 appserver-crm-start                                STARTED (11.859 s)
...
```

The start command will start any servers that are not running and can be run repeatedly without any harm. If a server was not running when the command was processed it will display a STARTED status, otherwise an OK status if it was already running.

Some of the servers are started in the background. For these servers, STARTED indicates that a request was submitted to start the server. To check on the status of the background process use the status command.

Individual servers can be started by executing the appropriate command.

```
> yab appserver-fin-start

                       appserver-fin-start (1 task)
------------------------------------------------------------------------------
1/1 appserver-fin-start                                  STARTED (11.859 s)
------------------------------------------------------------------------------
```

status

The *status* command shows the status of environment servers.

```
> yab status

                              status (30 tasks)
------------------------------------------------------------------------------
1/30  adminserver-status                                  STARTED (1.048 s)
2/30  nameserver-status                                   STARTED (0.668 s)
3/30  database-qadadm-status                              STARTED (0.134 s)
4/30  database-qaddb-status                               STARTED (0.032 s)
5/30  database-qadhlp-status                              STARTED (0.018 s)
6/30  database-qxevents-status                            STARTED (0.017 s)
7/30  database-qxodb-status                               STARTED (0.024 s)
8/30  appserver-fin-status                                STARTED (0.444 s)
9/30  appserver-mfg-status                                STARTED (0.428 s)
10/30 appserver-qra-status                                STARTED (0.424 s)
11/30 appserver-qxosi-status                              STARTED (0.423 s)
12/30 appserver-qxoui-status                              STARTED (0.439 s)
13/30 appserver-qxtnative-status                          STARTED (0.471 s)
14/30 webspeed-default-status                             STARTED (0.442 s)
15/30 tomcat-default-status                               STARTED (0.072 s)
16/30 tomcat-qxtend-status                                STARTED (0.008 s)
17/30 aia-default-status                                  STARTED (0.943 s)
...
```

The status command will return STARTED if the server is started and STOPPED if the server is stopped. The status of individual servers can be displayed by executing the appropriate command.

```
> yab appserver-fin-status

                       appserver-fin-status (1 task)
------------------------------------------------------------------------------
1/1 appserver-fin-status                                  STARTED (0.536 s)
------------------------------------------------------------------------------
```

stop

The *stop* command stops an environment.

```
> yab stop

                              stop (19 tasks)
--------------------------------------------------------------------------------
1/19  fin-application-stop                              STOPPED (0.519 s)
2/19  qxtend-stage                                      SKIPPED (0.011 s)
3/19  qxo-services-stop                                 STOPPED (0.196 s)
4/19  tomcat-default-stop                               STOPPED (6.631 s)
5/19  tomcat-qxtend-stop                                STOPPED (6.558 s)
6/19  webspeed-default-stop                             STOPPED (2.420 s)
7/19  appserver-fin-stop                                STOPPED (4.134 s)
8/19  appserver-mfg-stop                                STOPPED (2.290 s)
9/19  appserver-qra-stop                                STOPPED (2.000 s)
10/19 appserver-qxosi-stop                              STOPPED (1.909 s)
11/19 appserver-qxoui-stop                              STOPPED (1.759 s)
12/19 appserver-qxtnative-stop                          STOPPED (1.822 s)
13/19 database-qadadm-stop                              STOPPED (7.110 s)
14/19 database-qaddb-stop                               STOPPED (6.114 s)
15/19 database-qadhlp-stop                              STOPPED (6.075 s)
16/19 database-qxevents-stop                            STOPPED (6.074 s)
17/19 database-qxodb-stop                               STOPPED (6.084 s)
18/19 nameserver-stop                                   OK (0.000 s)
19/19 adminserver-stop                                  STOPPED (11.724 s)
--------------------------------------------------------------------------------
```

The stop command will stop any servers that are running and can be run repeatedly without any harm. If a server was running when the command was processed it will display a STOPPED status, otherwise an OK status if it was not running. Servers are generally stopped in the reverse order of how they are started. Individual servers can be stopped by executing the appropriate command.

```
> yab appserver-fin-stop
                        appserver-fin-stop (1 task)
--------------------------------------------------------------------------------
1/1 appserver-fin-stop                                  OK (0.432 s)
--------------------------------------------------------------------------------
```

system-diagnostics

The command *system-diagnostics* creates an archive that contains diagnostic files from the environment.

The archive includes the following files and directories:

- All files within the configuration directory (appdir.config).
- All files within the log directory (appdir.logs).
- The output of the info command with the (-more) flag enabled.
- A snapshot.xml includes installed package names and versions.
- A packages.properties file that lists all packages and patches from the environment.
- All files within the customizations directory with (-include-customizations) flag enabled.
- A file listing the structure of the customizations directory with (-include-customizations) flag disabled.
- All files within the patches directory with (-exclude-patches) flag disabled.
- A file listing the structure of the patches directory with (-exclude-patches) flag enabled.

The archive is created in the current working directory using the naming pattern:

```
[APPDIR DIRECTORY NAME]-[TIMESTAMP].zip
```

Options

Name	Description
archive	The name of the archive file.
threshold	The maximum number of megabytes to capture from each file. If the threshold is exceeded, the threshold number of megabytes will be captured from the end of the file. Default: 10
include-customizations	Include the files within the customizations directory.
exclude-patches	Exclude the files within the patches directory.

Examples

Ex. Create a diagnostics archive in the current working directory:

```
> yab system-diagnostics
```

EX. Create a diagnostics archive including files within the customizations directory:

```
> yab system-diagnostics -include-customizations
```

Ex. Create a diagnostics archive excluding patches directory:

```
> yab system-diagnostics -exclude-patches
```

Ex. Create a diagnostics archive named myenv.zip:

```
> yab -archive:/dr01/myenv.zip system-diagnostics
```

EX. Create a diagnostics archive named 'myenv.zip' where no log file included in the archive will exceed 5 MB

```
> yab -archive:/dr01/myenv.zip -threshold:5 system-diagnostics
```

system-find

The *system-find* command searches for files referenced from configuration settings.

Ex. Find the data file that distributes the 'ab001' browse

```
> yab find data | xargs grep -l ab001
/dr01/qadapps/qea/build/catalog/packages/mfg/2019/0/19/787/data/qadadm/brw_mstr-brwt_det-brwf_det-
proc_det-prol_det.xml
/dr01/qadapps/qea/build/catalog/packages/mfg/2019/0/19/787/data/qadadm/vue_mstr-vwj_det-vuf_det.
xml
```

Ex. Find the tax programs reached from the operational compile.

```
> yab -includes:"**/us/tx/*.p" find code.mfg
/dr01/qadapps/qea/build/catalog/packages/mfg/2019/0/19/787/src/us/tx/txtx2upd.p
/dr01/qadapps/qea/build/catalog/packages/mfg/2019/0/19/787/src/us/tx/txdetrp3.p
/dr01/qadapps/qea/build/catalog/packages/mfg/2019/0/19/787/src/us/tx/txavconf.p
/dr01/qadapps/qea/build/catalog/packages/mfg/2019/0/19/787/src/us/tx/txcalcln.p
...
```

system-package-create

The *system-package-create* command creates a package.

Ex. Create a package named 'test' that distributes all of the files in the current working directory.

```
> yab -class:test system-package-create .
> ls -l test-1.0.0.0.zip
-rw-r--r-- 1 wtb devel 804 Dec 15 13:48 test-1.0.0.0.zip
```

Ex. Create another version of the package named 'test' that distributes all of the files in the current working directory.

```
> yab -class:test -version:1.1 system-package-create .
> ls -l test-1.1.0.0.zip
-rw-r--r-- 1 wtb devel 804 Dec 15 13:49 test-1.1.0.0.zip
```

Ex. Create a package while defining some package attributes.

```
> yab -class:another -version:1.2.3.4 -attribute:module.uri=urn:module:com.qad.another -attribute:
owner=abc system-package-create .
> ls -l another-1.2.3.4.zip
-rw-r--r-- 1 wtb devel 804 Dec 15 13:50 another-1.2.3.4.zip
```

Ex. Create a new package by repackaging an existing package with updates from a directory named 'updates'.

```
> yab -copy:test-1.0.0.0.zip -version:1.1 system-package-create updates
> ls -l test-1.1.0.0.zip
-rw-r--r-- 1 wtb devel 804 Dec 15 13:51 test-1.1.0.0.zip
```

Ex. Obtain a version from a version sequence.

```
> cat test.version
<version-specification>
    <version>1.0.0.0</version>
</version-specification>


> yab -class:test -version-sequence:test.version system-package-create

                      system-package-create (1 task)
-------------------------------------------------------------------------------
1/1 system-package-create                                  OK (2.260 s)
-------------------------------------------------------------------------------

BUILD SUCCESSFUL (3.296 s)

> ls -l test*
-rw-rw-r-- 1 wtb devel 300 Dec 16  2016 test-1.0.0.0.zip
-rw-rw-r-- 1 wtb devel  79 Dec 16  2016 test.version

> cat test.version
<version-specification>
    <version>1.0.0.1</version>
</version-specification>coli49:sr1-core-systest>


> yab -class:test -version-sequence:test.version system-package-create

                      system-package-create (1 task)
-------------------------------------------------------------------------------
1/1 system-package-create                                  OK (0.882 s)
-------------------------------------------------------------------------------

BUILD SUCCESSFUL (1.818 s)


> ls -l test*
-rw-rw-r-- 1 wtb devel 300 Dec 16 06:00 test-1.0.0.0.zip
-rw-rw-r-- 1 wtb devel 299 Dec 16  2016 test-1.0.0.1.zip
-rw-rw-r-- 1 wtb devel  79 Dec 16  2016 test.version


> cat test.version
<version-specification>
    <version>1.0.0.2</version>
</version-specification>
```

The primary value of a package is that it associates a version with a set of files. When it is necessary to distribute updates to these files, a new package should be created with a higher version. Reusing versions eliminates one of the primary benefits of packages.

See Also: Creating Tomcat Security Patches

system-process-list

The *system-process-list* command displays the commands that would be executed if a command were executed.

Ex. Display the commands that would be executed if the environment was updated.

```
> yab system-process-list update

1. qxtend-stage
2. stage
3. adminserver-script
4. nameserver-script
5. database-script
6. appserver-script
7. webspeed-script
8. tomcat-script
9. daemon-script
10. mongodb-script
11. mongodbreplica-update-scripts
12. qxo-services-script
13. script-update
14. script-master-update
15. path-fin-dirs-update
16. path-foundation-appserver-update
17. path-foundation-client-update
18. path-foundation-code-update
...
```

Ex. Display the commands that would be executed if the environment was started.

```
> yab system-process-list start

1. adminserver-start
2. nameserver-start
3. database-qadadm-start
4. database-qaddb-start
5. database-qadhlp-start
6. database-qxevents-start
7. database-qxodb-start
8. database-start
9. appserver-fin-start
10. appserver-mfg-start
...
```

system-updates-list

- Introduction
- Options
- Usage & Examples
  - Default
  - -package
    - Usage
    - Example
  - -version-level
    - Usage
    - Example
  - -skip-compliance
    - Usage
    - Usage
  - -all
    - Usage
  - -depth
    - Usage
    - Example

Introduction

The command *system-updates-list* can provide user a convenient approach to check for updates to modules installed in the YAB instance.

Options

```
> yab help system-updates-list

PROCESS
     system-updates-list - Lists the updates that are available.

OPTIONS

     Name                        Description
     -----                       -----------
     package                     Lists updates for a package by name (e.g. 'abc').
                                 Wildcard matching is supported.
                                 *: 0 or any multiple character(s)
                                 .: any single character
                                 e.g.
                                 foo*    => foo, foo-bar, ...
                                 fo.     => foo, fox, fog, ...
                                 *-bar   => any string ends with "-bar"
                                 *foo*   => any string contains "foo"

     version-level               Used to control what types of updates are listed.
                                 Possible values: major, minor, patch, build.
                                 Default: patch
                                 A version consists of four parts:

                                 e.g. 1.2.3.4
                                 Major = 1
                                 Minor = 2
                                 Patch = 3
                                 Build = 4

                                 When the version-level is set to 'patch', listing updates in an
environment with the package 'abc-1.2.3.4'
                                  configured would display the highest 'abc-1.2.x' version
available in all of the configured catalogs.
                                 Likewise with a version-level set to 'minor', the highest 'abc-1.
x' version.

     skip-compliance             List updates for all packages and not only the packages that
conform to QAD versioning standards.

     exclude-current-version     Do not show the current version of packages in the display.
                                 Default: Show the current version column.

     all                         Include packages that are up to date.
                                 Default: Only output the packages which have updates available.

     depth                       Used to limit which modules that are printed.
                                 A depth of 0 prints all modules, whereas a depth of 1 will only
print the top level modules,
                                 a depth of 2 will print the top level modules and their direct
members and so on.
                                 Default: 1.
                                 e.g. -depth:2
```

Usage & Examples

Default

Option	Default value
package	-
version-level	patch
skip-compliance	false
exclude-current-version	false
all	false
depth	1

By default, the command will only list packages which follow the versioning standard and have available patch updates.

Only the top level packages will be displayed in the output.

```
> yab system-updates-list
```

-package

The *-package* option limits the check for updates to the specified package (s). Wildcard matching is supported to include multiple packages.

Usage

```
yab system-updates-list -package:name|pattern
```

Wildcard matching

Here we ONLY support two wildcard '.' and '*'

- * is for 0 or any multiple character(s)
- . is for any single character

Example

1.Specify a single package

```
> yab system-updates-list -package:foo-app1
```

2.Specify all the package(s) which contains "app"

```
> yab system-updates-list -package:*app*
```

-version-level

The option *-version-level* is to restrict the output list in a specified version level.

Usage

```
yab system-updates-list -version-level:major|minor|patch|build
```

Versioning convention

A version consists of a set of four digits arranged from the most significant to the least significant value (when read from left to right).

The integer values are associated with the following names: major, minor, patch, build.

e.g. foo-bar-1.2.3.4 (Package name is foo-bar, major = 1, minor = 2, patch = 3, build = 4.)

Example

Check for any updates up to and including minor version changes.

```
> yab system-updates-list -version-level:minor
```

-skip-compliance

The option *-skip-compliance* is used to check updates for all packages regardless of whether they conform to version standards.

Usage

```
> yab system-updates-list -skip-compliance

INSTANCE

/qad/sbox/007/user/ucm/02/trunkcore


CATALOGS

/qad/local/sandbox/cache
http://packages.qad.com
http://plli05:32000/

MODULES                              CURRENT         AVAILABLE       UP-TO-DATE

|- base-api                          1.1.0.79        1.1.2.3         No
|- dde-build                         2.5.0.97        2.5.0.109       No
|- fin-apidoc                        2017.0.80.4     2017.0.80.7     No
|- fin-bin64-proxy                   2017.0.80.4     2017.0.80.7     No
|- fin-bin64-qadfin                  2017.0.80.4     2017.0.80.7     No
|- fin-bldata                        2017.0.80.4     2017.0.80.7     No
|- fin-customization                 2017.0.80.4     2017.0.80.7     No
|- fin-erp-trunk                     2017.0.17.497   2017.0.17.504   No
|- fin-src-proxy                     2017.0.80.4     2017.0.80.7     No
|- fincore                           2.17.0.8        2.17.1.1        No
|- foo-pkg2                          1.3.0.0         1.3.1.1         No
|- foo-pkg3                          3.3.0.0         3.3.1.1         No
|- mfg-erp-trunk                     2017.0.17.497   2017.0.17.504   No
|- mfgcoreplus                       2.17.0.15       2.17.1.3        No
|- mfgcoreplus-api                   2.17.0.15       2.17.1.3        No
|- netui                             3.2.0.62        3.2.1.12        No
     netui-module-32-cumulative      3.2.38.0        3.2.55.0        No
|- netui-module-cmr                  1.8.0.33        1.8.0.39        No
|- netui-module-ctd                  6.0.0.3         6.0.0.4         No
|- netui-module-fin                  2017.0.80.5     2017.0.80.9     No
|- netui-module-grs                  3.0.0.3         3.0.2.8         No
|- netui-module-kanban               1.2.3.10        1.2.3.11        No
|- netui-module-mrc                  1.3.0.82        1.3.0.85        No
|- netui-module-mswpsw               3.3.8.7         3.3.7000.35     No
|- netui-module-periodic-costing     1.0.0.200       1.0.0.205       No
|- netui-module-wms                  1.0.0.1         1.0.0.20        No
|- qpm                               3.0.0.5         3.0.0.8         No
|- qracore                           2.17.0.32       2.17.5.0        No
|- qracore-api                       2.17.0.32       2.17.5.0        No
|- qxtend-bundled                    1.8.7.11        1.8.8.3         No
|- requisition-api                   1.1.0.91        1.1.2.0         No
|- system-test-data-erp-trunk        2017.0.17.497   2017.0.17.504   No
|- tomcat                            7.0.52.0        7.0.77.1        No
|- trans-dotdees-fhd                 9.3.16.1        9.3.16.8        No
|- yab                               1.6.0.30        1.6.0.46        No
|- yab-client                        1.6.0.21        1.6.0.42        No
|- yab-conv                          1.6.0.5         1.6.0.6         No
|- yab-conv-ee-xrc                   2016.0.0.1      2016.0.5.0      No
|- yab-ee-foundation                 1.6.0.89        1.6.0.108       No
|- yab-install                       1.6.0.24        1.6.0.28        No
|- yab-qra                           1.6.0.34        1.6.0.44        No
|- yab-qxtend                        1.6.0.44        1.6.0.45        No

...
```

-exclude-current-version

The option *-exclude-current-version* is to hide the current version column in the output list. The current version column will be displayed by default.

Usage

```
> yab system-updates-list -exclude-current-version
```

-all

This option -all is a row control option. The command will only output the package(s) which have updates available by default. By using this option the output will list all the packages whether or not they have updates available.

Usage

```
> yab system-updates-list -all
```

-depth

This option is used to limit the modules which are displayed. The command will output all package(s) include all the inner package(s) no matter how deep it is by using value 0 in this option.

By default, the command will only list the top level packages.

Usage

```
yab system-updates-list -depth:n
```

Example

1.List all the package(s) no matter how deep it is.

> **Asterisk in up-to-date column**
>
> In default case, the process will just show the package(s) which have updates available. That means only the package that column UP-TO-DATE is "No" will be displayed.
>
> If you see an asterisk on the right of "Yes", that means this app contains some packages which have updates available in current condition but hidden by the depth control. You can use option -depth to spread it.

```
> yab system-updates-list -depth:0

INSTANCE

/qad/sbox/007/user/ucm/02/trunkcore


CATALOGS

/qad/local/sandbox/cache
http://packages.qad.com
http://plli05:32000/

MODULES                    CURRENT          AVAILABLE        UP-TO-DATE

|- base-api                1.1.0.79         1.1.2.3          No
|- foo-app1                1.0.0.0          1.0.0.0          Yes*
   |- foo-app-lvl2         1.0.0.0          1.0.1.0          No
      |- foo-m1            2.0.0.0          2.0.0.2          No
      |- foo-m3            1.3.0.1          1.3.1.0          No
   |- foo-test             1.0.0.0          1.0.1.1          No
|- foo-pkg1                1.1.0.0          1.1.1.1          No
|- foo-pkg3                3.3.1.0          3.3.1.1          No
|- mfgcoreplus             3.0.0.1          3.0.0.2          No
|- mfgcoreplus-api         3.0.0.1          3.0.0.2          No
|- qracore                 3.0.0.2          3.0.0.11         No
|- qracore-api             3.0.0.2          3.0.0.11         No
|- requisition-api         1.1.0.91         1.1.2.0          No
|- yab-conv                1.6.0.5          1.6.0.6          No
|- yab-conv-ee-xrc         2016.0.0.1       2016.0.5.0       No
|- yab-core                1.6.0.0          1.6.0.4          No
   |- dde-build            2.5.0.105        2.5.0.109        No
   |- yab-client           1.6.0.38         1.6.0.42         No
   |- yab-install          1.6.0.25         1.6.0.28         No
   |- yab                  1.6.0.39         1.6.0.46         No
|- yab-ee-foundation       1.6.0.103        1.6.0.108        No
|- yab-qra                 1.6.0.41         1.6.0.44         No
|- yab-qxtend              1.6.0.44         1.6.0.45         No



...
```

2.List specified depth package(s)

```
> yab system-updates-list -depth:2

INSTANCE

/qad/sbox/007/user/ucm/02/trunkcore


CATALOGS

/qad/local/sandbox/cache
http://packages.qad.com
http://plli05:32000/

MODULES                     CURRENT          AVAILABLE        UP-TO-DATE

|- base-api                 1.1.0.79         1.1.2.3          No
|- foo-app1                 1.0.0.0          1.0.0.0          Yes*
   |- foo-app-lvl2          1.0.0.0          1.0.1.0          No
   |- foo-test              1.0.0.0          1.0.1.1          No
|- foo-pkg1                 1.1.0.0          1.1.1.1          No
|- foo-pkg3                 3.3.1.0          3.3.1.1          No
|- mfgcoreplus              3.0.0.1          3.0.0.2          No
|- mfgcoreplus-api          3.0.0.1          3.0.0.2          No
|- qracore                  3.0.0.2          3.0.0.11         No
|- qracore-api              3.0.0.2          3.0.0.11         No
|- requisition-api          1.1.0.91         1.1.2.0          No
|- yab-conv                 1.6.0.5          1.6.0.6          No
|- yab-conv-ee-xrc          2016.0.0.1       2016.0.5.0       No
|- yab-core                 1.6.0.0          1.6.0.4          No
   |- dde-build             2.5.0.105        2.5.0.109        No
   |- yab-client            1.6.0.38         1.6.0.42         No
   |- yab-install           1.6.0.25         1.6.0.28         No
   |- yab                   1.6.0.39         1.6.0.46         No
|- yab-ee-foundation        1.6.0.103        1.6.0.108        No
|- yab-qra                  1.6.0.41         1.6.0.44         No
|- yab-qxtend               1.6.0.44         1.6.0.45         No



...
```

update

The *update* command applies configuration changes to the system.

```
> yab update
```

The update command will restart the environment. Some configuration changes can be applied with the reconfigure command which does not take down the environment.

validate

The *validate* command is used primarily to validate YAB configuration settings. The command, for example, will check that all required settings have a value, that values that expect an integer are assigned a valid value, and so on. A subset of these validations are automatically performed every time the environment is refreshed.

See Validation Settings

System Configuration

System Configuration includes topics related to (re)configuring an environment.

The standard configuration procedure (discussed briefly in the introduction) is to define the configuration changes in *build/config/configuration.properties* and then apply the change to the environment with the appropriate YAB command. The update command may be used to apply all changes (unless specifically stated otherwise) but it is comprehensive and will take the environment offline for a period of time. In certain cases, you may receive guidance to apply the change with a different command (usually reconfigure) as a more efficient alternative.

Example Reconfiguration

We can demonstrate this process flow in action by enabling and disabling 4GL Tracing (extra logging) on the MFG application server.

List the application servers in the configuration to find/remember the name of the MFG application server in the configuration.

```
> yab -instances config pas
pas.fin
pas.mfg
pas.qra
...
```

The settings associated with an application server correspond very closely to the application server settings in the Progress configuration file *ubroker.properties*. Print the help for the application server.

```
> yab help "pas.mfg."
```

Using that information, enable 4GL tracing, by editing *configuration.properties* and adding the following settings to override the default values (in all likelihood *configuration.properties* will not already contain these settings, but if it did we would edit the existing settings in the file).

build/config/configuration.properties

```
pas.mfg.openedge.session-mgr.srvrlogginglevel=4
pas.mfg.openedge.session-mgr.agentLogEntryTypes=ASPlumbing,DB.Connects,4GLTrace
```

Execute the `pas-mfg-update` command to apply the configuration change to the environment (which calls the Progress *oeprop* utility to merge the MFG application server configuration into *servers/pas-mfg/conf/openedge.properties*). This command is included in a reconfigure and everything in a reconfigure is included in an update, so we also could use either of these commands to apply the change. A good rule of thumb is that you can use reconfigure for updating scripts and changing most Progress settings, but many other changes will require an update.

```
> yab pas-mfg-update
```

With 4GL Tracing enabled, the application server will write a lot more information to its log files and this can slow down the application and consume excessive amounts of disk space, so in this special case it is a good idea to undo the configuration change after we have captured the data to evaluate. To undo the change, remove the settings from *configuration.properties* and then apply the changes using the same command as before.

```
> yab pas-mfg-update
```

General Information

- Configuration Type System
- Configuration Files
- Distributing Settings
- Configuration File Includes
- Undefined Progress Parameters

Configuration Type System

Many of the configuration settings are related by the fact that they describe the desired configuration of a specific resource in the environment. In cases where there is only one instance of the resource in the environment (and there will only ever be one instance) we use the following pattern to configure the resource:

[TYPE].[NAME]

OpenEdge is an example of this type of resource.

Ex. Open Edge:

```
> yab config "openedge.*"
openedge.appserver.type=pas
openedge.certificatestore=/tech/progress/dlc128/certs/psccerts.jar
openedge.dir=/tech/progress/dlc128
openedge.env.avmmemory2.key=AVMMEMORY2
openedge.env.avmmemory2.value=1
openedge.env.catalina-tmpdir.key=CATALINA_TMPDIR
openedge.env.catalina-tmpdir.value=/tmp
openedge.env.pas-properties-dir.key=PSC_AS_INSTANCE_DIR
...
```

To describe resources that may have multiple instances in the environment we use the following pattern:

`[TYPE].[INSTANCE].[NAME]`

A Progress database is an example of this type of resource.

Ex. QADDB database:

```
> yab config "db.qaddb.*"
db.qaddb.bi=16384
db.qaddb.biblocksize=16
db.qaddb.blocksize=8
db.qaddb.centuryformat=1950
db.qaddb.codepage=utf-8
db.qaddb.collation=ICU-UCA
...
```

Some of these multiple instance resources are set up to inherit settings from a prototype instance named `_base`.

Ex. Prototype database configuration:

```
> yab config "db._base.*"
db._base.bi=16384
db._base.biblocksize=16
db._base.blocksize=8
db._base.centuryformat=1950
db._base.codepage=utf-8
db._base.collation=ICU-UCA
...
```

A setting is inherited from the prototype unless specifically overridden. The (-trace) option of the config command shows this relationship.

```
> yab -trace config db.qaddb.codepage
db.qaddb.codepage=utf-8 (inherited: db._base)

    [build/config/packages/yab-ee-foundation/1/5/0/16/default/yab-ee-foundation.properties]
    db._base.codepage=utf-8
```

The `config-new` command prints example configurations that can be extended.

```
> yab config-new
Usage: yab config-new [TYPE] [NAME]

> yab config-new db test

# @extends db._base
db.test=
db.test.physicalname=test

> yab config-new dbserver test

# @extends dbserver._base
dbserver.test=
dbserver.test.name=db-${db.test.physicalname}
dbserver.test.databasename=${db.test.dir}/${db.test.physicalname}
```

Here is a table listing some of the important configuration types in the system along with their compatibility with different OE versions.

Type	Description	Multiple Instances	OE11	OE12
adminserver	Progress Admin Server	NO	YES	NO
aia	Application Internet Adapter	YES	YES	NO
appserver	Application Server	YES	YES	NO
pas	Progress Application Server	YES	NO	YES
code	Code	YES	YES	YES
bootstrap	QRA Bootstrap Documents	YES	YES	YES
copy	File copy	YES	YES	YES
data	Data	YES	YES	YES
db	Database	YES	YES	YES
dbserver	Database Server	YES	YES	YES
filegen	File merge and replace	YES	YES	YES
netui	.NET configuration	NO	YES	YES
ns	Name Server	NO	YES	NO
packages	Packages	YES	YES	YES
process	Commands	YES	YES	YES
qpackage	Client packages	YES	YES	YES
schema	Schema	YES	YES	YES
tomcat	Tomcat	YES	YES	YES
webapp	Web Application	YES	YES	YES
ws	WebSpeed Server	YES	YES	NO
wsa	Web Services Adapter	YES	YES	NO

Configuration Files

- Comments
- References
  - Algorithm
  - Nesting
  - Wildcard Expansion
  - Dereferencing Aliases
- Annotations
  - @if
  - @unless
  - @end
    - Built-in If/Unless Tests
      - Tests
      - Functions
  - @extends
  - @aliasof
  - @ref
  - @append
  - @noappend
  - @group
  - @grouporder
  - @port
  - @exclude
  - @patch
  - @unique
  - @multiply
- Indexers
  - Syntax
  - When to use
  - Strategy
  - Examples
    - Arguments
    - Lists
  - Strategy
    - Units of Measure
  - Duration
  - Size

Configuration settings are defined in configuration files where each setting is defined on a separate line using the syntax:

`KEY=VALUE`

By convention keys are lowercase and the period is used as a delimiter for compound names (e.g. dbserver.qaddb.afterimagebuffers). The type system describes additional conventions for configuring "resources" in the environment.

Comments

A line that starts with the hash (#) character is processed as a comment.

```
# The physical name of the qaddb database.
db.qaddb.physicalname=qadprod
```

References

The value of a setting may reference other settings using the syntax:

`${[REFERENCE]}`

Ex. The default tomcat instance logfile.

```
tomcat.default.logfile=${base}/logs/catalina.out
```

Algorithm

A reference is resolved using the following algorithm:

- Resolve the reference relative to the "ancestors" of the referencing key (closest match wins).
- Resolve the reference as an absolute reference.
- Resolve the reference as a Java system property.

Ex. Hello World

```
foo.bar.baz=Hello ${user}
```

1. Replace "${user}" with the value of the setting *foo.bar.user* if defined.
2. Replace "${user}" with the value of the setting *foo.user* if defined.
3. Replace "${user}" with the value of the setting *user* if defined.
4. Replace "${user}" with the value of the Java system property *user* if defined.

Use an "!" before the reference to resolve the reference only as an absolute reference.

```
${![REFERENCE]}
```

If the reference cannot be resolved, the literal reference (e.g. "${user}") is retained. It may be preferable in some situations to remove the reference when it cannot be resolved. In these cases, the dash modifier may be used to express this intent.

```
${-[REFERENCE]}
```

Alternatively, use the following syntax to define a default value if the reference is not resolved.

```
${[REFERENCE]:-[DEFAULT VALUE]}
```

The '#' modified may be used to reference parts of the key by index starting at 0. For example, given the key "foo.bar.baz", then 0 is the index for "foo", 1 for "bar", and 2 for "baz".

```
${#[INDEX]}
```

Nesting

References can be nested.

In the following example the setting *russian.dolls* has the value "d".

```
a=d
b=a
c=b
russian.dolls=${${${c}}}
```

To prevent YAB from interpreting a literal "${" as a property reference, the "$" can be escaped by doubling the "$" character.

```
foo.bar=Hello $${user}
```

Wildcard Expansion

Wildcards may be used to reference multiple values evaluated to a comma-separated list. In the following example, the value of "another" is "a,b".

```
foo.bar.setting=a
foo.baz.setting=b
another=${foo.*.setting}
```

Dereferencing Aliases

The following syntax can be used to dereference settings that might be aliased (see @aliasof annotation below)

```
${<[REFERENCE]}
```

In the following example the setting "d" has the value "c" because "a" is aliased to "c" and "d" dereferences "a". The setting "e" has the value "b" because the setting "b" is not aliased to another setting.

```
a=>c
b.color=orange
c.color=blue
d=${<a}
e=${<b}
```

Annotations

An annotation is a special form of comment that provides additional information about the setting that follows the annotation. Annotations are defined using the syntax:

```
# @[ANNOTATION NAME]
# @[ANNOTATION NAME] [ANNOTATION VALUES...]
```


Care must be taken when editing a file that uses annotations. Annotations are formatted as comments but they do have an effect on the system. In particular you should be careful commenting out settings with annotations.

The following file uses the *exclude* annotation to exclude the *foo* setting (and any children of the setting such as *foo.child*):

```
# @exclude
foo=
bar=baz
```

If the *foo* setting was commented out, the *exclude* annotation would be applied to the nearest setting which is now *bar*.

Incorrect

```
# @exclude
# foo=
bar=bar
```

Commenting out the annotations is one way to avoid this displacement.

Correct

```
## @exclude
# foo=
bar=bar
```

@if

Asserts a test to be evaluated.

If the test evaluates to FALSE and the test IS final, the configuration document will not be processed any further. If the test evaluates to FALSE and the test IS NOT final, the properties that follow the test will be skipped until an @end annotation is defined or the end of the file is reached. The operators '&&' and '||' can be used to evaluate multiple tests with a single IF statement using a Boolean AND/OR respectively to combine the outcomes, where tests are processed from left to right. The outcome from tests defined in separate IF/UNLESS statements are combined using an implicit AND operator.

Variants

```
# @if [TEST]
# @if [TEST] [&& | ||] [TEST]...
# @if FINAL [TEST]
```

@unless

Asserts a test to be evaluated.

If the test evaluates to TRUE and the test IS final, the configuration document will not be processed any further. If the test evaluates to TRUE and the test IS NOT final, the properties that follow the test will be skipped until an @end annotation is defined or the end of the file is reached. The operators '&&' and '||' can be used to evaluate multiple tests with a single UNLESS statement using a Boolean AND/OR respectively to combine the outcomes, where tests are processed from left to right. The outcome from tests defined in separate IF/UNLESS statements are combined using an implicit AND operator.

Variants

```
# @unless [TEST]
# @unless [TEST] [&& | ||] [TEST]...
# @unless FINAL [TEST]
```

@end

Ends the scope of one or more tests.

Built-in If/Unless Tests

The built-in tests use the syntax:

```
[A] [[OPERATOR] [B]]
```

Where "A" is either a key, a function, or a literal. When "A" is a key, the value of the key is evaluated, when "A" is a function, the return value of the function is evaluated, and when "A" is a literal it is evaluated as is. The determination of whether "A" should be interpreted as a key, function, or literal, depends on the syntax of "A" and/or the operator chosen as described in the table below.

When a test accepts/expects a KEY, the key is configured directly (e.g. "foo"). The value of keys may be referenced in the test using the standard syntax (e.g. "${foo}"). This is most useful in tests that accept a literal value. In both cases, tests should only refer to settings that will have been evaluated before the test is evaluated, taking into consideration that configuration files are processed in order of precedence.

Tests

Syntax	Example	Description
[KEY/FUNCTION]	foo	True if KEY/FUNCTION is not null.
[KEY/FUNCTION] = [VALUE]	foo = bar	True if KEY/FUNCTION equals VALUE.
[KEY/FUNCTION] < [VALUE]	foo < bar	True if KEY/FUNCTION is less than the VALUE (using a numeric comparison if appropriate).
[KEY/FUNCTION] <= [VALUE]	foo <= bar	True if KEY/FUNCTION is less than or equal to the VALUE (using a numeric comparison if appropriate).
[KEY/FUNCTION] > [VALUE]	foo > bar	True if KEY/FUNCTION is greater than the VALUE (using a numeric comparison if appropriate).
[KEY/FUNCTION] >= [VALUE]	foo >= bar	True if KEY/FUNCTION is greater than or equal to the VALUE (using a numeric comparison if appropriate).
[KEY/FUNCTION] ~ [VALUE]	foo ~ bar	True if KEY/FUNCTION contains the VALUE.
[KEY/FUNCTION] =~ [REGEX]	foo =~ /bar/	True if KEY/FUNCTION is matched by the REGEX.
[KEY/FUNCTION] =* [VERSION RANGE]	foo =* [1.2)	True if KEY/FUNCTION is a member of the VERSION RANGE.
[KEY/FUNCTION] : alias	foo : alias	True if KEY/FUNCTION is an alias.
[LITERAL] : file	/foo/bar : file	True if LITERAL is a file.
[LITERAL] : dir	/foo/bar : dir	True if LITERAL is a directory.

Functions

Syntax	Example	Description
first ([FIND /RETURN KEY]) first ([FIND KEY], [RETURN KEY])	first (package.yab-ee-app.version)	Finds the first value of the FIND key searching the history from the newest to the oldest records, stopping when the key is not configured. If the function is called with a single FIND /RETURN key, that value is returned, otherwise the value of the RETURN key at that point in time. For example, the function returns "b" for a FIND/RETURN key with the history ["a" -> null -> "b" -> "c"] and null for a FIND/RETURN KEY with the history ["a" -> null -> "b" -> "c" -> null] or [null].

Care should be taken when nesting if/unless tests. By default the scope of all tests is ended by the "@end" annotation. The following configuration probably does not do what the author intended. The setting "c" will always be defined (regardless of whether or not "someprop" is defined, because both tests are ended by the first "@end" annotation.

```
# @if someprop
a=foo
# @if otherprop
b=bar
# @end
c=baz
# @end
```

If condition nesting is enabled (see annotation below), "@end" statements end the scope of the nearest test in scope.

```
# @enable-condition-nesting
```

@extends

Used to "inherit" the child keys of another key.

Variants

The key to extend.

```
# @extends [KEY SOURCE]
# @extends [KEY SOURCE] [KEY DEST PATTERN]
```

In the following example, "foo.instance1" is configured to extend from "foo._base". The setting "foo.instance1.greeting" would inherit the value "Hello" from "foo._base", while preserving the overridden value "Hasta Luego" for the setting "foo.instance1.farewell".

```
foo._base.greeting=Hello
foo._base.farewell=Goodbye

# @extends foo._base
foo.instance1=
foo.instance1.farewell=Hasta Luego
```

If the KEY DEST PATTERN is not defined, the implied destination is the key that defines the annotation ("foo.instance1" in the previous example). The KEY DEST PATTERN may be used to specify an alternative set of destination keys with support for wildcards. In the following example, any "instance" of "foo" whose name does not begin with an underscore "_" would automatically inherit from "foo._base".

```
# @extends foo._base foo.*
foo=

foo._base.greeting=Hello
foo._base.farewell=Goodbye

foo.instance1=
foo.instance1.farewell=Hasta Luego

foo.instance2=
foo.instance2.farewell=Vaarwel
```

@aliasof

Used to make a key an alias of another key.

Defining a key as an alias of another key places the two keys in an equivalence relationship where they have identical child properties. If we use A to represent the key defining the alias and B to represent the key being aliased, then the child properties in B are merged to A and the child properties in A are merged to B, where a child property that was defined both in A and B obtains the value from B. Subsequent updates to the configuration may violate this relationship.

Some operations to enumerate configuration instances will not include aliases in the enumeration.

Variants

The key to alias.

```
# @aliasof [KEY]
```

Alternatively aliases can be expressed without annotations using the following notation:

or

```
[ALIAS KEY]=>[ALIAS OF KEY]
```

In the following example, bar would inherit the property (bar.greeting=Hello and bar.farewell=Goodbye) from foo while foo would inherit the property (foo.baz=true) from bar.

```
foo.greeting=Hello
foo.farewell=Goodbye

# @aliasof foo
bar=
bar.farewell=Hasta
bar.baz=true
```

To escape a configuration value that begins with the '>' character use the '\':

```
foo2=\>foo
```

An alias setting can be overridden like any other configuration setting. The value that you use to "break" the alias ("_unlink_" in the example below) is not important.

Ex. The QAD Reference Architecture (QRA) database requirements are aliased to the main QADDB database.

```
> yab config db.qadmodule
db.qadmodule=>db.qaddb
```

To deploy QRA schema and data into a separate database.

```
db.qadmodule=_unlink_
```

@ref

Used to add the configuration of another key to this key.

A key may reference multiple keys. A reference may be used to inherit appended values (see @append) while preserving any ordering information (see @group). In the following example, a would be set to (a=foo,bar,baz,end).

```
# @append
# @group 3
d=end

# @append
# @group 1
c=bar

# @append
# @group 2
# @ref c
b=baz

# @append
# @group 0
# @ref b
# @ref d
a=foo
```

Variants

The key to reference.

```
# @ref [KEY]
```

@append

Used to indicate that the value should be appended to the existing value if the property is already defined (otherwise the value is discarded). The append annotation may be defined at any layer in the precedence and will apply to all values.

If multiple sources define an append delimiter for the property, the delimiter defined by the source with the highest precedence will be used, otherwise if no sources define the delimiter, a comma will be used.

Java character escape codes can be used to represent whitespace delimiters:

Escape	Character
\n	Newline
\t	Tab
\u0032	Space

Variants

The value should be appended to an existing value using a comma as the delimiter.

```
# @append
```

The value should be appended to an existing value using the specified delimiter.

```
# @append [DELIMITER]
```


There are a couple of situations where the "@append" annotation may not work as anticipated:

Appending to a key that was inherited using "@extends" overwrites the extended value even when "@append" is used. In the following example the value of "example.greeting" is not "Hello, World" but "World".

```
base.greeting=Hello

# @extends base
example=

# @append
example.greeting=World
```

The config command may be used to verify any configuration change and the (-trace) option shows the underlying details of how the value was computed.

@noappend

Used to prevent values from being appended to the property.

The annotation only has an effect when it is defined by the highest precedence source for the property.

Variants

Any appended values should be discarded.

```
# @noappend
code.mfg.databases=db.qadcpl,db.qadadm,db.qadhlp,db.qadrcode
```

@group

Used in conjunction with @append to obtain a desired value ordering.

The appended value is guaranteed to be preceded by all values associated with lower group indexes and followed by all values associated with a higher group indexes. Values associated with the same group are ordered by source precedence unless ordering hints or the *@grouporder* annotation is defined. When the *@grouporder* annotation is defined for a group it overrides all ordering hints for that group.

An ordering hint is defined using the syntax *[+|-][ID PATTERN]* where the *ID PATTERN* is used to select other group members by their *@id* and (-) is interpreted as an instruction to order value before the selected values, whereas (+) is interpreted as an instruction to order the value after the selected values.

The meaning of a group index depends on the nature of what is being configured. We have given the following interpretation to group indexes in the context of configuring a PROPATH.

0=Configuration
1=Bootstrap
2=Customizations
3=Patches
4=Extensions
Undefined=Default[1]

[1] The default group is the group assigned when a group index is not defined. To allow for the possibility of introducing additional non-default groups in the future, members of the default group should not explicitly define a group index.

ID Patterns

An ID pattern may use the '*' character to represent one or more characters and the '?' character to represent a single character. If an ID is matched by multiple patterns, the longest pattern is assigned the match. The '*' character alone may be used to match all ID's that are not otherwise matched by a pattern (and this latter use typically only makes sense in the context of a @grouporder annotation).

Variants

Assign the value to the lowest precedence group.

```
# @group
```

Assign the value to the group.

```
# @group [INDEX]
```

Assign the value to the group and define some ordering hints.

```
# @group [INDEX] [ORDERING HINT] [ORDERING HINT]...
```

@grouporder

Used to assign a secondary ordering to the members of a *@group*.

The group members will be ordered in the listed order. Members not specified in the list will be ordered after the listed members by source precedence. IDs that do not correspond to a member of the group will be ignored. When the *@groupor der* annotation is defined for a group it overrides all ordering hints for that group.

Variants

Orders the members of the default (lowest precedence) group:

```
# @grouporder [ID PATTERN] [ID PATTERN]...
```

Orders the members of a specific group:

```
# @grouporder [INTEGER] [ID PATTERN] [ID PATTERN]...
```

See @group for a discussion of ID patterns.

@port

Identifies the property as a TCP-IP port.

Variants

Identifies the property as a port.

```
# @port
```

Identifies the property as a port and configures a preferred range offset.

```
# @port +[OFFSET]
```

Identifies the property as a port and configures a default port.

```
# @port [DEFAULT PORT]
```

Identifies the property as a port and configures a preferred range offset and default port.

```
# @port +[OFFSET] [DEFAULT PORT]
```

(If DEFAULT PORT is not an integer, it is interpreted as a reference to a configuration setting that configures a port and may be used to migrate settings that allocate ports.)

Assigns a specific port number to a property, using the annotation so YAB will not assign the port to another property.

```
# @port
some.port=30000
```

Assigns a well known offset to ports that users might interact with. If for some reason, the port is already allocated the property will be allocated an available port from the configured port range.

```
# @port +0
tomcat.default.httpport=
# @port +1
adminserver.port=
```

Ports which are not typically relevant for users (the majority of ports) should be configured without an offset. To minimize unnecessary conflict with ports assigned by offset, ports that will accept any valid port are allocated from the upper bound of a port range counting backwards.

```
# @port
tomcat.default.serverport=
# @port
adminserver.adminport=
```

A default port may be defined to handle cases where a port range is not configured.

```
# @port +0 22000
tomcat.default.httpport=
```

@exclude

Used to exclude/ignore the setting and all child settings.

Ex. Excludes the setting 'foo.bar' and 'foo.bar.baz' but not 'foo.barbaz'.

```
# @exclude
foo.bar=
```

@patch

Used to "patch" a property value using a regular expression to identify the character sequences to replace.

When the property value is evaluated all character sequences matched by the regular expression are replaced with the patch value. If the patch value is defined and the regular expression did not match the property value, the patch value will be appended to the property value using the default delimiter ',' or the delimiter specified. If the patch value is not defined, all character sequences matched by the regular expression will be removed from the property value.

Patching occurs before property references are evaluated. Use the (-skip-resolution) option on the `config` command to see the value of the property to be patched before references are evaluated.

Variants

The key to alias.

```
# @patch /[REGEX]/
# @patch /[REGEX]/[REGEX FLAGS]
# @patch /[REGEX]/ [DELIMITER]
# @patch /[REGEX]/[REGEX FLAGS] [DELIMITER]
```

Java character escape codes can be used to represent whitespace delimiters:

Escape	Character
\n	Newline
\t	Tab
\u0032	Space

Ex. Merge "-Bt 3000" into the *progress.startup.params* setting replacing an existing value (matched by the regex), otherwise appending the value using a space as a delimiter.

```
progress.startup.params=-T ${tmp} -yy ${progress.centuryoffset} -s 32768 -mmax 8192 -inp 32000 -
rereadnolock -c 30 -D 1000 -Bt 350 -nb 200 -cpcoll ${db._base.collation} -cpcase basic -h 25 -tok
4096 -tmpbsize 8 -TB 31 -TM 32

# @patch /-Bt [0-9]+/ \u0032
progress.startup.params=-Bt 3000
```

Ex. Remove a PROPATH entry from a Progress session.

```
> yab -skip-resolution config pas.mfg.propath
pas.mfg.propath=${appdir}/config,${appdir}/config/fin/local,${qra.qracore.pl},${code.mfg-
customizations.dir},${dist.dir}/fin/proxypatch,${netui.pro.dir}/com/mfgpro,${dist.dir}/fin
/patch,${appdir}/dist/fin,${base}/openedge,${base}/webapps/ROOT/WEB-INF/openedge,${openedge.dir}
/tty,${openedge.dir}/tty/netlib/OpenEdge.Net.pl,${fin.proxy.pl},${netui.pro.dir},.,${qra.
pl},${code.qxi.dir},${code.mfg.dir},${code.mfg.dir}/us,${code.mfg.dir}/us/bbi,${code.activity-
feed.dir},${appdir.work}/sharedobjects/qracore/so,${packages.fin-bldata.dir},${fin.qadfin.pl}
```

```
# @patch /,\$\{code.activity-feed.dir}/
pas.mfg.propath=
```

```
> yab -skip-resolution config pas.mfg.propath
pas.mfg.propath=${appdir}/config,${appdir}/config/fin/local,${qra.qracore.pl},${code.mfg-
customizations.dir},${dist.dir}/fin/proxypatch,${netui.pro.dir}/com/mfgpro,${dist.dir}/fin
/patch,${appdir}/dist/fin,${base}/openedge,${base}/webapps/ROOT/WEB-INF/openedge,${openedge.dir}
/tty,${openedge.dir}/tty/netlib/OpenEdge.Net.pl,${fin.proxy.pl},${netui.pro.dir},.,${qra.
pl},${code.qxi.dir},${code.mfg.dir},${code.mfg.dir}/us,${code.mfg.dir}/us/bbi,${appdir.work}
/sharedobjects/qracore/so,${packages.fin-bldata.dir},${fin.qadfin.pl}
```

@unique

Used to eliminate duplicate values associated with a setting. When this annotation is defined, only the highest precedence duplicated value is retained. This is typically used in conjunction with appended values.

@multiply

Multiplies the value of the property.

Variants

```
# @multiply [MULTIPLIER]
Multiplies the property by the multiplier value.
```

```
$ yab config -trace foobar
foobar=5000

    [build/config/configuration.properties]
    # @multiply 1000
    foobar=5
```

```
# @multiply [MULTIPLIER] [PROPERTY DEFAULT]
```

Multiplies the property by the multiplier value. If the property value is undefined, uses the property default as the property value instead.

```
$ yab config -trace foobar
foobar=10000

    [build/config/configuration.properties]
    # @multiply 1000 10
    foobar=${baz}
```

Indexers

An indexer is a configuration setting that is used to update a list type configuration setting.

Syntax

Indexers are defined with the following syntax:

```
KEY[INDEX]=VALUE
```

Term	Description
KEY	The setting to update. The key can be a literal to change a single setting or use a wildcard (*) to represent any name in a compound key, potentially updating multiple settings. For example if the key was configured as "tomcat.*.startupopts", the indexer would update ""tomcat.default.startupopts", "tomcat.webui.startupopts", and so on.
INDEX	The INDEX is matched against the current value of the settings selected by the KEY and is used to determine what text to add or remove from the value (if any). The INDEX may have a single wildcard (*) to match 0..n characters. When a wildcard is configured, the value of the settings selected by the KEY is updated where the characters matched by the wildcard are replaced with the VALUE. For example, the indexer "tomcat.webui.startupopts[-Xms*]=2048m", would update the value of the "tomcat.webui.startupopts" setting, so "-Xms2048m" is configured, by adding the argument if the INDEX did not match the current value or by updating the matched argument (i.e. -Xms512m). If the following characters are used in the INDEX they may need to be escaped:

Character	Escape	When
*	&#42	to interpret the '*' as a normal character and not as a wildcard
=	&#61	always
[	&#91	always
]	&#93	always

VALUE	The value to apply. The following special values are used to remove content.

Value	When to use
NULL	To remove unary options (i.e. -verbose) from lists of arguments or items from lists.
NULL_PAIR	To remove non-unary options (i.e. -timeout 10s) from lists of arguments.

When to use

Indexers are designed to update a value, in situations, where overriding the value would be undesirable. In that sense, they overlap with the "@patch" annotation. The main difference between indexers and patches is that patches are applied before property references are evaluated, whereas indexers are applied after property references are evaluated. In general, indexers are easier to work with, because they update the "finished" value that you see, but as the sidenote below illustrates, there are situations where patching is the better choice.

Consider the following setting:

```
progress.startup.params.streams=${progress.startup.params} -cpinternal ${db._base.
codepage} ...
```

If *progress.startup.params* was updated with an indexer, the change would not be reflected in *progress.startup.params.streams*, because the property reference is evaluated before the indexer is applied. If the desire, was to update *progress.startup.params* and all settings that referenced it, patching would be the only option.

Strategy

Settings can be associated with an indexer strategy to configure how indexers should update the setting.

The following strategies are supported:

Strategy	Description
list	Interpret the value as a delimited list.
args	Interpret the value as a whitespace delimited list of arguments.

If a strategy is not configured, the default strategy processes the setting as a comma delimited list.

```
# Support indexers that process the value as a list of arguments.
# @indexer args
custom.setting=

# Support indexers that process the value as a colon separated list.
# @indexer list :
custom.setting=
```

Examples

Arguments

Ex. Ensure *progress.startup.params* configures the unary option (-v6colon).

```
progress.startup.params[-v6colon]=
```

Ex. Ensure *progress.startup.params* does not configure the unary option (-v6colon).

```
progress.startup.params[-v6colon]=NULL
```

Ex. Ensure *progress.startup.params* configures the option (-Bt 20000).

```
progress.startup.params[-Bt]=20000
```

Ex. Ensure *progress.startup.params* does not configure the option (-Bt VALUE).

```
progress.startup.params[-Bt]=NULL_PAIR
```

Ex. Ensure all tomcat instances *startupopts* configure the unary option (-Xms512m).

```
tomcat.*.startupopts[-Xms*]=512m
```

Ex. Ensure all tomcat instances *startupopts* do not configure the unary option (-XmsVALUE).

```
tomcat.*.startupopts[-Xms*]=NULL
```

Ex. Ensure tomcat.webui.startupopts configures the G1GC garbage collector

```
tomcat.webui.startupopts[-XX:+UseG1GC]=-XX:+UseG1GC
```

Lists

Ex. Ensure *code.mfg.databases* includes the item (db.custom).

```
code.mfg.databases[db.custom]=
```

Ex. Ensure *code.mfg.databases* does not include the item (db.custom).

```
code.mfg.databases[db.custom]=NULL
```

Strategy

The technique used to apply an indexer to a setting depends on the strategy associated with the setting:

Strategy	Description
list	Interpret the value as a list.
args	Interpret the value as a list of arguments.

The default strategy is to process a setting as a comma delimited list. The standard settings are associated with an appropriate indexer strategy. The "@indexer" annotation my be used to configure the strategy for custom settings.

```
# Support indexers that process the value as a whitespace delimited list of arguments.
# @indexer args
custom.setting=

# Support indexers that process the value as a colon separated list.
# @indexer list :
custom.setting=
```

Units of Measure

Properties which are defined in milliseconds or bytes can also be expressed in a wide range of durations and sizes to improve readability. Properties are interpreted to ensure that human readable values are converted to milliseconds/bytes.

Duration

The following unit of measures are supported in upper or lower case

- ms,millisecond,milliseconds
- s,second,seconds
- m,minute,minutes
- h,hour,hours
- d,day,days
- w,week,weeks

Example

```
timeout.adminserver.start=1 minute
```

Size

The following unit of measures are supported in upper or lower case (the international standard which defines a kilobyte as 1000 bytes is used):

- b,byte,bytes
- k,kb,kilobyte,kilobytes
- m,mb,megabyte,megabytes
- g,gb,gigabyte,gigabytes

Example

```
filereduce.tomcat-logs-archive.minsize=100 mb
```

Distributing Settings

A convenient way to distribute a group of configuration settings is to define the settings in a file that can be copied into (and out of) an environment.

The (-p) option of the YAB Client can be used to bring configuration settings into an environment.

```
yab -p:[FILE|URL]
```

The client will process any include statements in the referenced document and then copy the document into the *build/config/system* directory. If a file of the same name exists in the *build/config/system* directory it will be replaced. YAB will automatically adjust the configuration but the changed configuration would still need to be applied to the environment as described in the introduction.

Alternatively, when dealing with configuration documents that do not use include statements, the files can be directly copied into the *build/config/system* directory using the OS file copy command.

```
> cp /shared/configs/development.properties build/config/system
```

Use the OS file remove command to remove the settings from the environment (and apply the change to the system as described in the introduction).

```
> rm build/config/system/development.properties
```

Reference the config.order setting to adjust the precedence order of system documents.

Merge Settings

The `-merge-settings` option of the YAB Client is used to merge the configuration documents referenced by the (-p) option into a consolidated configuration document, rather than bring the documents into the active environment.

```
-merge-settings:FILE
```

The `-excludes` option may be used to exclude a list of include files from the result.

```
-excludes:NAME1,NAME2...
```

Ex.

```
yab -p:URL -p:URL -excludes:NAME -merge-settings:FILE
```

See: Configuration File Includes

Configuration File Includes

The YAB Client supports evaluating include statements in configuration files when they are brought into the environment using the (-p) option. In the environment the include statements are replaced by the referenced document.

Include statements are defined using the following syntax:

"{" [DIRECTIVE]","["!"DIRECTIVE]... "|" [URL|ABSOLUTE PATH|RELATIVE PATH] "}"

Ex.

```
{core.properties}
{../../envs/rd.properties}
{PROD|production.properties}
{DEVEL,PROD|production.properties}
{http://server/yab/ee/2016/core.properties}
```

Where:

DIRECTIVE	Directives are used to define the conditions under which the referenced file should be included. The client defines certain directives (e.g. WIN, UNIX) as determined by the host platform, other directives can be supplied with the request. The client will assume that all request options in upper case are directives. Directives can be negated in an include statement by prefixing the directive with "!". Directives are optional. If no directives are defined, the pipe delimiter can be omitted. Ex. `yab -p:/opt/media/ee2016.properties -DEVEL -PROD -v create` When a directive is requested it is stored in the file "build/work/system/include-directives" and automatically applied to subsequent (-p) requests. In other words, the include directives are "sticky". The include-directives file may be directly edited or removed to undefine previously defined include directives.

URL	A well formed URL (e.g. "http://yab.qad.com/core.properties").
	
	Query string parameters associated with the requested document will be used when requesting included documents.
	
	For example if the following request was submitted to the client:
	
	yab -p:"http://yab.qad.com/core.properties?rev=920" -v create
	
	And if the core-systest.properties document had the following definition:
	
	core-systest.properties
	
	`{a.properties}`
	`{b.properties}`
	
	The client would retrieve the includes using the following URLs:
	
	http://yab.qad.com/a.properties?rev=920
	
	http://yab.qad.com/b.properties?rev=920

ABSOLUTE PATH	An absolute path to a file (e.g. "/dr01/configurations/core.properties").
RELATIVE PATH	A relative path (e.g. "configurations/core.properties"). The path is resolved relative to the document defining the include statement. The notation "../" is used to signify a parent path.

Undefined Progress Parameters

Most Progress parameters can be configured through a corresponding YAB setting. For example, to list all of the YAB configuration settings for an dbserver server use the help command:

```
> yab config-help dbserver
```

When a valid Progress parameter does not have a corresponding YAB setting, the Progress parameter may still be configured using the following syntax:

Parameter (without value)

`[aia|appserver|dbserver|ns|ws|wsa].[INSTANCE].property.[PROPERTY INSTANCE].key`

Ex. Define a new Progress parameter named "ParameterWithoutValue" that does not have a value on the QADDB (e.g. -ParameterWithoutValue):

```
dbserver.qaddb.property.pwov.key=ParameterWithoutValue
```

NOTE: The PROPERTY INSTANCE ("pwov" in the preceding example) is a name that uniquely identifies the setting and can be chosen at your discretion.

Parameter (with value)

`[aia|appserver|dbserver|ns|ws|wsa].[INSTANCE].property.[PROPERTY INSTANCE].key`

`[aia|appserver|dbserver|ns|ws|wsa].[INSTANCE].property.[PROPERTY INSTANCE].value`

Ex. Define a new Progress parameter named "ParameterWithValue" with the value "512" on the QADDB (e.g. -ParameterWithValue 512):

```
dbserver.qaddb.property.pwv.key=ParameterWithValue
dbserver.qaddb.property.pwv.value=512
```

Refer to the table below to determine which configurations are compatible with your OE environment.

Type	Description	OE11 Compatibility	OE12 Compatibility
aia	Application Internet Adapter	YES	NO
appserver	Application Server	YES	NO
dbserver	Database Server	YES	YES
ns	Name Server	YES	NO
ws	WebSpeed Server	YES	NO
wsa	Web Services Adapter	YES	NO

Environment Identification

Settings that start with "environment" identify the environment, the organization that owns it, and its role.

```
> yab config-help environment

SETTINGS

     environment.uuid                     A globally unique ID to identify the environment.

                                          The UUID is managed by the system.

     environment.id                       An ID to describe the environment.

                                          The ID must match the regular expression "[a-zA-Z0-9.-]
+)".

     environment.name                     A short name/phrase to describe the environment.

     environment.type                     Describes the role of the environment.

                                          Accepted:
                                          - development (Development)
                                          - test (Test)
                                          - production (Production)

     environment.organization.id          An ID to identify the organization.

     environment.organization.vertical    Describes the organization's vertical market.

                                          Accepted:
                                          - auto (Automotive)
                                          - food (Food & Beverage)
                                          - conp (Consumer Products)
                                          - elec (Electric/High Tech)
                                          - ind (Industrial)
                                          - lsm (Life Science Medical)
                                          - lsp (Life Science Pharma)
```

The `environment.uuid` setting is automatically configured by the system to uniquely identify each environment. The `system-id-print` command prints this ID and the `system-id-regenerate` command may be used to assign a new unique ID to the environment, for example if the environment is copied.

Reconfiguring Databases

Databases are associated with the `db` and `dbserver` configuration types.

The `db` type configures the database.

`db.INSTANCE.*`

Ex.

`db.qaddb.*`

And the `dbserver` type configures the database server (for databases with a database server)

`dbserver.INSTANCE.*`

Ex.

`dbserver.qaddb.*`

The database and server are associated by sharing the same instance name (e.g. "qaddb").

Configuring Database Location

By default all databases will be located in the directory:

```
databases
```

This default location can be reconfigured with the setting:

```
db._base.dir=[DIRECTORY]
```

Alternatively to configure the location of a specific database:

```
db.[INSTANCE].dir=[DIRECTORY]
```

Ex.

```
db.qaddb.dir=/dr01/database
```

The location of the database should be configured before the environment is created (see QAD Enterprise Edition Installation Guide for details on providing install properties to the installer.) To change the location of an existing database, the database must either be rebuilt using the command *db-[INSTANCE]-rebuild* (which will only retain system data) or repaired using the Progress *prstrct* tool.

Configuring Database Structure

A structure description (.st) file defines the structure of the database. The .st file is a text file that is used to define the areas and extents of the database. For detailed information about structure description files, see *OpenEdge Data Management: Database Management*.

The following command will display a representation of the current structure of a database

```
database-[INSTANCE]-structure-list
```

It will also write the current structure of the database to a file in the database directory:

```
[PHYSICAL NAME].st
```

The structure file in the database directory should always reflect the current structure of the database to support disaster recovery.

To customize the database structure configure the *structurefile* setting on the database.

```
db.[INSTANCE].structurefile=[FILE]
```

The database structure should be configured before the environment is created (see QAD Enterprise Edition Installation Guide for details on providing install properties to the installer.) To change the structure of an existing database, the database must either be rebuilt using the command *db-[INSTANCE]-rebuild* (which will only retain system data) or adjusted using the Progress *prstrct* tool.

Configuring Primary Login Broker (4GL)

To enable the 4GL broker to service connections over a TCP/IP network enable the broker's *network* setting which will assign the broker a port from the configured port range.

Ex. Configure the QADDB database to accept connections from ABL clients over the network with an auto-assigned port.

```
dbserver.qaddb.fourgl.network=true
```

Alternatively you can assign the broker port explicitly.

Ex. Configure the QADDB database to accept connections from ABL clients over the network with an explicit port.

```
dbserver.qaddb.fourgl.port=23500
```

Use the `database-script` command to regenerate the database start scripts.

```
> yab database-script
```

The core application components will use shared memory connections (for performance reasons) even when the 4GL broker is configured to allow network connections. The setting "progress.database.network" can override this behavior but it should not be changed.

Configuring Secondary Login Broker (SQL)

To enable the SQL broker to service connections over a TCP/IP network enable the broker's *network* setting which will assign the broker a port from the configured port range.

Ex. Configure the QADDB database to accept connections from SQL clients over the network with an auto-assigned port.

```
dbserver.qaddb.sql.network=true
```

Alternatively you can assign the broker port explicitly.

Ex. Configure the QADDB database to accept connections from SQL clients over the network with an explicit port.

```
dbserver.qaddb.sql.port=23500
```

Use the `database-script` command to regenerate the database start scripts.

```
> yab database-script
```

Additional secondary login brokers may be setup with the "dbserver.INSTANCE.broker" collection. The port number must be explicitly configured or allocated from the ports range using the "@port" annotation.

Ex. Configure the QADDB database with an additional secondary login broker to accept connections from ABL and SQL clients over the network with a port from the configured ports range.

```
# @port
dbserver.qaddb.broker.another.port=
dbserver.qaddb.broker.another.type=both
dbserver.qaddb.broker.another.numberofservers=1
dbserver.qaddb.broker.another.minclientsperserver=5
dbserver.qaddb.broker.another.maxclientsperserver=10
```

See TCP/IP Ports

Configuring Before Imaging

Overview

Before-imaging is always enabled to let the database engine recover transactions if the system fails. This mechanism is extremely important for database reliability, but it creates a significant amount of I/O that can affect performance. In addition, before-image I/O is usually the first and most likely cause of I/O bottlenecks. The engine must always record a change in the BI file before it can record a change in the database and after-image files. If BI activity creates an I/O bottleneck, all other database activities are affected. The Before Image Writer (BIW) improves database performance by performing before-image overhead operations in the background.

To enable the BIW on a database:

```
dbserver.INSTANCE.beforeimageprocess=true
```

Use the following setting to configure the number of buffers (-bibufs):

```
dbserver.INSTANCE.beforeimagebuffers=INT
```

The `database-script` command regenerates the database start scripts to start the BIW:

```
> yab database-script
```

Configuring After Imaging

Overview

After-imaging lets you recover a database that was damaged when a failure caused the loss of the database or primary recovery (before image) area. When you enable after-imaging, the database engine writes notes containing a description of all database changes to after-image (AI) files. You can use the AI files in the roll-forward recovery process to restore the database, without losing completed transactions that occurred since the last backup.

The after image archiver is used to manage after-image extents following Progress best practices. The utility has three major goals:

- Archive FULL AI extents to a user-specified location
- Maintain a log file to aid in ROLL FORWARD
- Be tightly integrated with OpenEdge Replication

Update Database Structure

The QAD default database structure does not define after image extents.

Use the following command to refresh the exported database structure.

```
database-[INSTANCE]-structure-list
```

And then review the refreshed database structure file to determine if the database has AI extents defined (search for lines that begin with an "a").

```
databases/[PHYSICAL NAME].st
```

If the database does not have any AI extents they will need to be added. Review the Progress documentation for details on properly sizing AI extents ("BASIC GUIDE TO AFTER-IMAGING"). The following example is only for demonstration.

Create a temporary file that defines the AI extents to add.

Ex. admdb-ai.st

```
a /dr01/qadapps/qea/databases/admdb.a1
a /dr01/qadapps/qea/databases/admdb.a2
```

Add the AI extents to the database using the Progress *prostrct* command and then refresh the exported database structure file.

```
> . scripts/pset
> prostrct add databases/admdb admdb-ai.st
> prostrct list databases/admdb
```

Enable After Imaging

If the database is offline, you must have a recent backup of the database. If the database has changed since the last backup you will be prompted to backup the database first. If the database is online a timestamped backup will automatically be created.

To enable AI on all databases, execute the command:

```
> yab database-ai-enable
```

Alternatively to enable AI on a specific database, execute the command:

```
> yab database-[INSTANCE]-ai-enable
```

Configuring After Image Writer

Configuring an after-image writer (AIW) will reduce the I/O required to support after-imaging. The AIW will be started and stopped automatically when the database is started and stopped.

```
dbserver.[INSTANCE].afterimageprocess=true
```

```
dbserver.qadadm.afterimageprocess=true
```

Configuring AI Archiver

The *archivaldir* setting configures the location where AI files are written.

`dbserver.[INSTANCE].archivaldir=[DIRECTORY]`

The default setting writes the AI files to:

`build/work/ai`

Enabling AI archiver

The AI archiver must be enabled when the target databases are offline. Once enabled the archiver process will automatically start and stop when the database is started and stopped.

To enable the AI archiver on all databases, execute the command:

```
> yab database-ai-archiver-enable
```

Alternatively to enable the AI archiver on a specific database, execute the command:

```
> yab database-[INSTANCE]-ai-archiver-enable
```

Update Database Scripts

Run the `database-script` command to regenerate the database start scripts with the correct AI configuration.

```
> yab database-script
```

Recovery

Consult the Progress documentation for instructions on roll-forward recovery.

Configuring Codepage and Collation

The default and recommended configuration of Enterprise Edition creates databases using the UTF-8 codepage and ICU-UCA collation.

To configure the codepage and/or collation for all databases adjust settings on the `db._base` configuration instance which will be inherited by all databases.

Ex. Configure ISO8859-1 codepage and Spanish collation.

```
db._base.codepage=ISO8859-1
db._base.template=spa
db._base.collation=SPANISH9
db._base.collationfile=spa1252.df
```

The help for these settings:

Property	Description
`db.codepage`	The codepage of the database. Default: utf-8
`db.template`	The name of a sub-directory under '${openedge.dir}/prolang' that contains resources that are used when creating the database and loading the collation tables. Ex. utf, dut, sch Default: utf
`db.collation`	The collation of the database (e.g. "basic", "icu-uca"). Default: icu-uca
`db.collationfile`	The collation file to load into the database when it is created. If a relative path is assigned it will be resolved relative to the 'template' directory. When the file is not defined, the system will attempt to find an appropriate collation file by looking for files in the following order: [TEMPLATE]/[COLLATION].df [TEMPLATE]/_tran.df If a matching collation file is not found a hard error is raised when the database is created.

The codepage and collation of the database should be configured before the environment is created (see QAD Enterprise Edition Installation Guide for details on providing install properties to the installer.)

Configuring Database Security

Progress databases can be configured to allow access from ABL and SQL clients. By default a user is permitted to access the database through an ABL or a SQL client, but it is possible to restrict access to only allow the user access from a SQL client.

Security Administrator (ABL)

Security Administrators are responsible for maintaining the security information in the database through an ABL client.

Database Administrator (SQL)

Database Administrators have the ability to access, modify, or delete database objects and to grant privileges to other users through a SQL client.

- Defining Users and Administrator Privileges
- Blank User Access
- Table Permissions

Defining Users and Administrator Privileges

YAB can be given responsibility for the management of database users and administrator privileges.

When user management is enabled, YAB will manage users exclusively, creating, updating, and deleting database users to match the configuration. This is the recommended approach to managing user accounts and administrator privileges.

Ex. Enable user management for all databases

```
db._base.security.user.managed=true
```

When the "user.managed" setting is disabled, YAB will only manage users with the (db.INSTANCE.users.NAME.managed) setting enabled. In this configuration, YAB will never update or delete a database user that is not (or no longer) configured. This approach is retained for backwards compatibility.

When users are not managed, the expectation is that all configured user information accurately describes how users have been set up independently.

A "connection" user should be configured to allow YAB to administer any database with users.

Ex. Configure the account YAB will use to administer the database.

```
db._base.connection.user=admin
db._base.connection.password=mysecret
```

If the account is not managed it must be granted the *Security Administrator* privilege (and may require the *Database Administrator* privilege for SQL administration), otherwise if it is managed it will automatically be granted *Security Administrator* and *Database Administrator* privileges. If a connection user is not configured YAB will attempt to use the Blank User to administer the database but will fail if the blank user does not have sufficient authority.

Review the configuration help for more details:

```
> yab help db.INSTANCE.security db.INSTANCE.connection db.INSTANCE.users
...
```

To apply changes:

```
> yab reconfigure
```

Blank User Access

By default a Progress database permits access to the database without supplying user credentials. As soon as a user is defined SQL clients must authenticate, but ABL clients may continue to access the database without supplying credentials. This ability to connect to the database without supplying credentials is described as "blank user" access in the Progress documentation.

To disable blank user access you must configure the "connection" user account for YAB to administer the database.

Ex. Enable user management and define a connection user for all databases

```
db._base.security.user.managed=true
db._base.connection.user=admin
db._base.connection.password=mysecret
```

See: Defining Users and Administrator Privileges

Blank user access is disabled by enabling the "db.INSTANCE.security.authentication" setting:

Ex. Disable blank user access to all databases

```
db._base.security.authentication=true
```

To apply the change:

```
> yab reconfigure
```

The authentication setting can be disabled to re-allow blank user access.

Table Permissions

Table permissions are used to restrict access to user tables. When multiple rules configure the same table permission, the applied permission is the union of the rules with revocations (patterns using "!") preceding grants.

Ex. Configure a user that has full table permissions to all tables except "baz"

```
db._base.users.foo.user=foo
db._base.users.foo.password=bar

db._base.table-auth.foo.includes=*
db._base.table-auth.foo.excludes=baz
db._base.table-auth.foo.permissions=*
db._base.table-auth.foo.users=foo
```

Review the configuration help for more details:

```
> yab help db.INSTANCE.table-auth
...
```

When Blank User Access is disabled all table permissions not configured by a rule will be set to disallow blank user access but permit any user (ID pattern "!,*") and when Blank User Access is enabled to permit the blank user as well (ID pattern "*").

Schema Changes

The following commands update the schema of databases:

Command	Description
`update`	Updates the environment.
`database-update`	Updates all databases.
`database-INSTANCE-update`	Updates a specific database.
`database-INSTANCE-schema-update`	Updates the schema of a specific database.

The database schema is configured by instances of the *schema* configuration type. Each database may be associated with zero or more schema files. As an optimization, the schema for a database will not be reevaluated if the configured schema files have not changed, unless the -clean option is used to force reevaluation. Reevaluation consists of creating a temporary database named *configured* with the configured schema and comparing that to the installed schema, producing an incremental schema file describing how to update the installed schema to match the configured schema.

`[DATABASE DIRECTORY]/.yab/[PHYSICAL NAME]/schema/incremental.df`

If there are no differences this file will be empty and the database will not be updated.

If tables or sequences are manually defined in the database, the incremental schema file will contain statements to remove these tables and sequences. The recommended approach is to configure these schema changes so they will be retained:

```
> mkdir -p customizations/schema/custom
> cp custom.df customizations/schema/custom
> cat build/config/configuration.properties
schema.custom.file=${customizations.dir}/schema/custom.df
schema.custom.database=db.custom
```

An alternative approach is to enable the following setting to retain manually added tables and sequences. It does not work for retaining changes to fields, triggers, and indexes on tables configured in the system.

`db.INSTANCE.allowunrecognizedschema=true`

To list the schema configuration:

```
> yab config schema.*
schema.fin-qaddb-qadcpl.database=db.qadcpl
schema.fin-qaddb-qadcpl.file=/dr01/qadapps/qea/build/catalog/packages/fin-ee2016/2016/0/16/209
/schema/qadfin/finempty.df
schema.fin-qaddb-qadcpl.version=2016.0.16.209
...
```

The compile database (db.qadcpl) is used when compiling operational source code. Schema files configured for the main database (e.g. schema.INSTANCE.database=db.qaddb) will automatically be mirrored in the compile database. The compile database has the same schema as the main database, excluding the schema associated with QAD Reference Architecture (QRA) modules.

To display the help for schema settings:

```
> yab help schema.

SETTINGS

     schema.area.map                 Used to map the AREA(s) defined in the schema to the AREA(s)
defined
                                     in the target database.

                                     Mapping cannot be performed on incremental schema files.

     schema.centuryoffset            Century Year Offset (-yy) is used to determine the start of
the 100-year period
                                     in which a date with a two-digit year is valid.
                                     Default: 1950

     schema.cpstream                 The codepage to use (cpstream) when reading the schema files.
                                     Default: utf-8

     schema.database                 A reference to the database where the schema should be
applied.

     schema.dateformat               The date format (d) to use.
                                     Default: mdy

     schema.dir                      The root directory containing the schema files to process.

                                     Use either 'file' or 'dir' to locate schema files.

     schema.excludes                 A comma-delimited list of exclude patterns to match schema
files
                                     in the configured directory.

     schema.file                     The schema file to process.

                                     Use either 'file' or 'dir' to locate schema files.

     schema.includes                 A comma-delimited list of include patterns to match schema
files
                                     in the configured directory.
                                     Default: **/*.df

     schema.numdec                   The decimal separator (numdec) to use.
                                     Default: 46 (.)

     schema.numsep                   The number separator (numsep) to use.
                                     Default: 44 (,)

     schema.objects.excludefiles     A comma-delimited list of files listing schema objects to
exclude, one per line.

                                     Filtering cannot be performed on incremental schema files.

     schema.objects.excludes         A comma-delimited list of schema objects to exclude.

                                     Filtering cannot be performed on incremental schema files.

     schema.objects.includefiles     A comma-delimited list of files listing schema objects to
include, one per line.

                                     Filtering cannot be performed on incremental schema files.

     schema.objects.includes         A comma-delimited list of schema objects to include.

                                     Filtering cannot be performed on incremental schema files.

     schema.renamefile               A Progress rename file to describe tables and fields that
have been renamed. Without a rename file, renaming a field A to B would result in dropping
                                     A and then adding B which could result in the loss of data.

                                     Syntax:
                                     T,[OLD TABLE NAME],[NEW TABLE NAME]
                                     F,[TABLE NAME],[OLD FIELD NAME],[NEW FIELD NAME]

                                     Ex. Rename table "foo" to "foo2" and field "bar" (formerly
in "foo") to "bar2".
                                     T,foo,foo2
                                     F,foo2,bar,bar2
```

Using Demo Data

QAD does not recommend upgrading Enterprise Edition in an environment where demo data is configured because this can lead to subsequent data load errors or loading of invalid data.

QAD provides demo data for demonstrating and testing application features. In a non-production environment, the demo data can be loaded into an environment following these steps.

Verify current configuration

Demo data is distributed in a package whose name starts with "demo-data". You can verify that the environment does not already have the demo data installed with the following query:

```
> yab info | grep demo
```

Load Demo Data

If you do not have demo data installed and want to load it follow these steps.

Backup Databases

Create a backup of all databases. The tag "initial-backup" can be replaced with a more meaningful name.

```
> yab -tag:initial-backup database-backup
```

Configure Demo Data

The QAD Enterprise Edition installer is used to reconfigure the environment to use the demo data.

```
> yab install [ENTERPRISE EDITION IMAGE] -install-update:false
```

Proceed through the installer prompts up to the 'Feature Selection' page, and enter '3' to select the Demo Data.

```
[Feature Selection]
Choose the features to install:
 [X] 1 - Enterprise Edition
 [X] 2 - QXtend
 [X] 3 - Demo Data
Hit ENTER to move to the next question.
```

Start the installation to reconfigure the environment.

```
[Start Installation]
Start installing QAD Enterprise Edition 2016?
 n - No
 y - Yes
> y

Validating                                                    OK
Initializing instance                                         OK
Reconfiguring instance                                        OK
Resolving and copying packages                                OK
Cleaning up                                                   OK
INSTALL SUCCESSFUL
```

Rebuild Databases & Update

```
> yab database-rebuild
> rm <appdir>/build/work/system/process-ignore (to reset conversions on QAD Adaptive environments)
> yab -clean update
```

If you plan on switching between standard and demo data frequently you can create a backup of the databases with the demo data loaded and replace the *database-rebuild* command in the previous step with the *database-restore* command (referencing the appropriate tag).

```
> yab -tag:demo-data database-backup
```

Restoring Original Data or Installing Release data

To restore the original data or install the Release/Empty data follow these steps.

Stop Environment

```
> yab stop
```

Unconfigure Demo Data

The YAB installer is used to reconfigure the environment to use the release data.

```
> yab install /dr01/installs/image -install-update:false
```

Proceed through the installer prompts up to the 'Feature Selection' page, and ensure '3 - Demo Data' is not selected.

```
[Feature Selection]
Choose the features to install:
 [X] 1 - Enterprise Edition
 [X] 2 - QXtend
 [ ] 3 - Demo Data
Hit ENTER to move to the next question.
```

Start the installation to reconfigure the environment.

```
[Start Installation]
Start installing QAD Enterprise Edition 2016?
 n - No
 y - Yes
> y

Validating                                                          OK
Initializing instance                                               OK
Reconfiguring instance                                              OK
Resolving and copying packages                                      OK
Cleaning up                                                         OK
INSTALL SUCCESSFUL
```

Restore Initial Backup & Update

If you have an initial backup restore at this point

```
> yab -tag:initial-backup database-restore update
```

Rebuild Databases & Update

If you do not have an initial backup rebuild the databases to load Release data.

```
> yab database-rebuild
> rm <appdir>/build/work/system/process-ignore (to reset conversions on QAD Adaptive environments)
> yab -clean update
```

Proprietary of QAD, Inc.

Using Parameter Files

Overview

Historically QAD has defined database connections using parameter files. When a Progress session starts, the connections defined in a parameter file are made under the authority of the user that installed Progress and not the user that started the Progress session. The Progress install user must have write permission on the database files when making a shared memory connection, but the user starting the session does not. Beginning with QAD Enterprise Edition 2015 (Cloud) and QAD Enterprise Edition 2016 (On-Premise), databases are connected from within a Progress session by the QAD Reference Architecture (QRA) bootstrapping procedure and not from a parameter file. The consequence of this change is that the user that starts a Progress session requires write permission to the databases connected with a shared memory connection.

This page describes how to configure Enterprise Edition to define database connections through parameter files.

Preparation

When parameter file connections are enabled, the system will create parameter files to connect the databases and remove database connection information from all QRA bootstrap files. By default, the parameter files have the same name as the bootstrap files but with a "pf" file extension.

```
> yab config "bootstrap.*.file" "bootstrap.*.parameterfile"
bootstrap.default.file=/dr01/qadapps/qea/config/bootstrap.xml
bootstrap.default.parameterfile=/dr01/qadapps/qea/config/bootstrap.pf
bootstrap.foundation.file=/dr01/qadapps/qea/config/foundationbootstrap.xml
bootstrap.foundation.parameterfile=/dr01/qadapps/qea/config/foundationbootstrap.pf
```

Also when parameter file connections are enabled, the factory default configuration of standard Progress sessions will reference the parameter files connecting the databases. Converting a system to use parameter files to connect to the database can be transparent as long as these configuration settings are not overridden and/or the system does not have any third party or custom Progress sessions that need to be adjusted.

Settings that end with *srvrstartupparam* configure server sessions to use parameter files and settings that end with *properties.pf* configure client sessions to use parameter files. The following commands will locate server and client settings that have been overridden.

```
> find build/config -name "*.properties" | grep -v "build/config/packages" | xargs grep
srvrstartupparam
> find build/config -name "*.properties" | grep -v "build/config/packages" | xargs grep
properties.pf
```

Make a note of any overridden settings and the files in which they are defined.

If Enterprise Financials 2016, 2016.1, 2017, or 2017.1 is installed, a Financials patch may be required to support parameter file connections. Please review your Financials patch version before proceeding with the change.

Open Edge 12 (OE12):

In an OpenEdge (OE) 12 environment, the process of using a parameter file to connect to the database is similar to the process described above, with the exception that the property containing the arguments *"-pf ${bootstrap.default.parameterfile}"* is "*pas.<instance>.openedge.session-<instance>.agentStartupParam"*.

Enabling

The *bootstrap._useparameterfile* setting that is used to enable (or disable) the use of parameter files to connect databases is the same as the property described above.

The property that contains the parameter file arguments is *pas.<instance>.openedge.session-<instance>.agentStartupParam*

Ex. for pas-mfg: *pas.mfg.openedge.session-mgr.agentStartupParam:*

```
> yab config -trace pas.mfg.openedge.session-mgr.agentStartupParam
pas.mfg.openedge.session-mgr.agentStartupParam=-T "/dr01/qadapps/systest/servers/pas-mfg/temp" -
mmax 16384 -Bt 10000 -tmpbsize 4 -lkwtmo 1800 -errorstack

    [1: build/config/packages/yab-ee-foundation/1/18/0/29/default/yab-ee-foundation.properties]
    # @if bootstrap._useparameterfile=true
    pas.mfg.openedge.session-mgr.agentStartupParam=-T "${base}/temp" -pf ${bootstrap.default.
parameterfile} -mmax 16384 -Bt 10000 -tmpbsize 4 -lkwtmo 1800

    [2: build/config/packages/dde-build/2/17/0/106/default/pas.properties]
    # @indexer args
    pas._base.openedge.session-mgr.agentStartupParam=

    [I: build/config/packages/dde-build/2/17/0/106/default/pas.properties]
    pas.*.openedge.session-mgr.agentStartupParam[-errorstack]=
```

The arguments "-pf ${bootstrap.default.parameterfile}" defined by the overridden setting need to be integrated into the first setting as in the following example:

```
pas.mfg.openedge.session-mgr.agentStartupParam=-pf ${bootstrap.default.parameterfile} -T "/dr01
/qadapps/systest/servers/pas-mfg/temp" -mmax 16384 -Bt 10000 -tmpbsize 4 -lkwtmo 1800 -errorstack
```

Once the configuration of all Progress sessions has been updated in the *build/config/configuration.properties* file to reference the correct parameter file, apply the changes by running the following commands to stop, reconfigure, and start the environment:

```
> yab stop
> yab reconfigure
> yab start
```

The changes can be verified by again running *yab config* command

Ex. pas-mfg:

```
> yab config  pas.mfg.openedge.session-mgr.agentStartupParam
pas.mfg.openedge.session-mgr.agentStartupParam=-pf /dr01/qadapps/systest/config/bootstrap.pf -T "
/dr01/qadapps/systest/servers/pas-mfg/temp" -mmax 16384 -Bt 10000 -tmpbsize 4 -lkwtmo 1800 -
errorstack
```

Open Edge 11 (OE11)

In an OpenEdge (OE) 11 environment, the process of using a parameter file to connect to the database is similar to the process described above, with the exception that the property containing the arguments "*pas.<instance>.openedge.session-<instance>.agentStartupParam" is "-pf ${bootstrap.default.parameterfile}"*.

Enabling

The *bootstrap._useparameterfile* setting is used to enable (or disable) the use of parameter files to connect databases.

build/config/configuration.properties

```
bootstrap._useparameterfile=true
```

If you identified any overridden settings in the previous step, they should be adjusted to reference the correct parameter file. The (-trace) option on the *config* command may be used show the value of the factory default setting that is being overridden. In the following example, the second definition of the setting *appserver.mfg.srvrstartupparam* is being overridden by the first.

```
yab -trace config appserver.mfg.srvrstartupparam
appserver.mfg.srvrstartupparam=-mmax 20408 -Bt 20000 -tmpbsize 4 -nodupttidxerror

    [1: build/config/system/fin2018-core-systest-pc.properties]
    appserver.mfg.srvrstartupparam=-mmax 20408 -Bt 20000 -tmpbsize 4 -nodupttidxerror

    [2: build/config/packages/yab-ee-foundation/1/10/0/10/default/yab-ee-foundation.properties]
    # @if bootstrap._useparameterfile=true
    # @if openedge.version =* [11.7.4, 12)
    appserver.mfg.srvrstartupparam=-pf ${bootstrap.default.parameterfile} -mmax 16384 -Bt 10000 -
tmpbsize 4 -nodupttidxerror
```

The arguments "-pf ${bootstrap.default.parameterfile}" defined by the overridden setting need to be integrated into the first setting as in the following example:

```
appserver.mfg.srvrstartupparam=-pf ${bootstrap.default.parameterfile} -mmax 20408 -Bt 20000 -
tmpbsize 4 -nodupttidxerror
```

When the configuration of all Progress sessions have been adjusted to reference the correct parameter file, the changes are applied with the following commands which will stop the environment, reconfigure the environment, and then start the environment:

```
> yab stop
> yab reconfigure
> yab start
```

The *reconfigure* command will generate the parameter files, update the bootstrap configuration files, rewrite scripts, and adjust the Progress ubroker.properties configuration file.

Reconfiguring Tomcat

- Enabling the Manager Web Application
- Reconfiguring Tomcat Startup Parameters
- Configuring SSL Connections

Enabling the Manager Web Application

Tomcat provides the manager web application to remotely control a Tomcat instance.

When Tomcat is installed in secure mode the manager web application is not deployed into the Tomcat instance.

Ex. Tomcat instance configured to use secure mode.

```
> yab config tomcat.default.enablesecure
tomcat.default.enablesecure=true
```

When Tomcat is not installed in secure mode the manager web application is deployed, but no accounts are preconfigured to allow access to the manager web application for security reasons. The "manager-gui" role is a Tomcat role with permission to access the manager web application.

Ex. Provide access to the manager web application with the username (admin) and the password (mfgpro).

build/config/configuration.properties

```
tomcat.[INSTANCE].roles.manager-gui.rolename=manager-gui
tomcat.[INSTANCE].roles.manager-gui.members=admin
tomcat.[INSTANCE].users.admin.username=admin
tomcat.[INSTANCE].users.admin.password=mfgpro
```

Ex. Enable the manager web application on the default Tomcat instance.

build/config/configuration.properties

```
tomcat.default.roles.manager-gui.rolename=manager-gui
tomcat.default.roles.manager-gui.members=admin
tomcat.default.users.admin.username=admin
tomcat.default.users.admin.password=mfgpro
```

To add additional users...

```
tomcat.[INSTANCE].roles.manager-gui.members=admin,[USER]
tomcat.[INSTANCE].users.[USER].username=[USER]
tomcat.[INSTANCE].users.[USER].password=
```

To add additional roles...

```
tomcat.[INSTANCE].roles.[ROLE].rolename=[ROLE]
tomcat.[INSTANCE].roles.[ROLE].members=[COMMA-SEPARATED USERS]
```

To apply the change:

`yab tomcat-[INSTANCE]-update tomcat-[INSTANCE]-stop tomcat-[INSTANCE]-start`

Ex. Apply the change to the default Tomcat instance.

```
> yab tomcat-default-update tomcat-default-stop tomcat-default-start
```

Verify

Navigate to the following URL in a web browser and login as the user "admin" with the password "mfgpro".

`http://[HOST]:[PORT]/manager`

Reconfiguring Tomcat Startup Parameters

The Java startup parameters for Tomcat are defined by the *startupopts* setting. To change the startup parameters that are inherited by all Tomcat servers.

```
tomcat._base.startupopts="-XX:MaxPermSize=256m"
```

Alternatively to change the startup parameters of a specific Tomcat server.

```
tomcat.[INSTANCE].startupopts="-XX:MaxPermSize=512m"
```

To apply the change:

```
> yab tomcat-[INSTANCE]-update
```

The change will be applied to the *setenv.[sh|bat]* script in the Tomcat instance *bin* directory.

Ex. Default Tomcat instance

```
> cat servers/tomcat/bin/setenv.sh
```

Configuring SSL Connections

Tomcat can be configured to support SSL connections. The configuration of SSL requires an X.509 certificate that digitally binds a cryptographic key to an organization's details. The certificate must be imported into the *keystore* that is associated with the Tomcat instance to be secured.

The default configuration associates all Tomcat instances with the keystore:

`build/work/keystore/default.bin`

Ex. Show the keystore that the default Tomcat instance is associated with.

```
> yab config tomcat.default.keystore
tomcat.default.keystore=/dr01/qadapps/qea/build/work/keystore/default.bin
```

Ex. Show the configuration of the default keystore.

```
> yab config keystore.default.*
keystore.default.file=/dr01/qadapps/qea/build/work/keystore/default.bin
keystore.default.password=changeit
```

The keystore is created when the first certificate is imported.

Change the Keystore Password

The keystore password should be changed before importing certificates into the keystore. If the password is changed after the certificates are imported the certificates will need to be imported again after changing the password.

```
keystore.default.password=abetterpassword
```

Remove the existing keystore. If it does not exist, nothing will be done.

```
> yab keystore-default-remove
```

The keystore password is stored in the clear in the *configuration.properties* file and in the *conf/server.xml* file associated with all configured Tomcat instances. These files should have appropriate OS permissions set.

Import Certificates into the Keystore

To import a certificate use either of the following commands. An alias can be used to uniquely identify the certificate if multiple certificates will be imported into the keystore (Tomcat will use the first certificate in the keystore unless configured with an alias to use).

`yab keystore-[INSTANCE]-import -key:[PRIVATE KEY] -certificate:[CERTIFICATE CHAIN]`

or

`yab keystore-[INSTANCE]-import -key:[PRIVATE KEY] -certificate:[CERTIFICATE CHAIN] -alias:cert1`

More information is available in the command help:

```
> yab help keystore-default-import
PROCESS
     keystore-default-import - Imports a certificate into the 'default' keystore.
DESCRIPTION
     If the alias is already defined in the keystore, the prior entries will be replaced.
     The openssl toolkit can be used to create a self-signed certificate for testing:
     openssl req -x509 -newkey rsa:2048 -days 10000 -nodes -keyout key.pem -out cert.pem
     and can be used to convert keys into the format required by this API:
     openssl pkcs8 -topk8 -in key.pem -inform pem -out key.der -outform der -nocrypt
OPTIONS
     Name            Description
     -----           -----------
     alias           The alias to identify the key in the keystore.
                     If not defined the alias 'default' will be used.
     key             The DER encoded private key file in PKCS#8 format (required).
     certificate     The DER encoded certificate file in X.509 format (required).
```

The following command will display the certificates in a keystore:

`yab keystore-[INSTANCE]-print`

Reconfigure Tomcat to enable SSL

Configure the following setting to true to enable SSL on a tomcat instance:

`tomcat.[INSTANCE].usessl=true`

If you imported multiple certificates into the keystore you can use the following setting to identify the alias of the certificate to use:

`tomcat.[INSTANCE].keyalias=[ALIAS]`

To apply the change update the Tomcat instance.

`yab tomcat-[INSTANCE]-update`

To display the TCP/IP port used for SSL connections:

Ex. Checking the SSL port of the default Tomcat instance.

```
> yab config tomcat.default.sslport
tomcat.default.sslport=22014
```

Reconfiguring PROPATHs

Progress sessions use the PROPATH to locate resources. The PROPATH is a list of paths where requests for resources are satisfied by the first path in which the resource is defined. To simplify the management of PROPATH information, QAD Enterprise Edition defines a set of base PROPATH definitions which are then used and extended in different application sessions (telnet, client, appservers, etc).

Base Definitions

Setting	Description
propath.base	The most fundamental PROPATH definition inherited by many sessions.
propath.mfg	Extends *propath.base* to provide a base PROPATH for operational sessions.
propath.fin	Extends *propath.base* to provide a base PROPATH for Finance sessions.

Analysis

The following command lists all of the PROPATH settings and may be used to locate the setting that controls the Progress session you are interested in adjusting.

```
> yab -skip-value config "*propath*"
clientscript._base.properties.propath
code.configurator-webspeedcode.propath
code.configurator.propath
code.eam.propath
code.edi-default.propath
code.fin.propath
code.ict.propath
code.mfg-customizations.propath
code.mfg.propath
code.qadcss.propath
code.qxi.propath
code.qxo.propath
conversion._base.propath
conversion.fin.propath
conversion.mfg.propath
...
```

The (-trace) option can be used to drill into a specific PROPATH to see how it was constructed. In the following example we see that the PROPATH that controls the Financials application server inherits the paths from *propath.fin*, which in turn inherits the paths from *propath.base*, and that there are independent contributions to the path.

```
> yab -trace config code.fin.propath
code.fin.propath=/dr01/qadapps/systest/config/qadcss,/dr01/qadapps/systest/config,/dr01/qadapps
/systest/build/catalog/packages/qracore/3/32/0/129/qad.qra.core/bin/oe12/qracore.pl,/dr01/qadapps
/systest/customizations/fin,/dr01/qadapps/systest/build/catalog/packages/fin-customization/2022/1
/7/3,/dr01/qadapps/systest/dist/mfg-customizations, /dr01/qadapps/systest/dist/fin/patch, /dr01
/qadapps/systest/dist/fin,/dr01/qadapps/systest/dist/pro/com/mfgpro,/dr01/qadapps/systest/dist
/ict,/dr01/qadapps/systest/build/catalog/packages/fin-bldata/2022/1/7/3,/dr01/qadapps/systest
/build/catalog/packages/fin-bin64-qadfin/2022/1/7/3/oe12/qadfin.pl,/dr01/qadapps/systest/dist
/pro,.,/dr01/qadapps/systest/build/catalog/packages/service-interface-foundation/1/2/0/1/lib/oe12
/qra.pl,
/dr01/qadapps/systest/dist/qxtadpt,/dr01/qadapps/systest/dist/mfg,/dr01/qadapps/systest/dist/mfg
/us,/dr01/qadapps/systest/dist/mfg/us/bbi

    [1: build/config/packages/yab-ee-foundation/1/18/0/29/default/yab-ee-foundation.properties]
    # @id customizations
    # @append
    # @ref propath.fin
    # @unique
    # @group 2
    code.fin.propath=${customizations.fin.dir},${packages.fin-customization.dir}

    [2: build/config/packages/yab-ee-foundation/1/18/0/29/default/yab-ee-foundation.properties]
    # @ref propath.base
    propath.fin=

    [3: build/config/packages/yab-ee-foundation/1/18/0/29/default/yab-ee-foundation.properties]
    # @path
    # @append
    # @group 3
    propath.fin=${dist.dir}/fin/patch,${appdir}/dist/fin

    [4: build/config/packages/yab-ee-foundation/1/18/0/29/default/yab-ee-foundation.properties]
    # @append
    propath.fin=${packages.fin-bldata.dir},${fin.qadfin.pl}

    [5: build/config/packages/yab-ee-foundation/1/18/0/29/default/yab-ee-foundation.properties]
    # @append
    # @id netui-pro
    propath.fin=${netui.pro.dir}

    [6: build/config/packages/yab-css/1/18/0/5/default/yab-css.properties]
    # @append
    # @group 0
    # @id qadcss
    propath.base=${appdir}/config/qadcss

    [7: build/config/packages/yab-ee-foundation/1/18/0/29/default/yab-ee-foundation.properties]
    # @unique
    propath.base=

    [8: build/config/packages/yab-ee-foundation/1/18/0/29/default/yab-ee-foundation.properties]
    # @path
    # @append
    # @group 0
    # @id base
    propath.base=${appdir}/config
```

Add a path

To add a path to a PROPATH choose one of the following options:

Standard Priority

```
# @id [PATH ID]
# @append
[SETTING]=[PATH]
```

Elevated Priority

```
# @id [PATH ID]
# @append
# @group [GROUP ID]
[SETTING]=[PATH]
```

The PATH ID is used to associate the path (or paths) with a name that can be used when ordering the PROPATH (see below), but it is optional. The GROUP ID is used to set the priority of the added path(s) using the following table:

Group ID	Description
0	Bootstrap
1	Configuration
2	Customizations
3	Patches
4	Extensions
(undefined)	Standard

Ex. Add some test programs to the operational compile:

```
# @id test
# @append
code.mfg.propath=/test/programs
```

See Configuration Files for more information about the "@id", "@append", and "@group" annotations.

Order Paths

The group assignment is used to define a first level ordering of the paths, where all group 0 paths will preceded all group 1 paths which will precede all group 2 paths and so on. A secondary ordering of the paths within a group is afforded by ordering hints associated with the group annotation (see the documentation for the *group* annotation in Configuration Files).

Ex. Add some test programs to the operational compile with higher precedence than the "main" operational code:

```
# @id test
# @append
# @group -main
code.mfg.propath=/test/programs
```

The group order is used to take explicit control over the ordering of paths within a group. It will replace the ordering hints when defined. The paths must define an ID to be ordered by this mechanism.

Ex. Order the test paths ahead of the "main" operational paths:

```
# @grouporder test main
code.mfg.propath=
```

Ex. Order the test paths before all *standard* operational paths:

```
# @grouporder test *
code.mfg.propath=
```

Ex. Order the test paths after all *standard* operational paths:

```
# @grouporder * test
code.mfg.propath=
```

See Configuration Files for more information about the "@grouporder" annotation.

Reconfiguring AdminServer

The `AdminServer` configuration is specific to OE11 and does not apply to OE12. Therefore, the details below are relevant only for OE11.

OpenEdge11(OE11):

The Progress AdminServer is configured through the *adminserver* type.

```
> yab help adminserver.
 adminserver.adminport                  The TCP/IP port used for communication between the
admin server and databases.
 adminserver.conmgr                     Locates the connection manager configuration file.
 adminserver.plugins                    Locates the plugin configuration file.
...
```

Properties in the plugin configuration file can be defined using the following pattern:

`adminserver.plugins.[INSTANCE].section=[section to modify]`

`adminserver.plugins.[INSTANCE].property=[property]`

`adminserver.plugins.[INSTANCE].value=[value]`

Ex. Define the *jvmargs* plugin setting:

```
adminserver.plugins.jvmargs.section=PluginPolicy.Progress.AdminServer
adminserver.plugins.jvmargs.property=jvmargs
adminserver.plugins.jvmargs.value=-Xmx256m -Djava.awt.headless=true -Dsun.lang.ClassLoader.
allowArraySyntax=true -Dserver.start.retryInterval=2
```

Result:

```
[PluginPolicy.Progress.AdminServer]
 jvmargs=-Xmx256m -Djava.awt.headless=true -Dsun.lang.ClassLoader.allowArraySyntax=true -Dserver.
start.retryInterval=2
```

Reconfiguring Application Servers

Open Edge 12 (OE12)

Progress application servers are configured through the *pas* type.

```
> yab config-help pas
```

```
> yab -instances config pas
```

Open Edge 11 (OE11)

In OE11 environment, progress application servers are configured through the *appserver* type.

```
> yab config-help appserver
```

```
> yab -instances config appserver
```

Enabling and Disabling 4GLTrace

4GLTrace is useful for debugging but can significantly increase log file sizes and impact performance, so it's important to manage this setting carefully.

Open Edge 12 (OE12)

Enable

In OE12, you can achieve this objective by updating the *agentLoggingLevel* property for any pas instance in *configuration.properties*. To increase the logging output, set it to 4.

Ex. Configure more detailed logging on the 'pas-mfg' server:

```
pas.mfg.openedge.session-mgr.agentLoggingLevel=4
```

Ex. Apply the configuration change to the 'mfg' pas server:

```
yab pas-mfg-update
```

Disable

With 4GL Tracing enabled, the application server writes a lot more information to its log files than is otherwise the case. This approach can slow down the application and consume excessive amounts of disk space, so it is generally a good idea to disable 4GLTrace after capturing the data to evaluate. To undo the change, remove the settings from *configuration.properties* (or comment them out) and then apply the changes.

Ex. Revert back to the original logging level value from 4 to 2 (if it was 2) on the 'pas-mfg' server:

```
pas.mfg.openedge.session-mgr.agentLoggingLevel=2
```

```
yab pas-mfg-update
```


The `agentLoggingLevel` property determines how much detail is captured in the logs. The available logging levels are:

- **0 - No Logging:** Disables logging completely.
- **1 - Errors Only:** Logs only critical errors. This is the default level for minimal impact on performance.
- **2 - Errors and Warnings:** Captures both errors and warnings. This level is useful for identifying potential issues that are not critical but may need attention.
- **3 - Errors, Warnings, and Info Messages:** Provides detailed information about operations and is suitable for troubleshooting and gaining insights into the system's behavior.
- **4 - Full Debugging:** Captures all logging details, including debug information. Use this level for in-depth troubleshooting, but be aware that it may impact performance due to the high volume of log data.

Open Edge 11 (OE11)

Enable

To increase the logging output from an application server configure the appropriate logging settings:

Ex. Configure more detailed logging on the 'mfg' application server:

```
appserver.mfg.srvrlogginglevel=4
appserver.mfg.srvrlogentrytypes=ASPlumbing,DB.Connects,4GLTrace
```

And then apply the change to 'build/work/generated/ubroker.properties':

Ex. Apply the configuration change to the 'mfg' application server:

```
yab appserver-mfg-update
```

If the environment is online the change will only have an effect if allowruntimeupdates is enabled for the application server.

```
> yab config appserver.mfg.allowruntimeupdates
appserver.mfg.allowruntimeupdates=1
```

If the brokers are very busy, it may take a while for a change to 4GLTrace (enabling and disabling) to have an effect.

Disable

With 4GL Tracing enabled, the application server writes a lot more information to its log files than is otherwise the case. This approach can slow down the application and consume excessive amounts of disk space, so it is generally a good idea to disable 4GLTrace after capturing the data to evaluate. To undo the change, remove the settings from *configuration.properties* (or comment them out) and then apply the changes.

Ex. Revert back to the original logging configuration on the 'mfg' application server:

```
# appserver.mfg.srvrloggінglevel=4
# appserver.mfg.srvrlogentrytypes=ASPlumbing,DB.Connects,4GLTrace
```

```
yab appserver-mfg-update
```

Migrating to a New Host

Preconditions

To use this procedure to migrate an environment to a new host the following preconditions must be met:

- The location of environment files should be the same on the source and destination host.
- The operating system should be the same on the source and destination host (or OS specific packages reviewed).

Procedure

Step 1: Ensure prerequisites are installed on the destination host.

Step 2: Copy environment from the source host to the destination host.

Step 3: Configure the host setting on the destination host.

build/config/configuration.properties

```
host=[DESTINATION HOST]
```

Step 4: Apply the change on the destination host (will restart environment if online)

```
> yab update
```

TCP/IP Ports

Servers use TCP/IP ports for communication.

By default ports are allocated to servers from ranges configured by the *ports* and the *dynamic-ports* settings.

```
> yab config ports
ports=22000-22100

vmwtb02:sc2> yab config dynamic-ports
dynamic-ports=1026-2000
```

Servers that require a stable port are allocated ports from the *ports* range. Once a port is allocated to a server it will continue to be assigned to that server. The file *build/work/system/ports* records port allocations. Servers that dynamically allocate ports are configured with the *dynamic-ports* range.

See the documentation for the *port* annotation in Configuration Files for further details.

Explicit Port Assignment

Alternatively ports can be directly assigned to servers.

Ex. Configure the SMTP to use port 26:

```
# @port
smtp.port=26
```

The statement "# @port" in the example above is a port annotation. The annotation simply serves to let the system know that the port number (26) has been assigned and should not be allocated to any other resource without an explicit port assignment.

To explicitly configure dynamic port ranges use the information in the following table:

Server	Range Start Setting	Range End Setting	OE11 Compatibility	OE12 Compatibility
Webspeed	ws.[INSTANCE].srvrminport	ws.[INSTANCE].srvrmaxport	YES	NO
Application Server	appserver.[INSTANCE].srvrminport	appserver.[INSTANCE].srvrmaxport	YES	NO
Database Server (4GL)	dbserver.[INSTANCE].fourgl.mindynamicport	dbserver.[INSTANCE].fourgl.maxdynamicport	YES	YES
Database Server (SQL Broker)	dbserver.[INSTANCE].sql.mindynamicport	dbserver.[INSTANCE].sql.maxdynamicport	YES	YES
Progress Admin Server (pas)	pas.[INSTANCE].openedge.agent.agentMinPort	pas.[INSTANCE].openedge.agent.agentMaxPort	NO	YES

Adding Languages

Configure Language

To add an additional language adjust the *languages* setting:

```
# A comma-delimited list of the languages to support.
# Available: us,ch,cs,cz,du,fr,ge,it,jp,ko,ls,pl,po,tw
languages=us,ge
```

Non Core Languages

QAD Enterprise Edition distributes resources for the following core languages:

Count	Code	Language
1	us	English
2	ch	Simplified Chinese
3	cs	Spanish
4	cz	Czech
5	du	Dutch
6	fr	French
7	ge	German
8	it	Italian
9	jp	Japanese
10	ko	Korean
11	ls	Spanish (Mexico)
12	pl	Polish
13	po	Portuguese (Brazil)
14	tw	Traditional Chinese

If the language being added is not one of the core languages, you must also configure the Financials patch with support for the language as well as the language specific *qad-lang* image that provides the translations.

See documentation included in the *qad-lang* image for additional details.

It may also be necessary to configure a new instance of the `language` configuration type to update application files like *locale.dat*, *encoding.dat*, and *configscreens.xml*.

```
> yab help "language."

SETTINGS

     language.encoding                          The encoding info for the language with the
format:[MFG/PRO language code],[Java encoding],[Progress encoding],[html/xml encoding],[xsl
encoding]
                                                e.g. us,ISO8859_1,ISO8859-1,utf-8,utf-8

     language.id                                The id for the language

     language.locale                            The locale info for the language with the format:
[MFG/PRO language code],[ISO language code],[ISO Country code],[optional variant],[date format],
[numberic format],[Progress language
                                                 code]
                                                e.g. US,en,US,,mdy,American,ame

     language.program.INSTANCE.defaulttable     The default table of the program

     language.program.INSTANCE.name             The language might need to update the program
section in configscreens.xml file, then define the new program here will do that trick
                                                The name of the program

     language.program.INSTANCE.tables           The table list of the program
```

If the new language should add additional codepages to the Financials *server.xml* file then append a value to the setting a `dditional.codepages`.

Ex. Defining Thai Language

build/config/configuration.properties

```
language.th.id=th
language.th.locale=US,en,TH,,dmy,Thailand,tha
language.th.encoding=${language.th.id},windows-874,620-253,windows-874,windows-874

language.th.program.kasoivmt.name=kasoivmt.p
language.th.program.kasoivmt.defaulttable=so_mstr
language.th.program.kasoivmt.tables=so_mstr,sod_det

# @append
additional.codepages=620-253
```

Apply Changes

Run an update to add the language.

```
> yab update
```

Using AIA

> ⚠ The Application Internet Adapter(AIA) is specific to OE11 and does not apply to OE12. Therefore, the details below are relevant only for OE11.

To configure the .NET client to send requests through the default Progress Application Internet Adapter:

build/config/configuration.properties

```
netui.aia.enabled=true
```

```
> yab tomcat-default-stop reconfigure tomcat-default-start
```

> ⚠ The Financials client components are not currently compatible with AIA and will continue to connect outside of an AIA adapter.

By default, connections from AppServer clients will be restricted to those that connect using HTTPS tunneling, when the Tomcat that hosts AIA is configured to support SSL (i.e. tomcat.default.usessl=true). This restriction can be explicitly enabled or disabled using the `aia.default.httpsenabled` setting.

Ex. Explicitly enable HTTPS:

```
aia.default.httpsenabled=true
```

SSH and Telnet Protocols

SSH

By default the .NET connection manager and terminal mode programs are configured to use the SSH protocol, because it is more secure than the Telnet protocol.

If you have installed a .NET release before 3.2, the "Granados SSH library for .NET" (Routrek.Granados.dll) must be copied to the Home Server directory to run programs in terminal mode in the .NET. Clients will download the DLL as necessary. QAD cannot redistribute the Granados SSH library due to export restrictions.

The library can be downloaded from:

http://granados.sourceforge.net/

Use the following command to print the Home Server directory the DLL should be copied into:

```
yab config webapp.homeserver.dir
```

Telnet

Use the following configuration to switch from the SSH protocol to the Telnet protocol:

build/config/configuration.properties

```
netui.connmgr.protocol=telnet
netui.connmgr.port=23
netui.telnet.protocol=telnet
netui.telnet.port=23
```

To apply the change:

```
yab reconfigure restart
```

Shell Configuration

The following settings are used by the .NET connection manager and terminal mode programs when connecting to the server as the OS account configured by the *netui.connmgr.user* and the *netui.telnet.user* respectively (typically the same account). These settings should match the prompts that are produced when making an SSH or Telnet connection to the server interactively as the OS account.

Setting	Description
`netui.connmgr.serverprompt`	The shell prompt, which is dependent upon the default shell, and can vary based on user configuration, as well as across different operating systems. Default: $
`netui.connmgr.loginprompt`	The prompt for the user name. Default: login:
`netui.connmgr.passwordprompt`	The prompt for the password. Default: Password:

To apply:

```
> yab reconfigure
```

Bootstrap Files

Application sessions are configured with bootstrap files, which in turn are configured by the `bootstrap` configuration type.

```
> yab config "bootstrap.*"
bootstrap.default.database.network=false
bootstrap.default.databases=db.qaddb,db.qadadm,db.qadhlp,db.qadmodule,db.qxevents
bootstrap.default.excludes=eambridge
bootstrap.default.file=/qad/sandbox/user/wtb/02/sc2-core/config/bootstrap.xml
bootstrap.default.global-module-locator=/qad/sandbox/user/wtb/02/sc2-core/config/global-module-
locator.xml
bootstrap.default.modules.base.databases=db.qaddb
bootstrap.default.modules.mfgcoreplus.databases=db.qaddb
bootstrap.default.programs.0.name=mfaistrt.p
bootstrap.foundation.database.network=false
bootstrap.foundation.databases=db.qaddb,db.qadadm,db.qadhlp,db.qadmodule,db.qaddb,db.qadadm,db.
qadhlp,db.qadmodule
bootstrap.foundation.file=/qad/sandbox/user/wtb/02/sc2-core/config/foundationbootstrap.xml
bootstrap.foundation.global-module-locator=/qad/sandbox/user/wtb/02/sc2-core/config/global-module-
locator.xml,/qad/sandbox/user/wtb/02/sc2-core/config/global-module-locator.xml
bootstrap.foundation.includes=qracore,mfgcoreplus,fincore
bootstrap.foundation.modules.mfgcoreplus.databases=db.qaddb,db.qaddb
```

A new bootstrap file can be defined based on the configuration of one of the standard bootstrap files. For example, to create an alternate version of the default bootstrap file that connects to the configured databases over the network, possibly to support clients in self service mode, you could configure the following:

build/config/configuration.properties

```
# @extends bootstrap.default
bootstrap.default-network=
bootstrap.default-network.database.network=true
bootstrap.default-network.file=${qra.config.dir}/bootstrap-network.xml
```

And this configuration would define a new process to generate the bootstrap file during an update:

```
> yab bootstrap-default-network-update
> cat config/bootstrap-network.xml
...
```

To use the alternate bootstrap in a client script, the script would pass the location of the bootstrap file (on the PROPATH) to the `ClientBootstrap.p` program as demonstrated below:

```
$DLC/bin/_progres -pf /qad/sandbox/user/wtb/02/sc2-core/build/work/generated/application.pf
$STARTUP_PARAMS -cpinternal $CODEPAGE -cpstream $CODEPAGE -p com/qad/qra/core/ClientBootstrap.p -
param bootstrap=bootstrap-network.xml,startup=mf.p,logfile=/qad/sandbox/user/wtb/02/sc2-core/build
/logs/client/session-chui-${USER}.log
```

Database Connections

Historically database connection information was defined in bootstrap files, but beginning with Enterprise Edition 2019, new installations define database connection information in parameter files by default. The setting `bootstrap._useparameterfile` controls whether connection information is stored in bootstrap files or in parameter files.

```
yab help bootstrap._useparameterfile

SETTINGS

     bootstrap._useparameterfile     When true, database connections will be defined in a
parameter file
                                     instead of the bootstrap file.

                                     When databases are defined in a parameter file they are
processed
                                     as startup parameters and a shared memory connection only
requires
                                     read permission on the database files. When databases are
defined
                                     in a bootstrap file they are processed at runtime using
CONNECT
                                     statements and a shared memory connection requires read and
write
                                     permission on the database files.

                                     There is no advantage to defining connections in the
bootstrap file.
                                     The default is false for backwards compatibility.

                                     This is NOT an instanced setting.

                                     Ex. Use PF files to connect databases for all bootstrap
files.
                                     bootstrap._useparameterfile=true

                                     WARNING: The value of this setting should not be changed
without
                                     understanding the implications. When the value is true, all
Progress
                                     sessions that use bootstrapping MUST reference the
bootstrap's parameter
                                     file and when the value if false, all Progress sessions that
use
                                     bootstrapping MUST NOT reference the bootstrap's parameter
file.
                                     The factory default settings for standard EE sessions
respect this
                                     option, but overrides (i.e. srvrstartupparam) and custom
sessions
                                     should be reviewed for compatibility.

                                     See: bootstrap.INSTANCE.parameterfile

                                     Default: false
```

Environments that are upgraded to a new version of YAB are not automatically updated to use parameter files because switching to use parameter files could break the environment and requires a careful review of all settings that are not set to their factory default value.

See: Using Parameter Files

QAD Reporting Framework Printers

QAD Reporting Framework printers are configured using instances of the `qrfprinters` configuration type.

```
> yab help qrfprinters

SETTINGS

     qrfprinters.description     The QRF Printer's Description. Ex. qrfprinters.1.
description=Kevin printer

     qrfprinters.uncpath         The QRF Printer's UNCPath. Ex. qrfprinters.1.
uncpath=\\corp23\rm01
```

Ex. Define two printers.

build/config/configuration.properties

```
qrfprinters.1.uncpath=\\corp23\rm01
qrfprinters.1.description=Mark's Favorite Printer

qrfprinters.2.uncpath=\\corp23\rm02
qrfprinters.2.description=Andy's Favorite Printer
```

To apply:

```
> yab webapp-homeserver-client-session-update
```

Batch Jobs

A batch job executes a program in a non-interactive application character session where input is read from a file. Batch jobs are used to automate character session tasks. Two different approaches to managing batch jobs are supported. The Batch Jobs (Enhanced) approach has more features and was introduced as an enhancement to the original Batch Jobs (Basic) approach. The Batch Jobs (Basic) approach has been retained for backwards compatibility and is more than sufficient for certain use cases.

Input

In both cases, input is fed to the Progress session through an input file which uses the following characters to represent control keys:

```
#       Character       Control Key         Notes
#       ---------       -----------         -----
#       -               TAB                 (Single line per frame)
#       {ENTER}         F1
#       .               F4                  (On a new
line)
```

Ex. Login, run Item Master Maintenance, and exit (multiple domains choosing default domain for user)

```
mfg -

1.4.1
.
.
Y
```

Ex. Login, run Item Master Maintenance, and exit (single domain)

```
mfg -
1.4.1
.
.
Y
```

Batch Jobs (Basic)

This approach uses the script `batch.[sh|py]` to run the batch program. The script takes three arguments:

Arg	Description	Example
1	The code page for the session.	utf-8
2	The batch program to run.	program.p
3	Arguments to add to the Progress (-param) argument. NOTE: The application will also embed comma-delimited data in the (-param) argument, for example, using startup=[PROGRAM] to locate your batch program.	foo=bar, bar=baz

Here is an example batch program that prints out the (-param) data and then runs the application.

customizations/mfg/default/src/program.p

```
define variable i as integer no-undo.
define variable element as character no-undo.
do i = 1 TO num-entries(session:parameter):
    put unformatted entry(i, session:parameter) skip.
end.

run mf.p.
```

To compile the batch program:

```
> yab code-mfg-customizations-update
```

To run the batch program with input from a file named input.

```
scripts/batch.[sh|py] utf-8 program.p < input | tee
```

The `batch.[sh|py]` script is configured by the following settings:

```
> yab config filegen.foundation-batchclient.*
```

Batch Jobs (Enhanced)

This approach configures batch jobs with instances of the `batch` configuration type. For every batch instance defined, the system will define a command that executes a system generated script to process the batch job.

```
# A comma-delimited list of files providing input for the batch session.
# Relative paths will be resolved relative to the working directory.
# Files can use the following characters to represent control keys.
#
#       Character       Control Key        Notes
#       ---------       -----------        -----
#       -               TAB                (Single line per frame)
#       {ENTER}         F1
#       .               F4                 (On a new line)
#
batch.in=

# The file where output should be written.
# A relative path will be resolved relative to the working directory.
# Default: batch.out
batch.out=

# To add a timestamp suffix to the output file.
# Default: false
batch.out.timestamp=

# The working directory to use for the batch session.
batch.workdir=

# Progress startup parameters to add to the startup parameters for the
# batch session.
batch.progress.params=

# A comma-delimited list of application parameters (KEY=VALUE, KEY=VALUE...)
# to add to the (-param) startup argument for the batch session.
batch.application.param=

# A lock file to control batch session concurrency.
# The lock file will be created before starting the batch session and removed
# after the batch session completes. If the lock file already exists the
# batch session will not be started.
batch.lockfile=

# An optional program to run before the system runs mf.p to start a character session.
batch.initprogram=
```


The system will run mf.p to start a character session with the input you have configured. The optional *initprogram* setting **sh ould not** be configured with the value *mf.p* and if another program is configured it should not run *mf.p*.

Here is an example init program that prints out the (-param) data.

customizations/mfg/default/src/program.p

```
define variable i as integer no-undo.
define variable element as character no-undo.
do i = 1 TO num-entries(session:parameter):
    put unformatted entry(i, session:parameter) skip.
end.
```

Ex. Configure a new batch job (job1).

```
batch.job1.initprogram=program.p
batch.job1.workdir=${appdir}/batch/job1
batch.job1.in=../login.in,job1.in,../logout.in
batch.job1.out=job1.out
batch.job1.out.timestamp=true
batch.job1.application.param=foo=bar,bar=baz
```

Ex. An example login sequence, logging in as the default "mfg" user.

login.in

```
mfg -
```

Ex. An example logout sequence (there is an empty line at the end).

logout.in

```
.
.
Y
.
Y
```

Ex. Process the configuration.

```
> yab batch-script

> ll scripts/batch
total 8
-rwxrw-r-- 1 wtb devel 498 Mar 28 10:06 batch-job1

> yab help batch-job1-execute
PROCESS
     batch-job1-execute - Executes the [job1] batch job.

> cat scripts/batch/batch-job1
#!/usr/bin/python
# Runs the batch.job1 batch job.
# Generated: 2017-10-04T05:59-0700
import os
os.environ['APPLICATION_PARAM_APPEND'] = r"batchIn=../login.in,batchIn=job1.in,batchIn=../logout.
in,batchOut=job1.out,batchOutTimestamp=true,initProgram=program.p,foo=bar,bar=baz"
os.environ['WORKDIR'] = r"/qad/sbox/004/user/wtb/02/sr2-core-systest/batch/job1"
os.environ['STARTUP'] = r"batch.p"
os.environ['PROGRESS_PARAMS_APPEND'] = r"-b"

import subprocess
import sys
params = [r"/usr/bin/python", r"/qad/sbox/004/user/wtb/02/sr2-core-systest/scripts/client-xx"]
p = subprocess.Popen(params , stdout=subprocess.PIPE, stderr=subprocess.PIPE)
out, err = p.communicate()
print(out)
if err is not None:
    print(err)
if p.returncode != 0:
    sys.exit(p.returncode)
```

Configuring Commands

The *process* configuration type is used to reconfigure existing commands and to hook new commands into the environment. The setting is an instanced setting using the following pattern.

`process.[INSTANCE].[NAME]`

In the following example we define a new command `database-backup-setup` to execute a script and another command `database-backup-cleanup` to execute another script. We then "anchor" the setup command to run before the existing `database-backup` command and the cleanup command to run after it.

build/config/configuration.properties

```
process.database-backup-setup.id=database-backup-setup
process.database-backup-setup.args=/dr01/scripts/backup-setup
process.database-backup-setup.impl=exec
process.database-backup-setup.anchormebefore=database-backup

process.database-backup-cleanup.id=database-backup-cleanup
process.database-backup-cleanup.args=/dr01/scripts/backup-cleanup
process.database-backup-cleanup.impl=exec
process.database-backup-cleanup.anchormeafter=database-backup
```

And then we can check our work by listing the commands that would be executed when the `database-backup` command is executed:

```
> yab system-process-list database-backup

1. database-backup-setup
2. database-backup
3. database-backup-cleanup
```

See Exec Commands for more elaborate examples of configuring commands to call programs.

In the following example we define a new command `compile` as a convenience to recompile the standard and customized operational code and then trim the MFG application server.

```
process.compile.id=compile
process.compile.depends=code-mfg-update,code-mfg-customizations-update,appserver-mfg-trim
```

Ex. Display help for the *process* configuration type.

```
yab help "process."
```

Exec Commands

To define a command that executes a system command set the implementation to "exec".

Ex. Define a command 'greeting' that executes a shell script.

```
process.greeting.id=greeting
process.greeting.args=/dr01/qad-scripts/greeting
process.greeting.impl=exec
```

Ex. Pass an argument to the script.

```
process.greeting.args=/dr01/qad-scripts/greeting ${appdir}
```

or (preferably)

```
process.greeting.args.0=/dr01/qad-scripts/greeting
process.greeting.args.1=${appdir}
```

Ex. Define an environment variable for the script.

```
process.greeting.env.APPDIR=${appdir}
```

Ex. Configure the greeting to be executed after the environment is started.

```
process.greeting.anchormeafter=start
```

When the command is "greedy", request arguments will be forwarded to the system command, instead of being interpreted as YAB commands.

```
process.echo.id=echo
process.echo.args=echo
process.echo.impl=exec
process.echo.console=true
process.echo.status=false
process.echo.greedy=true
```

With the following behavior:

```
> yab echo Hello World
Hello World
```

Progress Commands

To define a command that executes a Progress program set the implementation to "progress".

Ex. Run the "test" program.

```
process.progress-test.id=progress-test
process.progress-test.args=-T /tmp -b -param ${appdir} -p /dr01/qad-scripts/test.p
process.progress-test.databases=db.qaddb,db.qadadm
process.progress-test.propath=${propath.mfg}
process.progress-test.impl=progress
```

ANT commands

A command to run an Apache ANT script is defined by setting the *impl* setting of the process to "ant".

Ex. Define a command 'ant-test' that executes the 'test' target of the ANT script

```
process.ant-test.id=ant-test
process.ant-test.summary=A test to execute an ANT script.
process.ant-test.impl=ant
process.ant-test.args.0=-script:/dr01/qad-scripts/build.xml
process.ant-test.args.1=-targets:test
```

If we wanted the *ant-test* process to run whenever a user runs an update we could add the following settings.

```
process.ant-test.anchormebefore=update
```

Within the ANT script all application properties are mapped to ANT properties.

```
<project>
    <target name="test">
                <echo level="info">Current Environment: ${environment.id}</echo>
    </target>
</project>
```

```
> yab -v ant-test
...
2014-09-10 11:15:55,834 DEBUG BuildContext - ant-test
2014-09-10 11:15:55,845 DEBUG Ant - Script: /dr01/qadapps/qea/build/catalog/packages/ant-test/1/0
/0/0/build.xml
2014-09-10 11:15:55,845 DEBUG Ant - Targets: [test]
2014-09-10 11:15:55,845 DEBUG Ant - Using script file: /dr01/qadapps/qea/build/catalog/packages
/ant-test/1/0/0/0/build.xml
2014-09-10 11:15:56,355 INFO  Echo - Current Environment: test
2014-09-10 11:15:56,355 DEBUG BuildContext - ant-test OK
```

Error Handling

When a request is submitted (update for example), it is evaluated into an ordered sequence of commands. If one of the commands reports an error the request will be aborted. There are two ways to alter the default request processing behavior, you can tell the system to continue processing the request if a process reports an error with the *failonerror* setting or you can tell the system to always execute certain commands even when the request is aborted using the *always* setting.

Failonerror

The *failonerror* setting is used to configure whether or not errors should fail (abort) the request. The default setting is true which means that any error will abort the request. The most typical use for this setting is as a request option to address a transient problem. For example, in an environment where a server cannot be stopped, failonerror might be added to the *stop* request to continue to shut down the remaining servers in the normal manner.

Ex. Continue to process all stop commands even if one or more report errors.

```
> yab -failonerror:false stop
```

It is also possible to only allow failures from specific commands using the syntax:

`-failonerror.[PROCESS]:false`

Ex. Do not halt the update if 'qxtend-default-update' or 'event-service-update' report errors.

```
> yab -failonerror.qxtend-default-update:false -failonerror.event-service-update:false update
```

The *failonerror* handling can be more permanently associated with a process through configuration. For example, a process that was responsible for sending an inessential notification to an unreliable service might be configured so it will never abort the request.

Ex. Try and send the notification but don't abort the request if it fails.

```
process.notify.id=fire-and-forget-notification
process.notify.failonerror=false
...
```

All errors reported by commands are recorded in the YAB log file regardless of how *failonerror* is configured.

Always

The *always* setting is used to configure commands that should be processed even when the request is aborted. When the *always* setting is enabled for a command it applies to that command as well as the commands associated with it.

The always setting may be used as a request option where it is scoped to the request. Consider the following scenario where a hypothetical `custom-backup` command will turn off environment monitoring, stop the environment, backup all databases, start the environment, and turn monitoring back on. If any of the database backups fail we may not want to attempt further backups, but we would like to bring the environment back online and re-enable monitoring. Furthermore we only want to always execute the `start` command in the context of this backup process. In the context of an `update` we do not want to start the environment if the update fails.

```
> yab -always:start -always:monitoring-start custom-backup
```

The *always* handling can be more permanently associated with a process through configuration. Extending the previous example, we might say that it is appropriate for the `monitoring-start` process to always run when it is used in any context.

```
# A hypothetical process that should always be run even if it is included in a request that fails.
process.monitoring-start.id=monitoring-start
process.monitoring-start.always=true
...
```

All errors reported by commands are recorded in the YAB log file regardless of how *always* is configured. The last error is used to abort the request when all always commands have been processed.

Timeouts

Timeouts are settings that configure how long the system should wait for an outcome. Timeouts are defined in milliseconds but can be also be expressed in a wide range of durations (see Configuration Files).

All services are associated with a timeout value to start the service and a timeout value to stop the service. Services that are not "instanced" (see Configuration Type System) are associated with a timeout setting using the following production rule.

```
timeout.[TYPE].[START/STOP]
```

Ex. The setting to configure how long the system should wait for the AdminServer to start.

```
timeout.adminserver.start=
```

Ex. The setting to configure how long the system should wait for the AdminServer to stop.

```
timeout.adminserver.stop=
```

Services that are instanced use the following production rule.

```
timeout.[TYPE].[START/STOP].[INSTANCE]
```

Ex. The setting to configure how long the system should wait for the MFG application server to start.

```
timeout.tomcat.start.qxtend=
```

The system uses a fallback algorithm to calculate the timeout for an action. So for example, if the system is starting the "mfg" application server it will use the first timeout value configured from the following list:

1. timeout.tomcat.start.qxtend
2. timeout.tomcat.start
3. timeout.tomcat
4. timeout

Key Settings

- catalogs setting
- check-for-updates setting
- clean setting
- config.order setting
- dependency settings
- packages setting
- ports setting
- verify setting

catalogs setting

Configures a comma-delimited list of software catalogs from highest to lowest precedence, where each entry may be a file system path or URL locating the catalog.

`catalogs=[FILE|URL],[FILE|URL]...`

The local software catalog should not be configured.

Ex.

```
catalogs=/shared/cache,http://packages.qad.com
```

check-for-updates setting

Controls whether the configuration of packages (i.e. the settings that begin with "packages") should be reevaluated.

With the default configuration, the system will automatically reevaluate the configuration of packages as needed. Setting (check-for-updates=true) forces the configuration of packages to be reevaluated whenever the configuration (package or otherwise) changes. Setting (check-for-updates=false) prevents the reevaluation of the configuration of packages.

A production environment may be configured with (check-for-updates=false) to ensure that software in the environment is only updated with a specific acknowledgement. When the system is configured with (check-for-updates=false), the setting can be temporarily overridden to process package updates as follows:

```
> yab -check-for-updates [COMMAND]
```

Ex.

```
> yab -check-for-updates update
```

The `install` command will automatically force the reevaluation of packages. When (-check-for-updates) is configured as a request option, it implies a refresh (-r).

clean setting

Forces the system to avoid using any cached information to process the request.

This is typically used as a command line option as necessary.

```
yab -clean ...
```

config.order setting

Defines the precedence order of configuration documents in the system directory:

`build/config/system`

Documents are listed from highest precedence to lowest precedence:

Ex. Settings in FILE1 take precedence over FILE2.

`config.order=[FILE1],[FILE2]...`

To show the existing order:

```
> yab config config.order
```

You can adjust the order by editing the setting in the file:

`build/config/system/loader.properties`

dependency settings

A family of settings to fine tune the evaluation of package settings.

To list the help for all package evaluation settings:

```
> yab config-help dependency
```

dependency.excludes

A comma-delimited list of package classes to exclude when evaluating package constraints.

```
dependency.excludes=[PACKAGE CLASS], [PACKAGE CLASS]...
```

Ex. Exclude the 'abc' package.

```
dependency.excludes=abc
```

dependency.excludesreferences

A comma-delimited list of package classes whose constraints should be excluded when evaluating package constraints.

```
dependency.excludesreferences=[PACKAGE CLASS], [PACKAGE CLASS]...
```

Ex. Excludes references from 'abc' packages.

```
dependency.excludesreferences=abc
```

dependency.redirects

A comma-delimited list of redirection statements to apply when evaluating package constraints.

```
dependency.redirects=[PACKAGE CLASS]=[PACKAGE RANGE],[PACKAGE CLASS]=[PACKAGE RANGE]...
```

Ex. Redirect all 'abc' references to 'abc-2.1.4.0'.

```
dependency.redirects=abc=abc-2.1.4.0
```

dependency.types

Configures the package constraint types that will be evaluated.

The value is a "bitwise" combination of the following types:

Type	Description
1	Grouping constraints
2	Installation constraints
4	Runtime constraints

Default: 7 (all)

packages setting

Configures packages in the system using the syntax:

```
packages.NAME=VALUE
```

NAME

The NAME is an identifier that is used internally to refer to the package. Typically the NAME must be identical to the package name.

Ex.

```
packages.fin-src-proxy=fin-src-proxy-2015.0.80.11
```

In special cases the NAME is different than the package name. This is best illustrated with an example. There are several packages that distribute data to initialize a system. In YAB each of these variants is associated with the NAME *ee-data* (to provide the management components with a consistent "handle" to reference the data packages).

Ex.

```
packages.ee-data=release-data-ee2016-2016.0.16.209
packages.ee-data=system-test-data-ee2016-2016.0.16.209

packages.ee-data=demo-data-ee2016-2016.0.16.209
```

VALUE

The VALUE is used to define a range of acceptable versions for the package. Typically the VALUE configures a specific version. When the NAME and the package name are identical, the package name may be omitted from the VALUE.

Ex.

```
packages.fin-src-proxy=2016.0.80.5
```

Here are some examples where a range is configured using the *netui-module-dashboard-cm* package for illustration:

Accepts any version

```
packages.netui-module-dashboard-cm=
```

Accepts any version >= 1.0

```
packages.netui-module-dashboard-cm=[1]
```

Accepts any version >= 1.0 and < 2.0

```
packages.netui-module-dashboard-cm=[1,2)
```

Include/Exclude Conditions

Packages may be configured so they are included in the environment only if other packages are included in the environment ("if" setting) or only if other packages are not included in the environment ("unless" setting).

If Condition

A comma-delimited list of package ranges, ONE of which MUST match an included package, or the package will be excluded.

```
packages.NAME.if=[PACKAGE RANGE], [PACKAGE RANGE]...
```

Unless Condition

A comma-delimited list of package ranges, ALL of which MUST NOT match an included package, or the package will be excluded.

```
packages.NAME.unless=[PACKAGE RANGE], [PACKAGE RANGE]...
```

Ex. Include the 'mongodb' package if either the 'event-service' or 'collaboration' package is included.

```
packages.mongodb=mongodb-rhel5-3.0.3.0
packages.mongodb.if=event-service,colloboration
```

Enable/Disable Conditions

Included packages may be configured so they are enabled in the environment only if other packages are enabled in the environment ("enabled.if" setting) or only if other packages are not enabled in the environment ("enabled.unless" setting). Alternatively packages can be directly enabled and disabled ("enabled" setting), which takes precedence over enabled conditions.

Enabled

Set to enable or disable a package.

```
packages.NAME.enabled=[true|false]
```

If Condition

A comma-delimited list of package ranges, ONE of which MUST match an enabled package, or the package will be disabled.

```
packages.NAME.enabled.if=[PACKAGE RANGE], [PACKAGE RANGE]...
```

Unless Condition

A comma-delimited list of package ranges, ALL of which MUST NOT match an enabled package, or the package will be disabled.

```
packages.NAME.enabled.unless=[PACKAGE RANGE], [PACKAGE RANGE]...
```

Ex. Enable the 'mongodb' package if either the 'event-service' or 'collaboration' package is enabled.

```
packages.mongodb=mongodb-rhel5-3.0.3.0
packages.mongodb.enabled.if=event-service,colloboration
```

Enable/Disable Package Attributes

If no enable/disable conditions are defined, the system will inspect the attributes associated with the package for conditions defined within the package using the following table:

Condition Name	Attribute Name
enabled	yab.enabled
enabled.if	yab.enabled.if
enabled.unless	yab.enabled.unless

Override

The 'override' setting is used to force all constraints for a package to use the configured value. It is the equivalent of defining a redirect statement for the package.

```
packages.NAME.override=[true|false]
```

Ex. Configure the 'base-1-4-0-139-customer-1.4.0.20004' hotfix package to override the standard 'base' package.

```
packages.base=base-1-4-0-139-customer-1.4.0.20004
packages.base.override=true
```

The override is equivalent to the following setting:

```
dependency.redirects=base=base-1-4-0-139-customer-1.4.0.20004
```

Patching

A comma-delimited list of package ranges, used to patch a package in the local catalog.

```
packages.NAME.patches=[PACKAGE RANGE], [PACKAGE RANGE]...
```

The patch packages are applied on top of the base package in the order in which they are defined.

See Package Patch.

ports setting

Configures a range of TCP/IP ports to allocate to services that do not have a fixed port.

`ports=[LOWER BOUND (inclusive)]-[UPPER BOUND (exclusive)]`

Ex. Allocate ports from 16500 up to and including 16549.

```
ports=16500-16550
```

The `dynamic-ports` setting is used to allocate a default port range for services that dynamically open ports.

`dynamic-ports=[LOWER BOUND (inclusive)]-[UPPER BOUND (exclusive)]`

See TCP/IP Ports for more details.

verify setting

Instructs YAB to verify commands.

This is best illustrated with an example. The `tomcat-default-start` command will start the default Tomcat instance if it is not already running. The command will execute a Tomcat script to start the server (see: scripts/tomcat-default-start) and this script is asynchronous, meaning it will begin to start the Tomcat instance but then immediately return control to the calling program. When the command returns a STARTED status this can be interpreted as saying that the Tomcat server was not running and a request was successfully submitted to start the server. The (-verify) option will take this one step further and wait for a configurable amount of time until the Tomcat server is started (Tomcat is listening on the HTTP or HTTPS port and all testable web applications are active), returning a PASSED status when the desired state is verified.

This is typically used as a command line option (as necessary).

```
> yab -verify start
                              start (18 tasks)
--------------------------------------------------------------------------------
1/18  adminserver-start                                  STARTED (1.662 s)
      adminserver-start                                  PASSED  (2.980 s)
2/18  nameserver-start                                   OK (0.000 s)
      nameserver-start                                   PASSED  (51.648 s)
3/18  database-qadadm-start                              STARTED (2.305 s)
      database-qadadm-start                              PASSED  (0.018 s)
4/18  database-qaddb-start                               STARTED (2.598 s)
      database-qaddb-start                               PASSED  (0.026 s)
5/18  database-qadhlp-start                              STARTED (2.262 s)
      database-qadhlp-start                              PASSED  (0.019 s)
6/18  database-qxevents-start                            STARTED (2.238 s)
      database-qxevents-start                            PASSED  (0.016 s)
...
```

The (-verify-no-exec) option does the verification but without executing any commands. For example, the environment could be stopped without verification, and then subsequently tested using the (-verify-no-exec) option which might provide better overall performance.

```
> yab stop
...
> yab -verify-no-exec stop
                               stop (18 tasks)
--------------------------------------------------------------------------------
1/18  qxtend-stage                                       SKIPPED (0.000 s)
2/18  qxo-services-stop                                  SKIPPED (0.000 s)
3/18  tomcat-default-stop                                SKIPPED (0.000 s)
      tomcat-default-stop                                PASSED  (0.048 s)
4/18  tomcat-qxtend-stop                                 SKIPPED (0.000 s)
      tomcat-qxtend-stop                                 PASSED  (0.005 s)
5/18  webspeed-default-stop                              SKIPPED (0.000 s)
      webspeed-default-stop                              PASSED  (0.239 s)
6/18  appserver-fin-stop                                 SKIPPED (0.000 s)
      appserver-fin-stop                                 PASSED  (0.221 s)
...
```

The maximum amount of time to wait for the system to be in the desired state is configured using the Timeouts mechanism and the handling of failures can be configured with the "verify.timeoutexception" setting (see below):

```
> yab help verify

SETTINGS

     verify                     True to run functional tests.

     verify-no-exec             True to run functional tests while skipping the execution of all
processes.

     verify.timeoutexception    True to throw an exception immediately if the condition is not
satisfied before timing out.
                                When false all verifications will be performed and the request
will be failed if any fail.

                                This setting configures verifications (enabled with the -verify
option) that wait for some condition to be true.
```

All commands to start and stop servers have an associated verification. Other commands are not currently associated with a verification.

Upgrades, Customizations, and Patches

Upgrades, Customizations, and Patches describes how to manage the software running in an environment.

- Product Upgrades
- Customizations
- Patches
- Prepared Contexts

Product Upgrades

Product updates are delivered as zip files. The zip file contains packages to install into the environment. Always review the product installation guide before upgrading the product.

To install the product:

```
> yab install product-[VERSION].zip
```

In most cases, the installer will automatically run an update to apply the product to the system after the product is configured. If the install fails before running the update, the installer will automatically roll back the install. If the update fails, there is no need to re-install the product. You can run the update again after resolving the problem to move forward with the product or restore the configuration backup from before the install (automatically created by the install) and then run an update to remove the product from the system.

A complete log of the installation is recorded in the temp directory and may contain debugging information not recorded in "build/logs/yab.log":

`/tmp/install.[USER].log`

Delayed Install

The option (-install-update:false) is used to configure a "delayed install" of the product where the packages are integrated into the environment but the environment update is delayed.

```
> yab -install-update:false install product-[VERSION].zip
```

This delay can be used to "batch" install multiple products and then apply all of the products with a single update.

```
> yab update
```

Background Install

You can run an install that does not prompt for input as you would any other process.

```
> nohup yab install product-[VERSION].zip &
```

If the install prompts for input you will need to define a file with the required input and locate that file using the (-install-conf) option, as well as disabling the user interface (-install-ui:false) when running the install.

```
> nohup yab -install-ui:false -install-conf:[FILE] install product-[VERSION].zip &
```

If you are unsure whether the install will prompt for input you can run the install in a special mode where it will run the UI (if there is one) and then exit before proceeding with the install.

```
> yab -install-validate-exit install product-[VERSION].zip
```

If the install output is redirected into a file it may be useful to turn off animations using the option (-notify.animated:false).

Customizations

Customizations are files that supplement or replace standard product files. The approach to integrating a customization varies according to the application component being customized, but in general customizations are organized in the customizations directory (configured by the setting *customizations.dir*) and then applied to the application with the *update* c ommand.

```
customizations.dir=${appdir}/customizations
```

The following topics are covered in this section:

- Operational Customizations
- Financials Customization
- Integrated Customization Toolkit
- Desktop Customizations
- Adding Custom Data
- Metadata
- Process Maps
- Adding Custom Database
- Adding Custom Application Server
- Compiling EDI Functions
- Adding Custom Directory Backup Processes

Operational Customizations

An operational customization can include Progress programs and data. Customizations are organized in the directory configured by the *customizations.mfg.dir* setting, which defaults to:

`customizations/mfg`

Setup

To define a new customization create a sub-directory for the customization:

```
> mkdir customizations/mfg/cust1
```

Create directories for the source code (as necessary):

```
mkdir -p customizations/mfg/cust1/src/us/so
mkdir -p customizations/mfg/cust1/src/us/wo
```

Create directories for the data (as necessary):

```
mkdir -p customizations/mfg/cust1/data/qadadm
mkdir -p customizations/mfg/cust1/data/qaddb
```

Copy the source code into the *src* directory and the data into the *data* directory.

As a convenience a *default* customization is pre-defined:

```
> tree customizations/mfg/default
customizations/mfg/default/
|-- data
| |-- qadadm
| `-- qaddb
`-- src
```

Compiling

To compile customized programs execute the command:

```
> yab code-mfg-customizations-update
```

The r-code will be written into the the directory configured by the *code.mfg-customizations.dir* setting, which defaults to:

`dist/mfg-customizations`

To recompile a standard program using the customization compile (for example if the standard program references an include file that has been customized) add the program to the following file with a propath relative path (e.g. 'us/so/sosomt.p'):

`customizations/mfg/compile.lst`

If the customization includes data, execute the *update* command instead, to load the data and compile the programs:

```
> yab update
```


YAB will automatically order the compile PROPATH so that customizations take precedence over standard programs. If the relative order of customizations is important a *grouporder* annotation may be defined on the *code.mfg-customizations.propath* setting to fine-tune the order. Customizations that are not enumerated in the *grouporder* annotation will be ordered after the enumerated customizations.

Ex.

```
# @grouporder 2 cust2 cust1
code.mfg-customizations.propath=
```

Removing

To remove customized programs from the system (source code and rcode), remove the source code and then recompile:

```
> rm -rf customizations/mfg/[NAME]/*
> yab code-mfg-customizations-update
```

Integrate QAD source file archive into environment.

Operational source code that has been ordered is downloaded from the QAD Download Center.

The following steps describe how the archive downloaded from the QAD Download Center can be integrated into a YAB environment, and how source files can be copied to a customization area.

In the context of these source files, 'integrated' means the sources are in the environment catalog. It does not mean that the sources appear on any environment propath (compile or runtime).

A command is provided to move sources from the environment catalog into a customization area - which does appear in application propaths.

As a starting point it is assumed that the media has already been downloaded. Ex. File 00098765.125.7z has been downloaded to /dr01/mymedia.

Install source archive into environment catalog.

This step creates a YAB compatible package named mfg-customer-src and installs it in the environment catalog.

```
> yab customer-src-integrate -archive:/dr01/mymedia/00098765.125.7z
```

Upon completion a new package mfg-customer-src is added to the local catalog.

```
> yab info
...
|- mfg-customer-src                              2018.0.18.191  local  (new)
...
```

Copy sources to customization area

Running 'customer-src-integrate' also sets up a copy command - customer-src-copy - to copy sources to the default customization area.

Note - when specifying wildcards (ex. '*') as part of the copy the argument should be within quotes.

Ex. copy us/pt/* and us/ud/* to default customization area.

```
yab customer-src-copy "us/pt/*" "us/up/*"
```

Ex. copy us/wo/wosc*.i to customization area 'domain1'.

```
yab customer-src-copy -dest-dir:/path/to/env/customizations/mfg/domain1/src "us/wo/wosc*.i"
```

Verify code matches

Before making any changes to the files copied to the customization area verify source files match the files in the environment.

Use 'code-mfg-customizations-locate' to verify the code copied to the customizations area matches the code it is replacing.

Ex. verify file us/pt/ptsurp.p copied into customization area matches the original version of the file.

```
> yab code-mfg-customizations-locate -xcode us/pt/ptsurp.p
File
Modified             Hash (X)                         Enc
----
--------             --------                         ---
/dr01/qadapps/2019/customizations/mfg/default/src/us/pt/ptsurp.p               2018-11-21 05:13
AM  60165690907638bfddc7f918971168f9  No
/dr01/qadapps/2019/build/catalog/packages/mfg/2018/0/18/711/src/us/pt/ptsurp.p  2018-11-21 05:14
AM  60165690907638bfddc7f918971168f9  Yes
```

As the original file is encrypted the -xcode option is used to create an encrypted copy of the new file so they may be compared.

If the hash of both files is not the same the version of the source archive must be reviewed to determine why they do not match.

Financials Customization

The Financials component is customized by defining Progress programs that adhere to the Financials Non-Intrusive Customizations guidelines.

Defining Financial Customizations

Financials Non-Intrusive Customizations templates are distributed in the package `fin-customizations.`

The location of this package on the system can be determined by executing this command.

```
> yab config packages.fin-customization.dir
packages.fin-customization.dir=/dr01/qadapps/qea/build/catalog/packages/fin-customization/2016/0
/80/5
```

Financials customizations should be defined in the location configured by the `customizations.fin.dir` setting.

Execute the following to find the location.

```
> yab config customizations.fin.dir
customizations.fin.dir=/dr01/qadapps/qea/customizations/fin
```

Template files can be copied into the `customizations.fin.dir` from the package directory for development.

Compiling Customization Programs

The customization programs will be compiled into the location specified by the `code.fin.dir` setting.

Execute the following to find the location.

```
> yab config code.fin.dir
code.fin.dir=/dr01/qadapps/qea/dist/fin/customcode
```

This is automatically included in the Financials appserver PROPATH:

```
> yab config pas.fin.propath
pas.fin.propath=/dr01/qadapps/systest/config,/dr01/qadapps/systest/build/catalog/packages/qracore
/3/38/0/168/qad.qra.core/bin/oe12/qracore.pl,/dr01/qadapps/systest/dist/mfg-customizations,/dr01
/qadapps/systest/dist/fin/patch,/dr01/qadapps/systest/dist/fin,/dr01/qadapps/systest/dist/pro/com
/mfgpro,/dr01/qadapps/systest/servers/pas-fin/openedge,/dr01/qadapps/systest/servers/pas-fin
/webapps/ROOT/WEB-INF/openedge,/tech/progress/dlc1289/tty,/tech/progress/dlc1289/tty/netlib
/OpenEdge.Net.pl,/dr01/qadapps/systest/build/catalog/packages/fin-bldata/2025/0/0/525,/dr01
/qadapps/systest/build/catalog/packages/fin-bin64-qadfin/2025/0/0/525/oe12/qadfin.pl,/dr01/qadapps
/systest/dist/pro,.,/dr01/qadapps/systest/build/catalog/packages/service-interface-foundation/1/2
/0/1/lib/oe12/qra.pl,/dr01/qadapps/systest/dist/qxtadpt,/dr01/qadapps/systest/dist/mfg,/dr01
/qadapps/systest/dist/mfg/us,/dr01/qadapps/systest/dist/mfg/us/bbi,/dr01/qadapps/systest/dist
/activityfeed,/dr01/qadapps/systest/build/work/sharedobjects/qracore/so
```

Applying Financial Customization

To apply Financial Customizations the `update` command must be executed.

```
> yab update
```

Alternatively as a convenience the following command can be executed to apply the customizations when the change is a code change only.

```
> yab code-fin-update
```

Integrated Customization Toolkit

The Integrated Customization Toolkit (ICT) is used to develop customizations for QAD Enterprise Edition. If ICT is included in the environment, customizations developed with ICT are staged in the location configured by the *customizations.ict.dir* setting with the default:

```
customizations/ict
```

Within the customization directory a compile list *utcompil.wrk* enumerates the files that should be compiled with ICT. It may be necessary to add a customized program to this list when using certain ICT features like "program hooks":

```
customizations/ict/utcompil.wrk
```

When a task is closed in a development environment, the task is promoted to the directory configured by the *ict.central.dir* setting, with the default:

```
dist/ict-customizations
```

ICT can be (re)installed into an environment following these steps:

The root page YABEEDEV:@self could not be found in space EE Configuration and Administration Guide (YAB 1.19).

Install and Configure the Integrated Customization Toolkit

Prerequisite

The following are required before the Integrated Customization Toolkit can be installed.

- ICT release media (integrated-customization-toolkit + yab-ict)
- ICT licenses

Installation

If the environment will be used to develop ICT customizations *ict.toolkit* should be set to true (default:false).

build/config/configuration.properties

```
ict.toolkit=true
```

Setting `ict.toolkit=true` configures application sessions with additional PROPATH entries to support the ICT development. These additional PROPATH entries should not be required when customizations developed with ICT are integrated into non-development environments.

To install ICT from the ICT installation media:

```
> yab install [ICT INSTALLATION MEDIA]
```

Or to install ICT from a software catalog:

build/config/configuration.properties

```
packages.integrated-customization-toolkit=[VERSION]
```

```
> yab update
```

Enter Toolkit License (Development Environments)

Start a character client session

```
> scripts/client-us
```

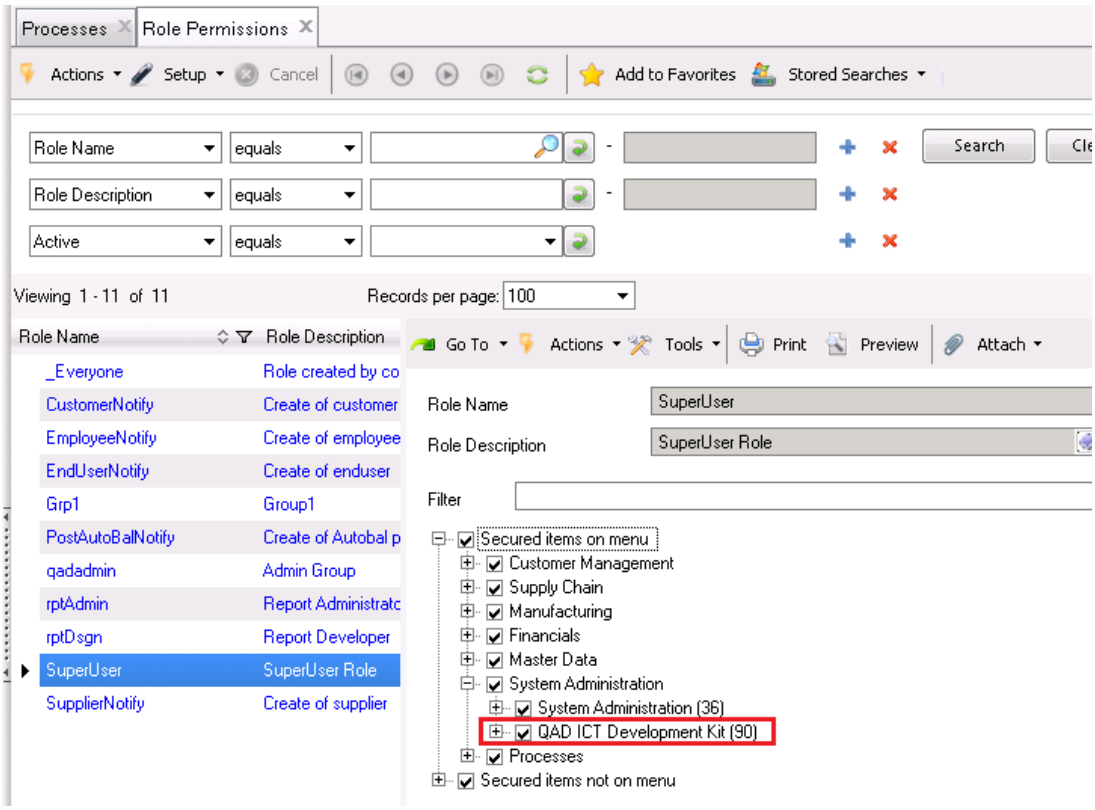
Register the toolkit license

Run License Maintenance (36.16.10.1) to enter your ICT toolkit license.

You must start a new client session for the license changes to take effect.

Grant ICT menu permissions in a .NET UI session

Run Role Permissions Maintain and update permissions to ICT menus.



The install creates the `ictdmp-ict-update` process to load ICT data using CIM. The process will not succeed (and will log a warning) when the core Enterprise Edition licenses have not been entered into the system. After the data is successfully loaded into the system, it cannot be reloaded (i.e. during a subsequent upgrade) until the application user configured by the user/password settings has been granted permissions to the ICT menus (see Grant ICT menu permissions above).

Desktop Customizations

Desktop customizations typically take the form of Progress programs to support a browse or a report. Customizations are organized in the directory configured by the *customizations.pro.dir* setting, with the default:

```
customizations/pro
```

The files in the customization directory will deployed into the directory configured by the *netui.pro.dir* setting, with the default:

```
dist/pro
```

You may need to create any nested directories if that is required by your customization.

Ex.

mkdir -p customizations/pro/com/qad/shell/report/reports

The *netui-pro-update* command (or *update*) copies all customizations into dist/pro and then (re)compiles the programs.

```
> yab netui-pro-update
```

Adding Custom Data

Custom data should be stored in the following directory structure:

customizations/mfg/[NAME]/data/[DATABASE]

The system comes with one pre-defined NAME "default" and others can be manually defined to keep work distinct if that is desirable (the name should consist of lowercase letters, numbers, and dashes). The DATABASE is the name of the database in the configuration without the "db." prefix (e.g. "qaddb") and may need to be manually defined.

Use the following command to enumerate the configuration names of the databases in the system:

```
> yab -instances config db
```

Both XML format (preferred) and Progress native ".d" format are supported.

Lets walk through an example where the standard "ab001" browse has been customized using the Browse Maintenance program. After developing the customization, export it into the directory.

```
> yab -dir:customizations/mfg/default/data/qadadm -rec:ab001 data-xml-dump browses
```

And then use the following command to (re)load the data. The refresh (-r) is only necessary once for the first file added in the data directory, to allow the system to recognize the change.

```
> yab -r database-qadadm-data-xml-update
```

Like all managed artifacts, the XML data file describes the data you want in this system. Removing the XML data file will restore the standard browse in this case or in the case where a new browse was defined, it will delete the browse.

Metadata

Metadata is another form of system data distributed in QAD Reference Architecture (QRA) modules. The `metadata-export` command is used to export metadata from a module to the file system.

Ex. Export Access Control Entries distributed by the `qracore` module.

```
> yab -type:ace metadata-export urn:module:com.qad.qracore
```

Process Maps

Customized process map content is staged in the *customizations/processmap* directory. Customized process map definitions can be added into the directory and additional sub-directories can be created as needed to organize the content. Property files added into the *properties* sub-directory will be merged into the deployed process map property files.

```
> tree customizations/processmap/
customizations/processmap/
|-- attachments
|-- images
`-- properties
```

As an alternative, the `webapp.pronav.content.excludes` setting may be used to exclude files from being updated by the system.

```
> yab help webapp.pronav.content.excludes

SETTINGS

     webapp.pronav.content.excludes     A comma-delimited list of patterns selecting content
files that should
                                        not be updated when new content is deployed into the web
application.
                                        Typically these patterns are used to protect customized
content from
                                        getting overridden with standard content.


                                        An alternative (and better) approach to managing
customizations is to
                                        store them in the process map customization directory.


                                        NOTE: The upgrade patterns should be defined relative to
the web application root,
                                        using forward slashes for nested paths (e.g. a/b/c).
```

Adding Custom Database

A database 'extension.db' is created at install time. This is intended to be used for creating application extensions / customizations. By default the extension database is connected to most Progress runtime sessions. The 'Using' section describes how to connect this database to other sessions (ex. compile.)

Additional databases and database servers can be configured.

Database

Defines a new database named 'custom' that inherits the default database settings.

```
# @extends db._base
db.custom=
db.custom.physicalname=custom
```

To display the configuration of the database.

```
> yab config db.custom.*
db.custom.bi=16384
db.custom.biblocksize=16
db.custom.blocksize=8
db.custom.centuryformat=1950
db.custom.codepage=utf-8
db.custom.collation=ICU-UCA
db.custom.dir=/dr01/qadapps/qea/databases
...
```

To display help for database settings.

```
> yab help db.
```

Database Server

Defines a database server that inherits the default database server settings.

```
# @extends dbserver._base
dbserver.custom=
dbserver.custom.name=db-${db.custom.physicalname}
dbserver.custom.databasename=${db.custom.dir}/${db.custom.physicalname}
dbserver.custom.fourgl.network=true
dbserver.custom.fourgl.port=23600
```

The database server is associated with the database by sharing the same INSTANCE name. For example, the "dbserver. custom" is the database server for "db.custom" because they share the instance name "custom".

To display the configuration of the database.

```
> yab config dbserver.custom.*
dbserver.custom.afterimagebuffers=50
dbserver.custom.archivaldir=/dr01/qadapps/qea/build/work/ai
dbserver.custom.archivalinterval=120
dbserver.custom.asynchronouspagewriters=1
dbserver.custom.beforeimagebuffers=50
dbserver.custom.blocksindatabasebuffers=1920
dbserver.custom.collationtable=ICU-UCA
dbserver.custom.databasename=/dr01/qadapps/qea/databases/foo
dbserver.custom.fourgl.host=vmwtb01
dbserver.custom.fourgl.maxclientsperserver=10
dbserver.custom.fourgl.minclientsperserver=5
...
```

To display help for database server settings.

```
> yab help dbserver.
```

Use the following setting to define a database server that does not automatically start and stop when the environment is started and stopped.

dbserver.custom.manual=true

Schema

To define schema for the custom database:

```
schema.custom.database=db.custom
schema.custom.file=/dr01/qadapps/qea/customizations/database/custom.df
```

Using

Use the following configuration to include the database in all compile sessions:

```
# @append
code._base.databases=db.custom
```

Or to add the database just to the operational compile:

```
# @append
code.mfg.databases=db.custom
```

To include the database in most Progress runtime sessions:

```
# @append
bootstrap.default.databases=db.custom
```

Update

To apply the configuration changes execute the *update* command.

```
> yab update
```

Adding Custom Application Server

Additional application servers can be configured. For example, an application server can be dedicated to running MRP to improve the performance of MRP runs. The following configuration defines a new application server that inherits settings from the operational application server.

Open Edge 12 (OE12)

build/config/configuration.properties

```
@extends pas._base
pas.as-mrp=
pas.as-mrp.name=pas-as-mrp
# @port
pas.as-mrp.httpport=23601
# @port
pas.as-mrp.sslport=
# @port
pas.as-mrp.serverport=
pas.as-mrp.openedge.agent.numInitialSessions=12
pas.as-mrp.openedge.agent.minAvailableABLSessions=12
```

To apply or reapply the application server configuration to the system:

```
> yab reconfigure
```

After you apply the configuration to the system, you can start and stop the application server as needed.

Start

```
> yab pas-as-mrp-start
```

Stop

```
> yab pas-as-mrp-stop
```

Status

```
> yab pas-as-mrp-status
```

To have the application server start and stop with the rest of the components in the environment adjust the following setting:

```
pas.as-mrp.manual=false
```

To display help for all application server settings:

```
> yab help pas.
```

Open Edge 11 (OE11)

In an OE11 environment, there is a change in how server properties are defined. The custom PAS (Progress Application Server) definition used in OE12 should be replaced with the corresponding AppServer definition in OE11. Here's how the configuration translates:

build/config/configuration.properties

```
# @extends appserver.mfg
appserver.mrp=
appserver.mrp.name=as-mrp
appserver.mrp.operatingmode=State-reset
appserver.mrp.initialsrvrinstance=12
appserver.mrp.maxsrvrinstance=20
appserver.mrp.minsrvrinstance=12
# @port
appserver.mrp.portnumber=23601
appserver.mrp.manual=true
```

To apply or reapply the application server configuration to the system:

```
> yab reconfigure
```

After applying the configuration to the system, the application server could be started and stopped as it is needed.

Start

```
> yab appserver-mrp-start
```

Stop

```
> yab appserver-mrp-stop
```

Status

```
> yab appserver-mrp-status
```

To have the application server start and stop with the rest of the components in the environment adjust the following setting:

```
appserver.mrp.manual=false
```

To display help for all application server settings:

```
> yab help appserver.
```

Compiling EDI Functions

EDI utilizes Progress functions (programs). A default compile for EDI sources is preconfigured in a new EE installation.

The default EDI compile is configured as follows:

- EDI sources are expected in dist/edifunc/default, and the rcode is also written to this directory.
- Compile database connections and propath are inherited from the code.mfg settings.
- The EDI compile is included as part of an update.

Using The Default EDI Compile

For EDI to use this default function location

- EDI functions must reside in dist/edifunc/default
- In eCommerceControl (35.13.24) the Function Directory field must be set to absolute path for dist/edifunc/default. Ex. /qond/apps/mfgpro/dist/edifunc/default.

Compile EDI Functions Using YAB

EDI code is compiled automatically as part of an update. To compile all edi functions manually execute:

```
> yab code-edi-update
```

Add Additional EDI Function Locations

As the EDI functions may vary by domain, multiple EDI function locations may be required.

Ex. To add domain specific EDI function locations for Domain1 and Domain2.

1. Create directories dist/edifunc/domain1, dist/edifunc/domain2.
2. Create / copy required EDI functions in each domain specific EDI code folder.
3. Compile EDI functions as described above.
4. The rcode is written to each domain specific EDI code folder.

Adding Custom Directory Backup Processes

Custom directory backup commands can be configured. For example, the following configuration defines a new command to backup the WEB-INF folder for the desktop webapp, excluding the logs directory. This example writes the backups to a tag folder under `${dbbackup.dir}`.

build/config/configuration.properties

```
# @extends directorybackup._base
directorybackup.custom=${dbbackup.dir}
directorybackup.custom.source.dir=${webapp.desktop.dir}
directorybackup.custom.target.dir=${dbbackup.dir}
directorybackup.custom.includes=WEB-INF/**
directorybackup.custom.excludes=WEB-INF/logs,WEB-INF/logs/**
```

This configuration generates the following commands

```
directory-custom-backup                                          Backs up the 'custom' files.
directory-custom-backup-list                                     Lists the 'custom' backup
files.
directory-custom-backup-remove                                   Removes the 'custom' backup
files.
directory-custom-restore                                         Restores the 'custom' backup
files.
```

Running Backup Commands

The backup command can either be run directly, or as part of other aggregating commands that call it. Ex. To run the 'custom' backup directly:

```
> yab directory-custom-backup
```

An aggregating backup command `directorybackup-backup` is available to group backups that should be run as part of an environment backup. By default a backup is not included in the aggregating command. To include a backup to run as part of the `directorybackup-backup` command:

```
directorybackup.custom.manual.backup=false
```

To list the backup commands registered with `directorybackup-backup`

```
> yab system-process-list directorybackup-backup
```

```
1. directory-action-center-backup
2. directory-custom-backup
3. directorybackup-backup
```

This aggregating command is run as part of commands `environment-offline-backup` and `environment-online-backup`.

Tags

The '-tag' option either gives a backup a tag to identify it, or specifies the backup to be restored or removed.

The `directorybackup.target.dir` setting defines the location where backups for this instance will be created. Within the backup directory, sub-directories based on the tag are used to organize backups. Previous backups that use the same tag are overwritten, unless configured to not overwrite

```
directorybackup.custom.overwrite=false
```.

The default tag name is "default". Backups can be configured to use timestamps as the tag by default

```
directorybackup.custom.timestamp=true
```

The maximum number of timestamped backups that are stored kept can be limited, 0 implies no limit.

```
directorybackup.custom.timestampmax=5
```

Ex. Backup 'custom' to the "stable" tag.

```
> yab -tag:stable directory-custom-backup
```

Ex. Backup 'custom' to a timestamp tag.

```
> yab -directorybackup.custom.timestamp directory-custom-backup
```

When directorybackups are run as part of an environment-backup the the dbbackup.timestamp / dbbackup.timestampmax settings override the directorybackup.timestamp / directorybackup.timestampmax settings - ensuring a consistent timestamp across the environment-backup.

Listing backups

To list the available backups:

```
> yab directory-custom-backup-list

directory-custom-backup-list (1 task)

--------------------------------------------------------------------------------
1/1 directory-custom-backup-list
Tag: default
------------
Location: /qad/local/sandbox/backups/dvr/vmdvr02.qad.com/default/custom
Compressed: No

qadui/WEB-INF                                 Jul 18, 2018 9:57:25 AM

Tag: 20180718095548
-------------------
Location: /qad/local/sandbox/backups/dvr/vmdvr02.qad.com/20180718095548/custom
Compressed: Yes

qadui/custom.zip                          Aug 31, 2018 7:19:56 AM
```

To list all backups for all directorybackup instances use `directorybackup-list`.

Restoring Backups

To restore a backup directly:

```
> yab directory-custom-restore
```

Similar to the aggregation of backup commands under an `directory-backups` command, restore commands are also aggregated under a `directorybackup-restore` command.

To prevent unintended restores each restore process must be configured to enable it run under the aggregating command using `directorybackup.manual.restore=false`

Ex 1. Run additional-restores without explicit enablement of any restore command.

```
>yab directorybackup-restore

directorybackup-restore (2 tasks)

--------------------------------------------------------------------------------
1/2 directory-action-center-restore      SKIPPED (0.001 s)
2/2 directory-custom-restore             SKIPPED (0.001 s)
--------------------------------------------------------------------------------
```

Ex 2. Run additional-restores enabling only `directory-action-center-restore` command

Configure `directorybackup.action-center.manual.restore=false`

```
> yab directorybackup-restore

directorybackup-restore (2 tasks)
--------------------------------------------------------------------------------
1/2 directory-action-center-restore      OK (1.048 s)
2/2 directory-custom-restore             SKIPPED (0.000 s)
--------------------------------------------------------------------------------
```

Use the '-tag' option to identify a specific backup to be restored. If '-tag' is not provided the tag 'default' is used.

Removing Backups

To remove a specific backup:

```
>yab directory-custom-backup-remove -tag:2018073119275657
```

If '-tag' is not provided the tag 'default' is used.

Patches

This section covers the following information related to patches:

- Operational Hotfixes (Patches/ECO)
- Financials Hotfix
- Package Patch
- File Patch
- qra.pl

Operational Hotfixes (Patches/ECO)

An operational patch can include Progress programs and data. Patches are organized in the directory configured by the *patches.mfg.dir* setting, with the default:

```
patches/mfg
```

Setup

To define a new patch create a sub-directory for the patch:

```
mkdir patches/mfg/patch1
```

Create directories for the source code (as necessary):

```
mkdir -p patches/mfg/patch1/src/us/so
mkdir -p patches/mfg/patch1/src/us/wo
```

Create directories for the data (as necessary):

```
mkdir -p patches/mfg/patch1/data/qadadm
mkdir -p patches/mfg/patch1/data/qaddb
```

Copy the source code into the *src* directory and the data (Progress .d or QAD XML) into the *data* directory.

As a convenience a *default* patch is pre-defined:

```
> tree patches/mfg/default
patches/mfg/default/
|-- data
| |-- qadadm
| `-- qaddb
`-- src
```

Installing

To install the patch execute the *update* command with the refresh option (-r).

```
> yab -r update
```

The data will be loaded into the relevant databases and the operational code will be recompiled, including the patched sources, into a directory configured by the *code.mfg.dir* setting, with the default:

```
dist/mfg
```

YAB will automatically order the compile PROPATH so that patches take precedence over standard programs. If the relative order of patches is important a *grouporder* annotation may be defined on the *code.mfg.propath* setting to fine-tune the operational code compile PROPATH. Patches that are not enumerated in the *grouporder* annotation will be ordered after the enumerated patches.

Ex.

```
# @grouporder 3 patch2 patch1
code.mfg.propath=
```

Removing

To remove patched programs from the system (source code and rcode):

```
rm -rf patches/mfg/[NAME]/*
yab code-mfg-update
```

Financials Hotfix

Financials is 'hotfixed' by copying the hotfix **r-code** into the following directories:

Proxy hotfix code:

`dist/fin/proxypatch`

Financials hot fixes:

`dist/fin/patch`

These directories are included in the run time propath property fields.

Financials can also be hotfixed by copying the proxy hotfix **source code** into the following directory:

`patches/fin/proxypatch`

This directory is included in the compile time propath property fields.

Hotfixes and Upgrades

Financial patches are not automatically removed during an upgrade so they should be reviewed and updated manually when running an upgrade or a hotfix.

Removing

To remove patched proxy programs from the system (source code and rcode):

```
> rm -rf patches/fin/proxypatch/*
> yab code-mfg-update
```

To remove Financial hotfix code the files should be deleted from

Proxy hotfix code:

`dist/fin/proxypatch`

Financials hot fixes:

`dist/fin/patch`

and the environment restarted.

Package Patch

A package is patched by overlaying another "patch" package on top of the package, potentially adding and replacing files. The package is patched in the local software catalog.

Configuration

Patches are configured using the *patches* setting:

`packages.[INSTANCE].patches=[PACKAGE RANGE],[PACKAGE RANGE]...`

Ex. Patch the dde-build-1.1.0.0 package by the application of two patch packages.

```
packages.dde-build=1.1.0.0
packages.dde-build.patches=dde-build-patch-1.1.0.1,dde-build-patch-1.1.0.3
```

Patches are applied to the destination package in the order in which they are defined. If a configuration change invalidates the patched package (i.e. a patch is removed, the patch order changes), the original package will be restored and patched (as necessary).

A package with patches configured is automatically sourced from the local software catalog.

Displaying

The *info* command lists the configured packages. A package with patches lists the patches below the package.

```
> yab info
...
dde-build                                              1.1.0.0        local
+ dde-build-patch                                      1.1.0.1        remote
+ dde-build-patch                                      1.1.0.3        remote
...
```

File Patch

A file can be patched using the *patch* configuration type. Typically a patch is used as a temporary corrective action to change a managed file in a way that is not yet supported by the system while ensuring that the change is not lost when the system is updated.

This is best illustrated with an example. Imagine it was necessary to add a *proserve* argument to the scripts that start database servers (i.e scripts/database-INSTANCE-start), but the argument was not yet supported by YAB. If the scripts were directly edited, it is possible the change would be lost the next time the system was updated. A more durable solution would be to create a patch describing the change and then configure that patch to be applied after the `database-script` command executes (the command that is responsible for generating the standard script).

Creating the patch

Copy one of the start scripts

```
cp scripts/database-qaddb-start scripts/database-qaddb-start.modified
```

Edit the copied script and make the desired change

```
vi scripts/database-qaddb-start.modified
```

Create the patch

```
mkdir patches/scripts
```

```
yab patch-create scripts/database-qaddb-start scripts/database-qaddb-start.modified > patches/scripts/database-instance-start.patch
```

```
rm scripts/database-qaddb-start.modified
```

Configuring the patch

Configure the patch to be applied to all files in the scripts directory that match the pattern 'database-*-start' anytime the database-script command is executed.

build/config/configuration.properties

```
patch.database-start.patch=${patches.dir}/scripts/database-instance-start.patch
patch.database-start.dir=${scripts.dir}
patch.database-start.includes=database-*-start
patch.database-start.trigger=database-script
```

Verifying the patch

```
yab database-script
```

> Applying a patch may not produce the desired result if the patched file differs greatly from the file that was used to generate the patch.

qra.pl

A patch for the `qra.pl` procedure library distributed in the `qra-oe11` package.

```
> mkdir patches/qra.pl
> cp [PATCHED qra.pl] patches/qra.pl
```

build/config/configuration.properties

```
# @append
# @group 3
propath.base=${patches.dir}/qra.pl/qra.pl
```

Prepared Contexts

An update can be prepared in a context. YAB will consume system resources (CPU, Memory, Disk) while preparing the update, but otherwise the request will have no impact on the live environment.

The ability to prepare an update "in advance", can have the following uses:

- To prepare an update for an environment, while the environment is running, without disrupting users.
- To abandon a failed attempt at preparing an update without having had any impact on the environment.
- To reduce the time the environment is offline when the update is applied, by reducing the work that must be done while the environment is offline.
- To review the changes before they are applied to the environment.
- To have the option to (partially) revert an update that has been applied to the system.

Contexts may also be leveraged as a creative way to periodically (nightly, weekly) validate that an environment is in a suitable state to be updated. For example, an administrator could set up a cron job to prepare the update command in a context and then delete the context, to validate that the code in an environment compiles.

This section covers the following information:

- Using a context
- Adding files to a context
- Validating a context
- Logging in a context
- Context Guidelines
- Limitations

Using a context

Use the (-c) option to submit a request to run in a context. If the context does not exist it will be created.

Typically you will want to name the context yourself by supplying a meaningful name as the value of the option.

```
> yab -c:test
> yab system-context-list
test  build/contexts/prepared/test
```

But you can omit the name to create a new context with a unique system generated name.

```
> yab -c
65fc
> yab system-context-list
65fc build/contexts/prepared/65fc
```

In the previous examples, we simply created a context. Our request did not have any commands. Following this, we could submit commands to run in that context by referencing the context by name (-c:NAME), but it is not necessary to create the context in a separate request. For example, either of the following requests will install *i19-es-2.2.0.7* in a context named "install-i19-es".

```
> yab -c:install-i19-es
> yab -c:install-i19-es install i19-es-2.2.0.7.zip
```

or

```
> yab -c:install-i19-es install i19-es-2.2.0.7.zip
```

We might even install multiple products into a context and use the (-install-update:false) option to defer the update until the end.

```
> yab -c:install-i19 -install-update:false install i19-es-2.2.0.7.zip
> yab -c:install-i19 -install-update:false install i19-de-2.2.0.7.zip
> yab -c:install-i19 update
```

Nothing we have done up to this point will have had an effect on the environment. We can see this by comparing the result of running the info command outside of the context with the result of running it in the context. The info outside of the context will not list our pending i19 products (because they have not been applied) but the info run in the context will. (You can use other YAB commands (help, config) to query the state of the context as well.)

```
> yab info
> yab -c:install-i19 info
```

Use the `explain-apply` command to get a detailed view of what would happen if the changes in the context were applied, without actually applying the changes.

```
> yab -c:install-i19 explain-apply
```

Only the changes produced by the **last** request are saved in the context, with the following exceptions:

- Requests that do not introduce changes (help, info, config, explain-apply) are safe to run at any time.
- Package and configuration changes are retained across requests.

The practical takeaway is that the last command in a context before the context is applied should almost always be `update` or a command that runs `update` like `install`.

When you are ready to apply the changes prepared in the context to the environment, use the `apply` command.

```
> yab -c:install-i19 apply
```

In the typical case where you have prepared an `update`, the environment will be taken offline for a portion of the time.

If the apply fails, you can revert the changes prepared in the context.

```
> yab -c:install-i19 revert
```

Not all changes that can be applied can be reverted, but usually a `revert` with some manual adjustments, is preferable to having to manually roll back all of the changes that were applied to the environment.

The `system-context-info` command reports on the processes (and optionally operations) that have been applied to the environment.

```
> yab -c:install-i19 system-context-info
```

When you are through with the context, you can delete it to reclaim disk space:

```
> yab system-context-delete install-i19
```

Adding files to a context

A context is associated with a "cache" to store pending file system changes.

`build/contexts/prepared/[NAME]/fs`

When you install software in a context, you do not need to interact directly with the cache. For certain kinds of changes, however, you may need to work with the cache. For example, consider a scenario where you want to prepare a change to `configuration.properties` in a context. To set things up you would use the `system-context-locate` command with the (-pull) option to add configuration.properties into the context.

```
> yab -c:cfg -pull system-context-locate build/config/configuration.properties
/dr01/qadapps/ee/build/contexts/prepared/cfg/fs/rw/_/build/config/configuration.properties
```

You could then edit the file in the context.

```
> vi /dr01/qadapps/ee/build/contexts/prepared/cfg/fs/rw/_/build/config/configuration.properties
```

Run an update in the context (as needed).

```
> yab -c:cfg update
```

And then apply the change to the environment.

```
> yab -c:cfg apply
```

Validating a context

Using a context introduces the risk of conflicts.

For example, applying a change prepared in a context typically will restart the environment. Standard operating procedures, may require that you schedule downtime and while waiting for the downtime window, a file with a pending update in the context could be modified in the environment. Applying the change would lose the changes made in the environment. To address this problem, the context includes information describing the original state of the environment, and when the environment is no longer in this state, the request will be flagged as INVALID. The `explain-apply` command can be used at any time to check whether or not a context is valid to be applied (and likewise the `explain-revert` command to check if the context is valid to be reverted). The `apply` command will also perform these validations up front and reject the request if any of the changes are INVALID.

The (-errors) option on the `system-context-info` command provides a focused way to see the details behind any integrity violations.

Logging in a context

Log messages are recorded in the context while the context is prepared:

```
build/contexts/prepared/[NAME]/logs/yab.log
```

When changes are applied to the environment (apply or revert) log messages are recorded in the context and in the environment:

```
build/logs/yab.log
```

Context Guidelines

A context can be leveraged to prepare a change in advance without impacting the environment, but this separation from the environment increases the difficulty of resolving failures. By following the guidelines below, you can reduce the chance of failure while being prepared to respond if a failure occurs.

Preparation

Verify the environment is in working order

Ensure that all environment components are running:

```
> yab -verify status
```

Ensure that there are no outstanding validation errors:

```
> yab validate
```

If the environment can be taken offline, an update should be run before verifying the environment.

Schedule an administrative quiet period

Users may continue to use the environment while the update is being prepared, but all admin changes, apart from the work in the context, should be suspended from the point at which the context is created until is has been applied to the environment. Performing admin work on the environment (changing configuration settings, running an update), after the context is created and before it is applied, may invalidate the work in the context.

Handling Failures

Before Apply

Until the context is applied to the environment, work in the context has no effect on the environment. The safest strategy for recovering from a failure that occurs before the context is applied, is to determine the underlying cause of the failure, delete the context, and then start over with an appropriately revised plan.

In limited circumstances where this extra precaution is not necessary it may be possible to correct a failure by adjusting the context (changing configuration settings, installing new software), followed by reprocessing the change in the context.

During Apply

Invalid Status

When the apply fails with an INVALID status, this indicates that the environment has changed since the context was created. The context log file will contain detailed information on the the files that have changed. These integrity errors are raised during an initial verification before the environment has been modified and can be handled in the same manner as a "Before Apply" failure.

In limited circumstances, the integrity error will describe a change that is not substantive (for example a file timestamp has changed where nothing else is different) and the administrator can choose to force the apply using the (-force) option.

Forcing an apply indiscriminately could result in losing changes to the environment as the "out of date" files in the context are applied to the system.

Other Errors

The `system-cache-flush` step integrates packages and configuration changes into the environment. If a failure occurs before this step, the error can be handled in the same manner as a "Before Apply" failure.

If a failure occurs after `system-cache-flush`, you have the choice of trying to continue integrating the prepared change or trying to restore the system to its previous state. Whether it is best to move forward or back depends on a number of factors and is not a decision that is easy to generalize about.

Moving Forward

The recommended approach is to continue by working directly with the environment and not the context. In other words, make the appropriate corrections directly in the environment and then process the changes by running an update in the environment.

In limited circumstances (when you know what you are doing), corrections can be applied to the context and/or environment and the apply can be reissued (it will resume where it previously failed).

Moving Back

Before the context is applied, the system creates a configuration backup with the name "before-CONTEXT" where CONTEXT is the name you assigned to the context. To restore the configuration backup use the (-config-restore) option and then run an update to apply the change.

Ex. Restore the configuration before the "test" context was applied.

```
> yab -config-restore:before-test
> yab update
```

Limitations

Some upgrades cannot be prepared.

Some applications are sensitive to version differences between client and server processes. OpenEdge, for example, cannot be upgraded in a context, because a shared memory connection from a client in the context (new version) to a server in the environment (old version) could fail.

Some commands cannot be prepared.

It is not possible (or technically infeasible) to prepare certain commands.

Some commands that can be prepared and applied cannot be reverted.

It is not possible (or technically infeasible) to revert certain commands.

Limited Coverage

We can prepare configuration, package, and Progress schema, (XML) data, and code changes. We plan on increasing coverage in subsequent releases.

Apply/Revert are valid for a limited time

Contexts were not designed to store changes for long periods of time. See Validating a context for an explanation of why this is the case.

You can prepare a request even when some of the steps/commands are not prepared. The commands that cannot be prepared are deferred (status DEFER) until the context is applied to the environment at which point they are run in the proper sequence along with the commands that were prepared in advance.

Troubleshooting

- Logging
  - Appserver Logging
  - Financials Logging
- Temporary Files
- Collecting Diagnostic Information
- Disabling Commands
- Refresh & Clean Options
- Validation Settings
- Defining Java Startup Parameters
- Adding Packages to Local Catalog
- Control Process Execution
  - Interactive Execution
  - Non-interactive Execution

Logging

Log information is recorded to the build/logs directory by default.

YAB

The *yab.log* file records log messages for requests submitted through YAB. The types of messages that will be recorded in the log file can be controlled with a request level option:

`-log-level:[OFF|FATAL|ERROR|INFO|DEBUG|TRACE]`

The level is interpreted as a threshold. A setting of OFF will discard all log messages, whereas the default setting of DEBUG will record FATAL, ERROR, INFO, and DEBUG messages to the log file.

```
> yab -log-level:trace ...
```

The (-v) option will write log messages to the console as well as to the log.

The logging in YAB uses the log4j framework. The log4j config file *build/config/etc/log4j.xml* is a standard log4j configuration document that is used to define specific thresholds for logging categories and to determine where log messages are routed (appenders).

Messages are logged using the following format (where the LOGGER is a name for the code that is submitting the log message):

`[TIMESTAMP] [LEVEL] [THREAD]:[REQUEST] [LOGGER] - [MESSAGE]`

Ex.

```
> yab -v nothing
2019-10-24 12:52:14,486 INFO  [main:022c] Main - ======================== START
========================
2019-10-24 12:52:14,486 INFO  [main:022c] Main - Args: [yab -v nothing].
2019-10-24 12:52:14,486 DEBUG [main:022c] Main - Application: [/dr01/qadapps/systest].
2019-10-24 12:52:14,486 DEBUG [main:022c] Main - User: [mfg].
2019-10-24 12:52:14,486 DEBUG [main:022c] Main - Host: [vmlwtb0010].
2019-10-24 12:52:14,487 DEBUG [main:022c] Main - Client: [/dr01/qadapps/yab].
2019-10-24 12:52:14,543 DEBUG [main:022c] BuildFactory - Using archived configuration data.
2019-10-24 12:52:15,107 DEBUG [main:022c] APPLY - system-init
2019-10-24 12:52:15,165 DEBUG [main:022c] APPLY - nothing
2019-10-24 12:52:15,168 DEBUG [main:022c] APPLY - nothing OK
2019-10-24 12:52:15,169 INFO  [main:022c] Main - BUILD SUCCESSFUL (0.835 s)
2019-10-24 12:52:15,170 INFO  [main:022c] Main - END
```

The (-log-copy) option may be used to write all log messages for the request to a specific log file in addition to the standard YAB log file. When a log file is not specified a timestamp log file is created in the log directory.

Ex. Write the output of this command to a file named "test.log" in the current working directory.

```
> yab -log-copy:test.log ...
```

Progress

The setting *progress.service.loglevel* is used to set the initial log level of all Progress servers.

Log Levels:

0 - No log file written
1 - Error only
2 - Basic
3 - Verbose
4 - Extended

The following query shows the current log level of all the Progress servers.

```
yab config "*log*level"
```

To apply a logging level change run the update command that corresponds to the server.

Ex. Update the configuration of the MFG application server.

Open Edge 12 (OE12)

```
> yab pas-mfg-update
```

Open Edge 11 (OE11)

```
> yab appserver-mfg-update
```

The System Configuration page includes an example process for enabling/disabling 4GL trace on an application server.

The database log files (*.lg) are written in the same directory as the other database files.

Appserver Logging

OpenEdge 12 (OE12)

Progress application server logs are located under *${appdir}/servers/pas-*/logs/*.

OpenEdge 11 (OE11)

In OE11, progress application server logs are located under *${appdir.logs}/as-*.log*.

Financials Logging

To troubleshoot a Financials synchronization error you can enable additional logging of the flow by editing the `Synchronize.config` file and setting the `BLDebugLevel` to 31. This will only impact synchronization and not other Financials sessions.

config/Synchronize.config

```
BLDebugLevel=31
```

Additional details will be logged to a file name ct<1234567>.log where 1234567 is the sessionID (random number) used by the process.

The location of the log is configured by the setting `fin.serverxml.logging-directory` which defaults to the standard logs directory:

```
fin.serverxml.logging-directory=${appdir.logs}
```

Temporary Files

YAB creates and removes temporary files while servicing requests.

Keep Temp Files

To prevent YAB temporary files from getting deleted set the environment variable KEEP_TEMP_FILES to true:

```
export KEEP_TEMP_FILES=true
```

To resume deleting temporary files, unset the variable.

```
unset KEEP_TEMP_FILES
```

Configure Temp Directory

By default temporary files are written into the */tmp* directory. YAB can be configured to write temporary files into a different directory by configuring the YAB_JAVA_OPTS environment variable:

```
export YAB_JAVA_OPTS=-Djava.io.tmpdir=/qond/tmp
```

Collecting Diagnostic Information

To help in diagnosing a problem you may be asked to create a diagnostics archive. The command *system-diagnostics* crea tes an archive that contains log files and configuration files from the environment. The archive is created in the current working directory using the following naming pattern:

`[APPDIR DIRECTORY NAME]-[TIMESTAMP].zip`

```
> yab system-diagnostics


                        system-diagnostics (1 task)
-------------------------------------------------------------------------------
1/1 system-diagnostics                                        OK (6.211 s)
-------------------------------------------------------------------------------
BUILD SUCCESSFUL (7.642 s)

> ll *.zip
-rw-rw-r-- 1 mfg qad 1316481 Mar 26  2015 qea-20160311095017.zip


> unzip -l complete-20150326112031.zip
Archive:  complete-20150326112031.zip
  Length     Date   Time    Name
 --------    ----   ----    ----
   310430  03-11-16 09:50   info
      704  03-11-16 09:50   build/logs/yab.log.config
  4952891  03-11-16 09:50   build/logs/yab.log
        0  03-11-16 09:50   build/logs/sql.log
     7590  03-11-16 09:50   build/logs/grs93_wsa.log
    62036  03-11-16 09:50   build/logs/desktop.log
        0  03-11-16 09:50   build/logs/desktop-authentication.log
   457737  03-11-16 09:50   build/logs/admserv.log
   180805  03-11-16 09:50   build/logs/cmdplugin.log
    53541  03-11-16 09:50   build/logs/ns-default.log
    23313  03-11-16 09:50   build/logs/as-crm.broker.log
    28404  03-11-16 09:50   build/logs/as-crm.server.log
    26495  03-11-16 09:50   build/logs/as-eam.broker.log
   543861  03-11-16 09:50   build/logs/as-eam.server.log
    93006  03-11-16 09:50   build/logs/as-fin.broker.log
   893259  03-11-16 09:50   build/logs/as-fin.server.log
...
```

See system-diagnostics

Disabling Commands

The process-ignore file is used to enumerate commands that should not be executed, for example, because the command is not appropriate for the environment or because the command is not functioning correctly and is preventing the execution of other essential commands.

`build/config/etc/process-ignore`

```
# This file enumerates processes that should not be executed in this environment.
#
# Each process should be listed on a new line and lines beginning with
# the '#' character are handled as comments. Use the refresh option (-r) to
# instruct YAB to reprocess this file.
#
#
# When a request is received to directly execute a process listed in this
# file, the system will raise an error that the process is disabled.
# When a request is received to execute a process that implies a process
# listed in this file, the request will be processed but the process listed
# in this file will not be executed. Adding a process to this file, also
# disables any relationships between the process and other processes. So,
# for example, if process (a) implies process (b) and process (b) implies
# process (c) and (b) is disabled, a request to execute (a) will not execute
# (c) unless it is associated with (a) independent of (b).
#
metadata-qracore-update
```

The process-ignore file is re-processed when the system is refreshed.

```
> yab -r ...
```

The `system-process-disable` and `system-process-enable` commands can be used as an alternative to editing the `process-ignore` file directly. The command `system-process-disable-list` lists the processes that are disabled.

Refresh & Clean Options

YAB uses pre-calculated data to efficiently service requests. Under normal conditions, it correctly determines when the pre-calculated data can be used and when it cannot. The refresh and clean options are used to force YAB to discard or ignore certain pre-calculated data when servicing a request.

Refresh Option

The refresh option (-r) will force YAB to re-evaluate the application configuration potentially resulting in changes to configuration settings, commands, and even the packages associated with the environment. This re-evaluation is automatically triggered whenever a configuration document is added, removed, or modified, the *update* command is executed, or the clean option (see below) is defined.

```
> yab -r ...
```

The check-for-updates setting controls whether or not a refresh will reevaluate packages.

Clean Option

The clean option (-clean) option discards/ignores the information used by the requested commands to determine if any work needs to be performed.

Ex. Force an update to the assistance help documentation.

```
> yab -clean help-assistance-help-ee-erp-en-update
```

Validation Settings

It is occasionally necessary or desirable to treat validation errors as non-critical warnings or to skip specific validations.

Use the following settings to adjust the validation mechanism.

```
> yab help validation

SETTINGS

     validation.user               When true, the system validates that the YAB request is
executed by the configured 'system.user'.

     validation.host               When true, the system validates that the YAB request is being
executed from the host
                                   configured by the 'host' setting and verifies that the host
aligns with
                                   restrictions configured for the user in the 'host.
restrictions' setting.

     validation                    When false, the configuration is not validated.

                                   Default: true

     validation.error              Determines whether the build should be halted if the
configuration is not valid.

                                   Default: true

     validation.skip.keys          A comma-delimited list of configuration settings that should
not be validated.

     validation.skip.validators    A comma-delimited list of validators that should be skipped.
                                   NOTE: Validators are identified by their "friendly" name (e.
g. int) or their fully
                                   qualified class name (e.g. com.qad.yab.ee.foundation.
CodePageValidation).
```

Ex. Treat all validation errors as warnings.

build/config/configuration.properties

```
validation.error=false
```

Ex. Skip the validations associated with the 'schema.qrabridge-qadadm.area.map' setting.

build/config/configuration.properties

```
validation.skip.keys=schema.qrabridge-qadadm.area.map
```

Ex. Skip the codepage validation.

build/config/configuration.properties

```
validation.skip.validators=com.qad.yab.ee.foundation.CodePageValidation
```

Validation settings cannot be defined as request parameters but must be set in a configuration file.

Defining Java Startup Parameters

Java startup parameters for the YAB process are defined using the environment variable YAB_JAVA_OPTS.

Ex. Setup remote monitoring of the YAB process

```
export YAB_JAVA_OPTS="-Dcom.sun.management.jmxremote.port=3334 -Dcom.sun.management.
jmxremote.ssl=false -Dcom.sun.management.jmxremote.authenticate=false"
```

Ex. Define the MaxPermSize setting

```
export YAB_JAVA_OPTS="-XX:MaxPermSize=128m"
```

Adding Packages to Local Catalog

In the course of troubleshooting a problem it might be necessary to add a package directly into the local catalog. Adding a package into the catalog will replace all other versions of the package in the local catalog. For example, adding the package `dde-core-1.0.0.0` will replace all other versions of the `dde-core` package in the local catalog.

Add Package

Ex. Add dde-core-1.1.0.0 into the local catalog.

```
> yab -i:dde-core-1.1.0.0.zip
```

Remove Package

Ex. Remove dde-core-1.1.0.0 from the local catalog.

```
> rm -rf build/catalog/packages/dde-core
> yab -r info
```

⚠ Adding a package into the local catalog will add the package to the local catalog but it will not be used by the application unless it is configured and applied.

Control Process Execution

- Interactive Execution
- Non-interactive Execution

Interactive Execution

Debug Pause(-debug-pause)

The request option (-debug-pause) puts YAB into a mode where the end user is prompted before each step in a command is executed. This mode can be useful when it is necessary to halt or pause the execution at a critical point to examine the state of the system before continuing.

```
> yab -debug-pause update
                                                                        [REFRESH]
------------------------------------------------------------------------------
packages                                                 OK (0.076 s)

                            (20 tasks)                                   [APPLY]
------------------------------------------------------------------------------
1/20  system-config-package-init                         OK (0.440 s)
2/20  system-config-before-configure                     OK (0.021 s)
3/20  extension-scan                                     OK (0.002 s)
4/20  system-config-extension-init                       OK (0.141 s)
5/20  stage-init                                         OK (0.001 s)
6/20  alerts-stage                                       OK (0.005 s)
7/20  configurator-stage                                 OK (0.006 s)
8/20  qadcss-stage                                       OK (0.021 s)
9/20  eam-stage                                          OK (0.004 s)
10/20 content-discovery                                  OK (0.133 s)
11/20 branch-evaluate                                    OK (0.036 s)
12/20 content-scan                                       OK (1.650 s)
13/20 system-config-configure                            OK (0.691 s)
14/20 system-config-final-configure                      OK (1.151 s)
15/20 system-config-validate                             OK (0.195 s)
16/20 system-config-after-configure                      OK (0.384 s)
17/20 system-config-final-after-configure                OK (0.001 s)
18/20 content-order                                      OK (0.002 s)
19/20 system-config-save                                 OK (0.354 s)
20/20 system-cache-flush                                 OK (0.001 s)
------------------------------------------------------------------------------

                        update (1067 tasks)                              [APPLY]
------------------------------------------------------------------------------

Press ENTER to run 'config-host-update' ('s' skip, 'a' run all, 'n' run all to next break, 'sn'
skip all to next break, 'q' quit).
>
```

The system can be configured to break (prompt) at a specific set of steps instead of at every step by configuring the option (-break) with a comma separated list of steps to break at.

```
> yab -debug-pause -break:netui-pro-compile,bootstrap-default-update update
```

By default, the steps that precede the first break step will be executed without prompting. Use the (-skip) option to skip the steps that precede the first break step, which may be useful to resume processing at a point of failure.

```
> yab -debug-pause -break:netui-pro-compile,bootstrap-default-update -skip update
```

By default, the system will prompt the user prior to executing any processes specified in (-break), this behavior can be altered to prompt the user after the specified process by using the (-after) option.

```
> yab -debug-pause -break:netui-pro-compile,bootstrap-default-update -after update
```

The prompt options control whether the current step is executed and at what point the system should prompt again.

Key	Description
{ENTER}	Executes the current step and prompts at the next step.
s	Skips the current step and prompts at the next step.
n	Executes the current step and prompts at the next break step.

sn	Skips the current step and prompts at the next break step.
a	Executes the current step and all remaining steps.
q	Stops processing the request.

In the following example an update is requested. The (non-system) steps preceding the first break step "netui-pro-compile" are skipped. When prompted, the option "n" was chosen to execute all steps until the next break step "bootstrap-default-update" at which point "q" was chosen to quit the program.

```
> yab -debug-pause -break:netui-pro-compile,bootstrap-default-update -skip update
                                                                          [REFRESH]
--------------------------------------------------------------------------------
packages                                                  OK (3.398 s)

                            (14 tasks)                                 [APPLY]
--------------------------------------------------------------------------------
1/14  system-config-package-init                          OK (0.239 s)
2/14  system-config-before-configure                      OK (0.011 s)
3/14  extension-scan                                      OK (0.001 s)
4/14  system-config-extension-init                        OK (0.068 s)
5/14  content-scan                                        OK (1.432 s)
6/14  content-configure                                   OK (0.300 s)
7/14  system-config-configure                             OK (0.419 s)
8/14  system-config-final-configure                       OK (0.603 s)
9/14  system-config-validate                              OK (0.720 s)
10/14 system-config-after-configure                       OK (0.335 s)
11/14 system-config-final-after-configure                 OK (0.000 s)
12/14 content-order                                       OK (0.001 s)
13/14 system-config-save                                  OK (0.180 s)
14/14 system-cache-flush                                  OK (0.001 s)
--------------------------------------------------------------------------------

                        update (599 tasks)                             [APPLY]
--------------------------------------------------------------------------------
1/599   openedge-upgrade-check                           SKIPPED (0.000 s)
2/599   config-host-update                               SKIPPED (0.000 s)
3/599   trans-dotdees-fhd-stage                          SKIPPED (0.000 s)
...
348/599 netui-language-configscreens-update               SKIPPED (0.000 s)
349/599 netui-pro-config-update                           SKIPPED (0.000 s)
350/599 netui-pro-compile
Press ENTER to run 'netui-pro-compile' ('s' skip, 'a' run all, 'n' run all to next break, 'sn'
skip all to next break, 'q' quit).
> n

OK (1:09 m)
351/599 netui-pro-install                                 OK (13.470 s)
352/599 bootstrap-default-update
Press ENTER to run 'bootstrap-default-update' ('s' skip, 'a' run all, 'n' run all to next break,
'sn' skip all to next break, 'q' quit).
> q

SKIPPED (21.178 s)
--------------------------------------------------------------------------------

BUILD CANCELLED (1:52 m)
```

Use the system-process-list command to list the "steps" associated with a command:

```
> yab system-process-list update

1. openedge-upgrade-check
2. config-host-update
3. trans-dotdees-fhd-stage
4. qxtend-stage
...
```

Non-interactive Execution

There are two Non-interactive Execution Options that YAB provides, (-debug-exit) and (-debug-start). Note, parallel processing is disabled when using these features.

Debug Exit(-debug-exit)

The request option (-debug-exit) can be useful when it is necessary to exit execution before or after a specific step. The system can be configured to exit at a given point by specifying a process after (-debug-exit:).

```
> yab -debug-exit:spark-master-masterdefault-status spark-status

                     spark-status (2 tasks)                          [APPLY]
-------------------------------------------------------------------------------

Exiting prior to execution of process: 'spark-master-masterdefault-status'

-------------------------------------------------------------------------------

BUILD CANCELLED (0.793 s)
```

By default, the program will exit prior to execution of the configured (-debug-exit) option. To alter this behavior, use the (-after) option to instruct the application to exit after execution of the selected process.

```
> yab -debug-exit:spark-master-masterdefault-status spark-status -after

                     spark-status (2 tasks)                          [APPLY]
-------------------------------------------------------------------------------
1/2 spark-master-masterdefault-status                    STARTED (0.071 s)

Exiting after execution of process: 'spark-master-masterdefault-status'

-------------------------------------------------------------------------------

BUILD CANCELLED (0.876 s)
```

Debug Start(-debug-start)

The request option (-debug-start) can be useful when it is necessary to start execution before or after a specific step; any /all preceding steps are skipped. The system can be configured to start at a given point by specifying a process after (-debug-exit:).

```
> yab -debug-start:spark-slave-slavedefault-worker1-status spark-status

                     spark-status (2 tasks)                          [APPLY]
-------------------------------------------------------------------------------
1/2 spark-master-masterdefault-status                    SKIPPED (0.003 s)
2/2 spark-slave-slavedefault-worker1-status              STARTED (0.047 s)
-------------------------------------------------------------------------------

BUILD SUCCESSFUL (0.601 s)
```

By default, the program will start execution at the step specified in the (-debug-start) option. To alter this behavior, use the (-after) option to instruct the application to start after execution of the selected process.

```
> yab -debug-start:spark-master-masterdefault-status spark-status -after

                     spark-status (2 tasks)                          [APPLY]
-------------------------------------------------------------------------------
1/2 spark-master-masterdefault-status                    SKIPPED (0.004 s)
2/2 spark-slave-slavedefault-worker1-status              STARTED (0.065 s)
-------------------------------------------------------------------------------

BUILD SUCCESSFUL (0.664 s)
```

Use the system-process-list command to list the "steps" associated with a command:

```
> yab system-process-list update

1. openedge-upgrade-check
2. config-host-update
3. trans-dotdees-fhd-stage
4. qxtend-stage
...
```

Appendix

- Parallel Execution
- Command Expressions
- Selecting Files
- Extensions
- Rebuild
- Managing Progress Data
- Creating Tomcat Security Patches

Parallel Execution

YAB commands can be executed in *serial* or in *parallel*. When commands are executed serially, they are executed one at a time, and when they are executed in parallel, more than one command may be executed at a time. By default all commands are configured for serial execution.

Commands are executed in an order that satisfies all ordering constraints, whether executed serially or in parallel. For example, the start command is executed in parallel, a database may be started without waiting for other databases to be started, but no application server will be started until all databases are started, because of a constraint that ensures that application servers are always started after database servers.

Only the `start` and `stop` commands are certified for parallel execution.

Configuration

Configuring a command to execute in parallel is a two step process:

Configure the command to execute in parallel

Use the following idiom, replacing NAME with the name of the command that should be executed in parallel.

```
process.NAME.id=NAME
process.NAME.parallel=true
```

Ex. Configure the start and stop commands to be executed in parallel.

```
process.start.id=start
process.start.parallel=true
process.stop.id=stop
process.stop.parallel=true
```

Configuring a command to execute in parallel also configures the sub-commands to execute in parallel when executed through the parent command. For example, the command *start* includes the command *database-start*. If *start* were configured to execute in parallel, executing *start* (yab start) would also execute *database-start* in parallel. If *database-start* was executed directly (yab database-start) it would be processed serially.

A command configured for parallel execution can be included within a set of commands configured for serial execution. If *start* were configured to execute in parallel, when *start* was executed by executing update, the commands associated with *start* would be executed in parallel and the commands preceding and following the *start* would be executed serially.

Configure the number of threads to service parallel commands

The *threads* property specifies the number of threads of execution that should be allocated to executing commands that are configured for parallel execution. The default value is 1 which is equivalent to executing all commands serially (whether or not they are configured for parallel execution).

Ex. Allocate up to 4 threads to service parallel commands.

```
threads=4
```

The threads property can be specified as a request parameter.

Ex. Execute the database-backup command allocating 10 threads.

```
> yab -threads:10 database-backup
```

The setting *threads.max* is a safety measure to prevent *threads* from being inadvertently set to an inappropriate value. It limits the maximum value accepted for the threads setting and has a default value of 10. This can be increased as needed.

Console Output

When commands are executed in parallel the start and completion of the process are captured on two separate output lines as demonstrated in the following example.

```
> yab -threads:2 status
                              status (35 tasks)
------------------------------------------------------------------------------
1/35  adminserver-status                                  PROCESSING
2/35  nameserver-status                                   PROCESSING
1/35  adminserver-status                                  STOPPED (1.348 s)
3/35  database-alerts-status                              PROCESSING
4/35  database-bisgen-status                              PROCESSING
3/35  database-alerts-status                              STOPPED (0.224 s)
4/35  database-bisgen-status                              STOPPED (0.035 s)
2/35  nameserver-status                                   STOPPED (0.358 s)
...
```

Logging

The messages in the log file identify the thread that produced the message:

build/logs/yab.log

```
2015-04-30 06:56:47,460 DEBUG [Thread-9] STDOUT - 06:56:47 BROKER  0: At end of Physical redo,
transaction table size is 256. (13547)
2015-04-30 06:56:47,636 DEBUG [Thread-2] BuildContext - database-qaddb-start STARTED
```

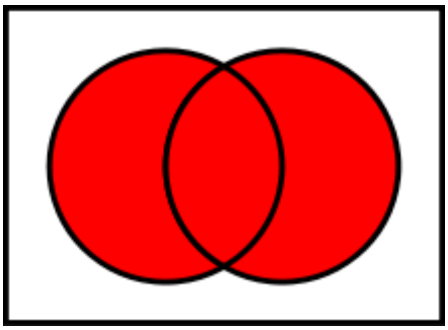
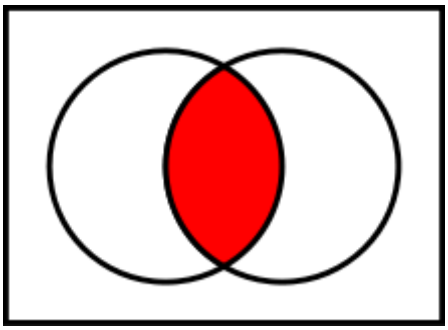
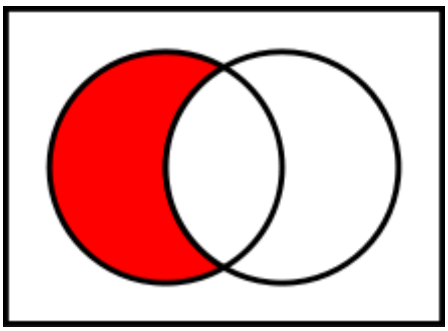
Command Expressions

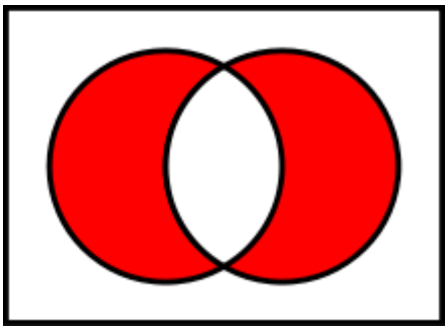
A command expression is a statement that operates on commands as sets.

Syntax

```
<expr> ::= ["("] <command>|<expr> <operator> <command>|<expr>... [")"]
<operator> ::= "|", "&", "~", "^"
<shallow modifier> ::= "!"<command>
```

Operators

Operator	Visual
"|" - Union	 The **union** of A and B
"&" - Intersection	 The **intersection** of A and B
"~" - Relative Complement	 The r**elative complement** of B in A

"^" - Symmetric Difference	 The **symmetric difference** of A and B

By default references to commands are "deep" in that they describe the set formed by the command and its (transitive) implied commands. The shallow modifier changes this to be a reference to the command alone.

Practical Examples

Troublesome Command

Consider a situation in which the environment cannot be cleanly shutdown because the step to stop the admin database raises errors. Everything in the environment can be shutdown while excluding the step to shutdown the admin database with the following request, which demonstrates how command expressions can be used in place of commands when submitting requests.

```
yab "stop~database-qadadm-stop"
```

For completeness, another approach to this problem, that attempts to stop the admin database but ignores failures is the following:

```
yab -failonerror:false stop
```

Alias

A command can be defined that is an alias of another command.

Ex. Define the command "compile" to execute the command "code-mfg-update".

```
process.compile.id=compile
process.compile.expression=code-mfg-update
```

```
> yab compile
```

Selecting Files

Many configuration types use a similar idiom for selecting files defined in terms of a base directory and include and/or exclude patterns to select files from the base directory. For example, the `copy` configuration type is used to configure a file copy. The `source` defines the base directory which contains the files to copy and the `includes` and `excludes` patterns are used to define the files to copy. The pattern matching algorithm is loosely based on the FileSet patterns in the Apache ANT framework, with support for the following wildcard characters:

Wildcard	Description
*	Matches zero or more characters.
?	Matches a single character.
**	Matches zero or more directories.

Ex. Copy all files.

```
copy.test.includes=**/*
```

Ex. Copy all files in the foo and bar directory.

```
copy.test.includes=foo/*,bar/*
```

Ex. Copy the foo.css and bar.html files.

```
copy.test.includes=foo.css,bar.html
```

Ex. Copy all XML files except those ending in "-mapping.xml".

```
copy.test.includes=**/*.xml
copy.test.excludes=**/*-mapping.xml
```

Extensions

An extension is a named directory that is registered with the environment.

An extension is like a package in that both identify directories containing resources for the environment. However, a package is a versioned, readonly resource that is comparable across systems and time, whereas an extension is an unversioned resource that may change over time.

Add Extension

Extensions may be either explicitly configured or discovered.

Ex. Explicit Configuration

build/config/configuration.properties

```
extension.test.name=test
extension.test.dir=${appdir}/test
```

Ex. Discovered

Sub-directories in the `extensions.dir` will be processed as extensions when YAB is refreshed (-r), using the sub-directory name to name the extension.

```
> yab config extensions.dir
extensions.dir=/dr01/qadapps/qea/extensions

> mkdir -p extensions/test

> yab -r config extension.test.*
extension.test.name=test
extension.test.dir=/dr01/qadapps/qea/extensions/bar
```

Discovered extensions can bypass the default extension configuration by defining a file named `extension.properties` that defines the desired configuration.

`[EXTENSION DIR]/yab/config/extension.properties`

Ex. Discovery with explicit configuration

extensions/test/yab/config/extension.properties

```
extension.testa.name=testa
extension.testa.dir=a
extension.testb.name=testb
extension.testb.dir=b
```

If the `extension.properties` file does not define the location of an extension ("dir" setting), the directory will default to the discovered extension directory (e.g. extensions/test). If an extension is defined with a relative "dir" setting, the location is resolved relative to the discovered extension directory (e.g. a = extensions/test/a).

List Extensions

Extensions are listed by the info command (below packages).

```
> yab info
...
EXTENSIONS

testa                                          extensions/test/a
testb                                          extensions/test/b
```

Remove Extension

An extension that is explicitly configured is removed by removing the configuration. Otherwise a discovered extension can be removed by removing the extension directory (or moving it outside of the `extensions.dir`) and then refreshing YAB.

```
> rm -rf extensions/test
> yab -r info
```

Extension Configuration

An extension can distribute configuration settings that will be integrated into the environment. The following table describes the expected location for configuration files of default and important priority and where they are integrated into the system.

Source Files	Destination
`[EXTENSION DIR]/yab/config/*.properties`	`build/config/extensions/[EXTENSION NAME]/default`
`[EXTENSION DIR]/yab/config/important/*.properties`	`build/config/extensions/[EXTENSION NAME]/important`

The configuration settings contributed by (or on behalf of extensions) have the following precedence in the overall configuration processing (high to low):

```
build/config/configuration.properties
build/config/system/*
build/config/extensions/.../important/*
build/config/packages/.../important/*
build/config/extensions/.../default/*
build/config/packages/.../default/*
```

Discovering Content

By default all extensions are scanned for content to integrate into the environment. The discovery process can be disabled by distributing a file named `content-info.properties` in the extension's root directory with the following setting:

content-info.properties
`scan.enabled=false`

Rebuild

Rebuild resets a component to its factory default state.

This operation should not be used in a production environment.

Rebuilding components can result in a loss of data. Rebuilding a database, for example, will restore the database to its original condition and will delete any transaction data entered. Rebuilding a web application, will remove files created in the application.

The following components support a rebuild command:

- Database
- Adminserver
- Nameserver
- Appserver
- AIA
- Code
- Tomcat
- Web application
- Webspeed Server
- Webservices Adapter

A rebuild should be followed by an update to apply necessary changes to the rebuilt component.

Ex Rebuild all databases (and reapply the QXtend default configuration).

```
> yab database-rebuild
> yab update
> yab -qxtend.reconfigure qxo-services-stop qxtend-config-update
```

Managing Progress Data

Overview

This is an in-depth introduction to the management of Progress data. It covers techniques for capturing data, comparing and patching data, and distributing and installing data. We are usually concerned with the management of system data, such as menus, messages, and browses, that configure the behavior of the application, and not transactional data, such as purchase orders, sales orders, and work orders, that reflect the ongoing use of the application. However, the techniques described in this section can be more generally applied to the management of any small- to medium-sized datasets.

XML Format

YAB provides a comprehensive suite of commands to manage data in XML format. It also provides limited support for loading data in the Progress native text (.d) and binary (.bd) format. XML is the recommended format for distributing data in YAB environments, with the exception of very large datasets.

Implementation

XML data files are created by calling the "WRITE-XML" method on a Progress ProDataSet.

https://documentation.progress.com/output/ua/OpenEdge_latest/index.html#page/dvref/write-xml(-)-method.html

The following method options are configured:

Argument	Value	Explanation
formatted	true	When a ProDataSet includes data from joined tables, child records are nested within their parent in the XML document structure.
encoding	UTF-8	The character encoding of the document.
write-xmlschema	true	The XML schema that provides information for interpreting the document is included within the document.
omit-initial-values	true	The XML document has a compact notation where fields whose value is equivalent to the configured default (initial) value of the field are not included in the document.

Some products distribute XML data files that were originally created in non-YAB environments using the same ProDataSet WRITE-XML technique but with different options. These "legacy" files are fully supported by YAB.

Menu Example

This is a typical XML data file describing a single menu:

```
<?xml version="1.0" encoding="UTF-8"?>
<xmlroot xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns="" xmlns:prodata="urn:schemas-
progress-com:xml-prodata:0001">
    <xsd:element name="xmlroot" prodata:proDataSet="true" prodata:datasetName="dataset-dde">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="mnd_det" minOccurs="0" maxOccurs="unbounded" prodata:tableName="tt-
mnd_det">
            <xsd:complexType>
              <xsd:sequence>
                <xsd:element name="mnd_nbr" type="xsd:string" nillable="true" minOccurs="0"
default=""/>
                <xsd:element name="mnd_select" type="xsd:int" nillable="true" minOccurs="0"
default="0"/>
                <xsd:element name="mnd_label" type="xsd:string" nillable="true" minOccurs="0"
default=""/>
                <xsd:element name="mnd_exec" type="xsd:string" nillable="true" minOccurs="0"
default=""/>
                <xsd:element name="mnd_fkey" type="xsd:int" nillable="true" minOccurs="0"
default="0"/>
                <xsd:element name="mnd_help" type="xsd:string" nillable="true" minOccurs="0"
default=""/>
                <xsd:element name="mnd_canrun" type="xsd:string" nillable="true" minOccurs="0"
default="*"/>
```

```
                <xsd:element name="mnd_name" type="xsd:string" nillable="true" minOccurs="0"
default=""/>
                <xsd:element name="mnd_user1" type="xsd:string" nillable="true" minOccurs="0"
default=""/>
                <xsd:element name="mnd_user2" type="xsd:string" nillable="true" minOccurs="0"
default=""/>
                <xsd:element name="mnd__qadc01" type="xsd:string" nillable="true" minOccurs="0"
default=""/>
                <xsd:element name="mnd_uri" type="xsd:string" nillable="true" minOccurs="0"
default=""/>
                <xsd:element name="mnt_det" minOccurs="0" maxOccurs="unbounded" prodata:
tableName="tt-mnt_det">
                  <xsd:complexType>
                    <xsd:sequence>
                      <xsd:element name="mnt_nbr" type="xsd:string" nillable="true" minOccurs="0"
default=""/>
                      <xsd:element name="mnt_select" type="xsd:int" nillable="true" minOccurs="0"
default="0"/>
                      <xsd:element name="mnt_lang" type="xsd:string" nillable="true" minOccurs="
0" default=""/>
                      <xsd:element name="mnt_label" type="xsd:string" nillable="true" minOccurs="
0" default=""/>
                      <xsd:element name="mnt_user1" type="xsd:string" nillable="true" minOccurs="
0" default=""/>
                      <xsd:element name="mnt_user2" type="xsd:string" nillable="true" minOccurs="
0" default=""/>
                      <xsd:element name="mnt__qadc01" type="xsd:string" nillable="true"
minOccurs="0" default=""/>
                    </xsd:sequence>
                  </xsd:complexType>
                </xsd:element>
              </xsd:sequence>
            </xsd:complexType>
          </xsd:element>
        </xsd:sequence>
      </xsd:complexType>
      <xsd:unique name="mnd_det" prodata:primaryIndex="true">
        <xsd:selector xpath=".//mnd_det"/>
        <xsd:field xpath="mnd_nbr"/>
        <xsd:field xpath="mnd_select"/>
      </xsd:unique>
      <xsd:unique name="mnt_det" prodata:primaryIndex="true">
        <xsd:selector xpath=".//mnt_det"/>
        <xsd:field xpath="mnt_nbr"/>
        <xsd:field xpath="mnt_select"/>
        <xsd:field xpath="mnt_lang"/>
      </xsd:unique>
    </xsd:element>
    <xsd:annotation>
      <xsd:appinfo>
        <prodata:relation name="RELATION1" prodata:nested="true" prodata:reposition="true"
prodata:parent="tt-mnd_det" prodata:child="tt-mnt_det" prodata:relationFields="mnd_nbr,mnt_nbr,
mnd_select,mnt_select"/>
      </xsd:appinfo>
    </xsd:annotation>
  </xsd:schema>
  <mnd_det>
    <mnd_nbr>0</mnd_nbr>
    <mnd_select>1</mnd_select>
    <mnd_label>Items/Sites</mnd_label>
    <mnd_exec>1</mnd_exec>
    <mnd_fkey>12</mnd_fkey>
    <mnt_det>
      <mnt_nbr>0</mnt_nbr>
      <mnt_select>1</mnt_select>
      <mnt_lang>ch</mnt_lang>
      <mnt_label>/</mnt_label>
    </mnt_det>
    <mnt_det>
      <mnt_nbr>0</mnt_nbr>
      <mnt_select>1</mnt_select>
      <mnt_lang>cs</mnt_lang>
      <mnt_label>Productos/Plantas</mnt_label>
    </mnt_det>
    ...
  </mnd_det>
</xmlroot>
```

It was created with this command:

```
> yab -rec:0:1 data-xml-dump menus
```

*** The (-rec) option was used to select a single menu. There is more information on the (-rec) option in the "Data File Commands" section.*

All XML data files produced by YAB have the following general structure:

```
<XML Declaration>
<xmlroot>
    <xsd:schema>
                ...
    </xsd:schema>
        <parent table record>
        <field>value</field>
        <field>value</field>
        ...
                <child table record>
            <field>value</field>
            <field>value</field>
            ...
                </child table record>
        </parent table record>
    <parent table record>
        <field>value</field>
        <field>value</field>
        ...
                <child table record>
            <field>value</field>
            <field>value</field>
            ...
                </child table record>
        </parent table record>
    ...
</xmlroot>
```

Entities

An entity is a name (e.g. "menus") associated with a document that describes how to export the entity data.

These entities are not related to QAD Financials entities.

The entity definition defines the following type of information:

- The well-known name of the entity (<DataSetName>)
- The database that contains the entity tables (<Databases>)
- The tables of interest (<Table>)
- How the tables are joined (<Relation>)
- Fields that should be included or excluded from data files (<IncludeField> <ExcludeField>)
- Where clause filters (<WhereClause>)

```
<Entity>
    <Dataset>
        <DatasetName>menus</DatasetName>
        <InlineSchema>true</InlineSchema>
        <Databases>qaddb</Databases>
        <Table>
            <TableName>mnd_det</TableName>
            <ExcludeField>oid_mnd_det</ExcludeField>
        </Table>
        <Table>
            <TableName>mnt_det</TableName>
            <ExcludeField>oid_mnt_det</ExcludeField>
        </Table>
        <Relation>
            <ParentTable>mnd_det</ParentTable>
            <ParentField>mnd_nbr</ParentField>
            <ParentField>mnd_select</ParentField>
            <ChildTable>mnt_det</ChildTable>
            <ChildField>mnt_nbr</ChildField>
            <ChildField>mnt_select</ChildField>
        </Relation>
    </Dataset>
</Entity>
```

The document serves as a "base" definition for the entity but commands may dynamically alter the definition. For example, the "data-xml-dump" command adds to the entity where clause when the option (-rec:0:1) is defined, to filter the data.

Entity definitions should usually only reference tables from a single database. Data is installed with a single database connected (see "Installing Data"). The predefined extended browse entity (browses-ex) that references tables in the "qaddb" and "qadadm" databases is used only for analysis and not as a means to distribute and install browse data.

Configured Entities

The system comes preconfigured with entities to support the management of system data. The "dev-data-entity-list" command lists these entities, their primary index, and the tables they reference.

```
> yab dev-data-entity-list

[MULTIPLE]

Entity                    Primary
Index                                                                    Tables
------
-------------                                                                    ------
browses-ex                n
/a                                                                              brw_mstr,
brwt_det, brwf_det, vue_mstr, vuf_det, vwj_det, proc_det, prol_det, pgmi_mstr, flh_mstr,
drl_mstr, url_mstr,

lbl_mstr, lbl_mstr, lbl_mstr, lbl_mstr, lbld_det

[QADADM]

Entity                    Primary
Index                                                                    Tables
------
-------------                                                                    ------
browses
brw_name                                                                         brw_mstr,
brwt_det, brwf_det, proc_det, prol_det
drilldowns                drl_field, drl_call_pgm,
drl_exec                                                 drl_mstr
label-details             lbld_fieldname,
lbld_execname                                                    lbld_det
labels                    lbl_lang,
lbl_term                                                               lbl_mstr
menu-substitutions
mnds_exec                                                                        mnds_det
program-information
pgmi_exec                                                                        pgmi_mstr
query-views
vue_name                                                                         vue_mstr,
vwj_det, vuf_det
transformation-functions
edtrf_name                                                                       edtrf_mstr

[QADDB]

Entity                    Primary
Index                                                                    Tables
------
-------------                                                                    ------
accounts                  actf_tblname, actf_exec,
actf_acct_fldname                                        actf_mstr
categories                ctg_category,
ctg_value                                                          ctg_mstr
field-attributes          fldattr_fldname, fldattr_progname,
fldattr_attrname                              fldattr_mstr
field-help                flh_field,
flh_call_pgm                                                     flh_mstr
generalized-codes         code_domain, code_fldname,
code_value                                           code_mstr
languages                 lngd_dataset, lngd_key1, lngd_key2, lngd_key3, lngd_key4, lngd_field,
lngd_lang     lngd_det
licenses
lpm_product                                                                      lpm_mstr,
lpmd_det
master-comments           cd_domain, cd_ref, cd_type, cd_lang,
cd_seq                                    cd_det
menus                     mnd_nbr,
mnd_select                                                         mnd_det, mnt_det
messages                  msg_nbr,
msg_lang                                                           msg_mstr
service-support-crossrefs cref_domain, cref_ref_type, cref_item1,
cref_item2                                    cref_mstr
service-support-programs  mnp_domain, mnp_program, mnp_userid, mnp_sequence,
mnp_prog_type                   mnp_det
service-support-timezones tzo_label,
tzo_area                                                         tzo_mstr, tzod_det
urls                      url_field, url_field_value, url_call_pgm, url_exec, url_addr,
url_script, url_type  url_mstr
warehousing-algorithms    Domain, AlgoType,
AlgoNbr                                                    AlgoM
```

You can define your own entities and use them directly:

```
> cat dump-labels.xml
<Entity>
    <Dataset>
        <DatasetName>labels</DatasetName>
        <InlineSchema>true</InlineSchema>
        <Databases>qadadm</Databases>
        <Table>
            <TableName>lbl_mstr</TableName>
            <ExcludeField>oid_lbl_mstr</ExcludeField>
        </Table>
    </Dataset>
</Entity>
> yab data-xml-dump dump-labels.xml
```

In fact, if you simply want to export data from a single table, you do not even need an entity definition (but you do have to specify the -database option):

```
yab -database:qaddb data-xml-dump pin_mstr
```

There are a few reasons that it may make sense to define and configure your own entities:

- To avoid locating the entity definition file or specifying the (-database) option each time data is exported.
- To include the data in snapshots (see "Snapshot Commands" below).

Configuring

The factory default configuration locates entity definitions for the standard system data:

```
> yab -skip-resolution config "dev-data.databases.*"
dev-data.databases.qadadm=${packages.yab-ee-foundation.dir}/etc/dev-data/qadadm
dev-data.databases.qaddb=${packages.yab-ee-foundation.dir}/etc/dev-data/qaddb
```

Additional entities can be configured through instances of the "dev-data.databases" setting, where the instance name is the name of the database without the "db" prefix (i.e. "dev-data.databases.custom" for the "db.custom" database) and the value of the setting is a directory that contains entity definition files.

```
# @append
dev-data.databases.custom=${appdir}/entities/custom
```

The predefined entities are a good reference for understanding the entity definition format and the help for the `data-xml-dump` command provides additional examples.

```
> yab help data-xml-dump
```

Capturing and Analyzing Data

Capturing data describes the techniques for getting data out of the database and into a format suitable for redistribution and installation. These same techniques are often useful in analyzing data issues as well. There are two different sets of commands to capture and analyze data. The snapshot commands operate on collections of data files (snapshots), whereas the data file commands operate on individual data files. The snapshot commands provide a convenient solution for efficiently capturing system data changes, while the data file commands are useful for ad hoc, focused activities.

Snapshot Commands

Snapshots are primarily used by developers to capture system data changes entered into the application. The commands are available in the "dev" namespace:

```
> yab command-help dev-data

PROCESSES

     dev-data-clear             Deletes all data snapshots.
     dev-data-diff              Compares two snapshots.
     dev-data-entity-list       Lists the configured data entities.
     dev-data-list              Lists all data snapshots.
     dev-data-patch             Compares two snapshots merging differences into one or more data
files in a directory.
     dev-data-snapshot          Creates a new data snapshot.
     dev-data-snapshot-auto     Create an initial dev-data snapshot when the environment is
created.
     dev-data-snapshot-list     Lists all data snapshots.
```

The "dev-data-snapshot" command creates a snapshot that captures the state of the configured entities in the database. The "dev-data-list" command lists all snapshots from newest to oldest.

```
> yab dev-data-snapshot

                    dev-data-snapshot (1 task)                          [APPLY]
------------------------------------------------------------------------------
1/1 dev-data-snapshot                                    OK (36.704 s)
------------------------------------------------------------------------------

> yab dev-data-list

Snapshot: 2020-07-23T14-49-29
-----------------------
Location: /dr01/qadapps/systest/build/work/dev-data/2020-07-23T14-49-29
...

> tree /dr01/qadapps/systest/build/work/dev-data/2020-07-23T14-49-29
/dr01/qadapps/systest/build/work/dev-data/2020-07-23T14-49-29
 qadadm
    browses.xml
    drilldowns.xml
    label-details.xml
    labels.xml
    menu-substitutions.xml
    program-information.xml
    query-views.xml
    transformation-functions.xml
 qaddb
     accounts.xml
     categories.xml
     field-attributes.xml
     field-help.xml
     generalized-codes.xml
     languages.xml
     licenses.xml
     master-comments.xml
     menus.xml
     messages.xml
     service-support-crossrefs.xml
     service-support-programs.xml
     service-support-timezones.xml
     urls.xml
     warehousing-algorithms.xml

2 directories, 23 files
```

A snapshot can be created that only captures certain entities.

```
> yab dev-data-snapshot menus messages

> tree /dr01/qadapps/systest/build/work/dev-data/2020-07-24T04-49-20
/dr01/qadapps/systest/build/work/dev-data/2020-07-24T04-49-20
 qaddb
     menus.xml
     messages.xml

1 directory, 2 files
```

A "configured" snapshot is a special snapshot that captures the data that is configured. It is implemented by creating temporary databases, loading schema and entity data, and then taking the snapshot. As such it is a relatively expensive operation, but it provides a way to compare the configured data with the installed data.

```
> yab -configured dev-data-snapshot
```

The "Data File Commands" can be used to analyze individual data files in a snapshot or between snapshots.

Scenarios

Capture New Changes

Using the snapshot capability is the best way to capture system data changes if the changes have not been made yet. The general approach is to create a snapshot before making the changes, make the changes through the application (add menus, etc), and then take another snapshot with your changes. Then the snapshot patch command can be used to merge the difference between the two snapshots into a destination directory, where the destination directory is usually the location where XML data files are stored for a project or product (see "Distribution").

In the following example, a new menu is added and the menu is captured, and later the menu is updated and captured again. The "dev-data-patch" command applies the difference between the snapshots to the data directory. It has two options (-snapshot1) and (-snapshot2) to identify the snapshots to compare. The patch will describe the changes needed to transform "snapshot1" into "snapshot2". In this scenario, "snapshot1" should be the snapshot taken before the data changes and "snapshot2" the snapshot taken after the data changes. With this ordering, an added menu is recorded as an added menu in the patch. (If the order was reversed it would create a patch to undo the changes where the added menu is recorded as a deleted menu).

```
> yab dev-data-snapshot (creates 2020-06-24T06-54-49)
(add new menu through the application)
> yab dev-data-snapshot (creates 2020-06-24T07-11-21)
> yab dev-data-list (to get the names of the before and after snapshots)
> yab -snapshot1:2020-06-24T06-54-49 -snapshot2:2020-06-24T07-11-21 -style:entity dev-data-patch
myproduct/data/progress/xml  (creates 'myproduct/data/progress/xml/qaddb/menus.xml' with the new
menu)
...
> yab dev-data-snapshot (creates 2020-07-05T11-12-32)
(update menu through the application)
> yab dev-data-snapshot (creates 2020-07-05T11-15-09)
> yab dev-data-list (to get the names of the before and after snapshots)
> yab -snapshot1:2020-07-05T11-12-32 -snapshot2:2020-07-05T11-15-09 -style:entity dev-data-patch
myproduct/data/progress/xml (updates 'myproduct/data/progress/xml/qaddb/menus.xml')
```

See "Capture Manual Changes" and "Capture Data By Primary Index" for alternative strategies to use when the data you want to capture is already in the database.

Capture Manual Changes

If you are in a situation where you need to capture changes to system data that have already been applied to the database and if there is a large number of changes or you are not entirely clear on what has changed, you can leverage a configured snapshot to try to reverse-engineer the changes. (However, if there are only a few changes and are well known, the "Capture Data By Primary Index" strategy is more efficient and precise.) The general approach is to take a configured snapshot and a normal database snapshot and then compare the two snapshots where the configured snapshot is referenced by "snapshot1" and the database snapshot by "snapshot2". It is important that these snapshots are taken when there are no pending data changes (configured data that has not been installed yet), because these pending changes would add noise to the comparison. If you are unsure of the state of the system, running an update will ensure that all pending changes are processed.

```
> yab -configured dev-data-snapshot (creates configured)
> yab dev-data-snapshot (creates 2020-06-24T07-11-21)
> yab dev-data-list (to get the name of the database snapshot)
> yab -snapshot1:configured -snapshot2:2020-06-24T07-11-21 -style:entity dev-data-patch
customizations/mfg/default/data (captures manually entered data as customizations)
```

Going to this effort to capture what has already been done may be counterintuitive, but there are several important benefits:

- Customizations of standard system data (i.e. changing a standard menu distributed by QAD) will be retained through upgrades.
- The customizations directory accurately reflects how the environment is different than a baseline system.
- Changes can be more accurately promoted from one environment to another.

Data File Commands

The commands in the "data" namespace operate on individual data files.

```
> yab command-help data-xml

PROCESSES

     data-xml-diff       Compares XML format data files for differences.
     data-xml-dump       Dumps data from a Progress database in XML format.
     data-xml-format     Formats an XML data file.
     data-xml-index      Prints the ID of records in an XML format data file.
     data-xml-load       Loads data from a Progress dataset in XML format.
     data-xml-new        Creates an empty XML data file.
     data-xml-patch      Adds/removes records from data files.
```

> The `data-xml-load` command is provided for troubleshooting and experimentation in lab environments and should only be used in exceptional circumstances otherwise. Loading data directly into the system goes against the principle that an environment should be fully described by its configuration. See "Distributing Data" and "Installing Data" for the correct way to distribute and integrate data into environments.

Scenarios

Capture Data By Primary Index

If the data you want to capture is in the database, you can identify the data using the primary index values for the parent table of each instance in a colon-delimited notation:

```
[VALUE 1]:[VALUE 2]...
```

The "dev-data-entity-list" command shows the primary index fields for each entity. For example, to identify a specific menu we must know its "mnd_nbr" and "mnd_select" value.

```
[QADDB]

Entity                    Primary
Index                                                          Tables
------
-------------                                                         ------
...
menus                     mnd_nbr,
mnd_select                                                   mnd_det, mnt_det
...
```

The primary index values to identify the "Item/Sites" menu (mnd_nbr=0 and mnd_select=1) is "0:1" and the primary index values to identify the "Addresses" menu (mnd_nbr=0 and mnd_select=2) is "0:2". The asterisk (*) can be used in place of a value to accept any value for the field. For example, "0:*" selects all menus with (mnd_nbr=0).

You can dump all of the entity data and review the primary index values of the instances you are interested in capturing.

```
> yab data-xml-dump menus
```

Sometimes it is useful to use the "data-xml-index" command to print the primary index values for all of the instances in the file, using other commands like "grep" to focus on an area of interest.

```
> yab -keys data-xml-index menus.xml | grep "^36:"
36:1
36:12
36:13
36:14
...
```

Once you have identified the instances to dump, they can be identified with the (-rec) option.

```
> yab -rec:0:1 -rec:0:2 data-xml-dump menus
```

Or to dump more than a handful of instances, use (-recfile) to locate a file containing primary index values one per line.

menu-ids

```
0:1
0:2
...
```

```
> yab -recfile:menu-ids data-xml-dump menus
```

Dump Arbitrary Data

You can export data from any table, including system tables. For example, the following command dumps the database users defined in the qaddb database:

```
> yab -database:qaddb data-xml-dump _user
```

Use the "database-INSTANCE-table-info" command to list all user tables.

```
> yab database-qaddb-table-info
```

Use the (-type) option to list all user and system tables.

```
> yab -type:TS database-qaddb-table-info
```

Distributing Data

Distributing data is the process of preparing for the installation of data into other environments. Data files can be distributed in a package along with other artifacts and installed into environments or distributed as files with instructions for integration into environments. Packaging data is the preferred approach because it simplifies installation and it provides a structured way to manage versions of the data.

There are several techniques that can be used to capture data for redistribution. All of these techniques will produce files with the correct names. It is important to not rename the data files when they will be used for installation into other environments. The ability to customize entities depends on the proper identification of data and this identification is based on the names of the data files. For example, renaming a "menus.xml" file as "custom-menus.xml" could result in the wrong data being processed.

Scenarios

Package

The contents of the package are prepared in a directory. Usually this directory is under revision control as a quality practice but that is not a requirement. In the following example, you prepare the package in a directory named "content" and create a package named "example". The files in the "content" directory are included in the package but not the "content" directory itself.

```
> mkdir content
```

We will create a YAB configuration file in a well known location in our package to enable content discovery.

```
> mkdir -p content/yab/config
> vi content/yab/config/example.properties
```

example.properties

```
# enable content discovery
scan.example.dir=${packages.example.dir}
scan.example.enabled=true
```

The standard location for Progress XML format data in a package is in the "data/progress/xml" directory.

```
mkdir -p content/data/progress/xml
```

The "Capture New Changes" scenario describes a strategy for capturing data and writing it into this directory, for example creating "content/data/progress/xml/qaddb/menus.xml" with your captured menu data.

If your data is a customization and should override all standard and patch data, add these additional lines to the *example.properties* configuration file to instruct the system to process your data as customizations.

example.properties

```
# enable content discovery
scan.example.dir=${packages.example.dir}
scan.example.enabled=true

# @append
# @group 2
data._order=data.example-xml-qaddb,data.example-xml-qadadm
```

When all of the content is in order you can create the package.

```
> yab -class:example -version:1 system-package-create content
```

This creates the package *example-1.0.0.0.zip* in the current working directory. This package can be copied to other environments and installed using the "install" command:

```
> yab install example-1.0.0.0.zip
```

After the product is installed, the `info` command reports on the version installed in the environment:

```
yab info | grep example
|- example                                1.0.0.0        local
```

Customization Directory

Customized data also can be integrated into a system by copying the data files into the appropriate customization directory:

`customizations/mfg/default/data/[DATABASE]`

Replace DATABASE with the name of the appropriate database without the "db" prefix (i.e. "custom" for the "db.custom" database). You may need to create the directory, if the data is for a database other than "qaddb" or "qadadm". After copying the data, run the "update" command to process the changes.

```
> yab update
```

Installing Data

When a package is installed or an update is run, XML data files are processed during the following steps, where INSTANCE is the name of a specific database:

```
database-INSTANCE-data-xml-update
```

The data process processes all of the XML data files for the database, assigning each file to an entity, by evaluating the name of the file. This assignment step also supports legacy file names, such as "FLAT_[ADD|MOD|DEL]_mnd_det-mnt_det.xml", for backward compatibility. All of the data files associated with an entity are consolidated into a single data file. Alternate versions of the data are reconciled in this consolidation phase. For example, a customized menu is added to the consolidated data file in preference to the standard menu it overrides. The consolidated data file is compared with the consolidated data file from the last successful evaluation to produce delta files that describe the records that should be added into the system and the records that should be removed. Complex entities like browses that consist of many records are processed with a truncate-load approach, where for example, if any record in a browse changes, all records related to that browse are deleted from the database, and then the browse is reloaded. Records that were previously configured but no longer are, are deleted from the system, or if they overrode records, the records they overrode are reinstated. So for example, if the file "customizations/mfg/default/data/qaddb/menus.xml" is deleted and "database-qaddb-data-xml-update" is run, menus are deleted or reinstated as appropriate.

Scenarios

Troubleshooting

When trace logging is enabled (-log-level:trace) the data process logs the underlying record-level create, update, and delete activity.

The intermediate files associated with the data process calculations are recorded in the following directory:

`build/work/system/processes/database-INSTANCE-data-xml-update/state.storage/default`

Finding Data

All installed data is configured by instances of the "data" configuration type.

```
> yab -instances config data
```

The "find" command is a useful tool for searching across all data files. For example, the following command would print the names of all XML or .d data files that contained the text "ab001" and could be used to search for the origin of the "ab001" browse.

```
> yab find data | xargs grep -l ab001
```

To only include XML data add an includes statement.

```
> yab -includes:"*.xml" find data | xargs grep -l ab001
```

Creating Tomcat Security Patches

The following procedure may be used to create a package that redistributes a release of Apache Tomcat to patch urgent security vulnerabilities when a package is not yet available through QAD. The procedure should not be used to upgrade to another major Tomcat release (which may have breaking changes). So for example, an environment with Tomcat 7 should be updated to a Tomcat 7 release with the security vulnerabilities fixed.

The example below demonstrates updating Tomcat 7 to version 7.0.109.

Download the release

```
wget https://archive.apache.org/dist/tomcat/tomcat-7/v7.0.109/bin/apache-tomcat-7.0.109.tar.gz
```

Extract the release

```
> tar -xvf apache-tomcat-7.0.109.tar.gz
```

Package the release

```
> yab system-package-create -class:tomcat -version:7.0.109 apache-tomcat-7.0.109

> ll tomcat-7.0.109.0.zip
-rw-rw-r--. 1 mfg mfg 10695778 Sep 22 06:30 tomcat-7.0.109.0.zip
```

The package can be installed into environments to apply the update.

Install package

```
> yab install tomcat-7.0.109.0.zip

> yab -all info | grep tomcat
   |- tomcat* (7.0.85.0)                          7.0.109.0        local  (new)
```