QAD Enterprise Applications
Enterprise Edition 2016

Configuration and Administration Guide
QAD Enterprise Edition

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QAD Enterprise Applications

Enterprise Edition

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Table of Contents

Administration Guide

This is the Administration Guide for QAD Enterprise Edition using Your Application Builder (YAB) 1.4.

YAB is used to administer QAD Enterprise Edition 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. It is oriented towards system administrators with a basic understanding of the QAD Enterprise Edition.

The *QAD Enterprise Edition Installation Guide* provides instructions for installing the Enterprise Edition and is available in the QAD Document Library:

http://documentlibrary.qad.com

Documentation Conventions

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

- The yab command 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

A QAD Enterprise Edition environment is administered using the command *yab*.

Executing the command without any arguments (or with "-?") will display help for the command.

```
> yab
YAB Console, 1.4.0.27


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

 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 configuration settings to install/update.
                 (multiple allowed)

 -i:arg          A FILE locating a package to install into the local software
                 catalog. (multiple allowed)

 -r              Reevaluates system settings (-r or -r:true) or prevents the
                 reevaluations of system settings (-r:false). Under normal
                 conditions system settings will be reevaluated as needed.

 -clean          Rebuilds the application cache.

 -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.

 Arguments:

 PROCESS         A process to execute.
```

When the QAD Enterprise Edition is installed the installer copies the YAB client into the *build/client* directory and creates a shell script named *yab* in the installation directory to run the client (unless it detects that the client is already installed). For your convenience it is recommended that you add the *yab* command to your PATH.

```
export PATH=[YAB CLIENT INSTALLATION]:$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 sub-directory 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 7. If set, the client will use the Java installation located by the JAVA_HOME environment variable, otherwise it will use the first Java launcher ([INSTALL]/bin/java) located on the PATH. If Java is not configured 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 will display the version of Java resolved from the PATH:

```
java -version
```

Packages

An environment is composed of *packages*. Packages are read-only versioned software bundles that are used to distribute application and management components.

Software Catalogs

A software catalog is a structured collection of packages. A catalog may contain compressed or uncompressed packages. Every QAD Enterprise Applications 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* setting can used to define additional catalogs to source packages (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.

Info Command

The info command lists the packages configured in an environment.

```
> yab info

INSTANCE

/dr01/qadapps/qea

MODULES

archiving                                          1.0.0.78       local
assistance-help-ee                                 2016.0.0.2     local
base-api                                           1.1.0.79       local
dde-ant                                            2.2.0.1        local
dde-build                                          2.2.0.49       local
dde-core                                           2.2.0.14       local
dde-registry                                       2.2.0.4        local
demo-data-ee2016                                   2016.0.16.209  local
fin-bin64-proxy                                    2016.0.80.5    local
...
```

See:

Info

Clean

Product Upgrades

Commands

Administrative commands are executed through the *yab* command.

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

Detailed information is recorded in the YAB log file:

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

To also print the log messages to the console include the verbose (-v) option.

```
> yab -v [COMMAND] [COMMAND]...
```

Frequently commands are grouped from the specific to the general.

Ex. Starts the QADDB database.

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

Ex. Starts all databases.

```
> yab database-start
```

Ex. Starts the environment (including databases).

```
> yab start
```

Some commands depend on the configuration of the 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
```

The help command is used to print 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 system-process-list command lists the commands that are grouped (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* dire ctory. With the exception of the file *build/config/configuration.properties*, these files should not be directly edited. 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 databases servers for the QADDB database to 15, the following setting would be added:

build/config/configuration.properties

```
appserver.mfg.maxsrvrinstance=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 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 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 not be edited.

Query

The config command is used to query configuration settings:

```
> yab config appserver.mfg.*
appserver.mfg.aia=aia.default
appserver.mfg.aiaurl=http://vmwtb02.qad.com:22000/aia/Aia?AppService=as-mfg
appserver.mfg.allowruntimeupdates=1
appserver.mfg.appservicenamelist=as-mfg
appserver.mfg.autostart=0
appserver.mfg.brkrloggінglevel=3
appserver.mfg.brokerlogfile=/qad/sandbox/user/wtb/02/sc2-core/build/logs/as-mfg.brok
er.log
appserver.mfg.connectionprotocol=appserverdc
appserver.mfg.controllingnameserver=ns-default
appserver.mfg.environment=as-mfg
appserver.mfg.hostname=vmwtb02.qad.com
appserver.mfg.initialsrvrinstance=1
appserver.mfg.manual=false
appserver.mfg.maxsrvrinstance=5
appserver.mfg.minsrvrinstance=1
appserver.mfg.name=as-mfg
appserver.mfg.operatingmode=Stateless
appserver.mfg.portnumber=22098
...
```

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

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

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  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/
```

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.
patches	patches.dir	Yes	Application patches.
scripts	scripts.dir	Yes	Shell scripts to start and stop application servers.

Enterprise Edition

The environment should be started before running the Enterprise Edition.

```
> 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].sh
```

Ex.

```
> scripts/client-us.sh
```

.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 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
```

System Administration

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

Starting and Stopping Environments

The commands start, stop, and status are used to start, stop, and check the status of servers in 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 Financials application server is *appserver-fin-start* which executes the script *scripts/appserver-fin-start*.

scripts/appserver-fin-start

```
#!/bin/sh

# Starts the 'fin' application server.
# Generated: 2015-03-24T08:04-0700

DLC=/progress/dlc; export DLC
PROMSGS=/progress/dlc/promsgs; export PROMSGS
PATH=/progress/dlc/bin:${PATH}; export PATH
PROTERMCAP=/progress/dlc/protermcap; export PROTERMCAP

/progress/dlc/bin/asbman -i as-fin -start -port 22001
```

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 to provide 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 Progress and Tomcat programs do not handle well a request to start a server that is already running or to stop a server that is already stopped.

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`	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 Demons

The Financials component is associated with background processes called *daemons*.

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.
     ...
```

There are other settings to fine tune the Financials API that is called to control the daemons.

```
> yab config fin.daemons.*
fin.daemons.logdir=/qad/sandbox/user/wtb/02/sc2-core/build/logs
fin.daemons.manual=false
fin.daemons.names=XmlDaemon,BalanceDaemon,BudgetDaemon,CrossCompanyDaemon,EventDaemo
n,HistoryDaemon,ReplicationDaemon,ScanDaemon,TimeoutDaemon,CubeDaemon,ReportDaemon
fin.daemons.onlinehousekeeping=OnlineHousekeeping
fin.daemons.propath=/qad/sandbox/user/wtb/02/sc2-core/config,/qad/sandbox/user/wtb/0
2/sc2-core/build/catalog/packages/qracore/2/20/0/68/qad.qra.core/bin/qracore.pl,/qad
/sandbox/user/wtb/02/sc2-core/dist/mfg-customizations,/qad/sandbox/user/wtb/02/sc2-c
ore/dist/fin/patch,/qad/sandbox/user/wtb/02/sc2-core/dist/fin,/qad/sandbox/user/wtb/
02/sc2-core/dist/pro/com/mfgpro,/qad/local/sandbox/cache/packages/fin-bldata/2016/0/
80/6,/qad/local/sandbox/cache/packages/fin-bin64-qadfin/2016/0/80/6/qadfin.pl,.,/qad
/local/sandbox/cache/packages/qra-oe11/1/1/166/0/lib/qra.pl,/qad/sandbox/user/wtb/02
/sc2-core/dist/mfg,/qad/sandbox/user/wtb/02/sc2-core/dist/mfg/us,/qad/sandbox/user/w
tb/02/sc2-core/dist/mfg/us/bbi,/qad/sandbox/user/wtb/02/sc2-core/dist/activityfeed,/
qad/sandbox/user/wtb/02/sc2-core/dist/qxtadpt
fin.daemons.startaction=StartDaemon
fin.daemons.startallaction=StartApplication
fin.daemons.statusaction=DaemonStatus
fin.daemons.statusallaction=DaemonStatus
fin.daemons.stopaction=StopDaemon
fin.daemons.stopallaction=StopApplication
fin.daemons.workdir=/qad/sandbox/user/wtb/02/sc2-core/build/work
> yab help fin.daemons

SETTINGS

     fin.daemons.logdir              The log directory for daemons.

     fin.daemons.manual              Whether Financials daemons will be started and
stopped with the environment (false) or manually (true).

     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,Re
plicationDaemon,ScanDaemon,TimeoutDaemon,CubeDaemon,ReportDaemon

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

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

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

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

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

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

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

     fin.daemons.workdir             The work directory for daemons.
```

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.

Data Management

Database Backups

Backing up Databases

To backup all databases, execute the command:

```
> yab database-backup
```

Alternatively to backup a specific database, execute the command:

```
> yab database-[INSTANCE]-backup
```

Database after imaging can be enabled after the backup if the database is offline.

```
> yab -enableai database-backup
```

> Databases may be backed up when they are offline or online.

Tags

The `dbbackup.dir` setting is used to define the location where backups will be created. Within the configured backup directory, sub-directories are used to organize backups. The (-tag) option specifies the sub-directory to use. Multiple databases can be backed up (and restored) into the same tag directory. If a backup for a database already exists within the tag directory it will be overwritten. The default tag/sub-directory name is "default", unless the `dbbackup.timestamp` setting is set to true, in which case the system will create a tag from the current date and time.

Ex. Backup databases to the "grs-install" tag.

```
> yab -tag:grs-install database-backup
```

Ex. Backup databases to a timestamp tag.

```
> yab -dbbackup.timestamp database-backup
```

Help

```
> yab help "dbbackup."

SETTINGS

     dbbackup.compress         When true backups will be GZIP compressed.

                               Note: Compression uses platform specific commands
(mkfifo, gzip) and shell syntax.
                               On Windows this setting is ignored.

                               Default: true

     dbbackup.dir              The directory to store backups in.

                               Default: ${appdir.work}/backups

     dbbackup.timestamp        When true backups will be associated with a timestamp
derived tag unless a
                               the backup request specifies a tag, otherwise when
false requests that do
                               not specify a tag are associated with the tag
'default'.

     dbbackup.timestampmax     The maximum number of timestamped backup tags to
allow.
                               When a new backup is requested and the maximum number
of timestamped backup
                               tags are defined, the oldest timestamped backup tag
will be removed.
```

Restoring Databases

To restore all databases from the default tag, execute the command:

```
> cd /dr01/qadapps/qea
> ./yab database-restore
```

or from a specific tag:

```
> ./yab -tag:NAME database-restore
```

Alternatively to restore a specific database from the default tag, execute the command:

```
> ./yab database-[INSTANCE]-restore
```

or from a specific tag:

```
> ./yab -tag:NAME database-[INSTANCE]-restore
```

See Backing up Databases for a discussion of backup tags.

> Databases must be restored when the system is offline.

Listing Database Backups

To display all database backups, execute the command:

```
> yab database-backup-list
```

Alternatively to display the database backups for a specific database, execute the command:

```
> yab database-[INSTANCE]-backup-list
```

Ex.

```
> yab database-backup-list

Tag: 20150325072049
-------------------
Location: /dr01/qadapps/qea/build/work/backups/20150325072049

hlpdb                Mar 25, 2015 7:21:37 AM

Tag: default
------------
Location: /dr01/qadapps/qea/build/work/backups/default

hlpdb                Feb 25, 2015 1:38:03 PM
admdb                Feb 25, 2015 1:15:28 PM
```

Marking Databases as Backed up

Progress records the last time a database was backed up and uses this metadata to validate certain requests (enabling after imaging). Marking a database as backed up manually records the database as having been backed up. It might be appropriate to execute this command after backing up databases using an approach other than Backing up Databases (which automatically marks the backed up databases as backed up).

To mark all databases as backed up, execute the command:

```
> yab database-backup-mark
```

Alternatively to mark a specific database as backed up, execute the command:

```
> yab database-[INSTANCE]-backup-mark
```

The database must be offline when this command is executed.

Configuration Backups

The system automatically creates a backup whenever the configuration changes. These backups can be listed with the `system-config-backup-list` command.

Ex. List configuration backups

```
> yab system-config-backup-list
2016-08-19T07-18-41
2016-08-19T07-16-24
2016-08-18T13-00-05
2016-08-18T04-46-10
2016-08-17T07-34-24
2016-08-17T07-13-15
2016-08-16T07-38-37
2016-08-16T07-36-06
2016-08-15T11-33-22
2016-08-15T11-26-02
...
```

Use the `system-config-backup` command to take a new backup. The name of the backup will be printed to the console.

```
> yab system-config-backup
2016-08-24T11-26-26
```

Use the `system-config-restore` command to restore a configuration backup.

```
> yab system-config-backup 2016-08-24T11-26-26
```

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
```

The preceding configuration would create a new command `data-test-update` to load the .d data files. The command could be executed directly, but it would also be executed during an `update` while processing data for the admin database `database-qadadm-data-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
```

The preceding configuration would create a new command `data-test-update` to load the XML data files. The command could be executed directly, but it would also be executed during an `update` while processing data for the admin database `database-qadadm-data-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	Loads XML data files into a database.
data-xml-load	Dumps data from a database into XML data files.
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.

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

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

build/config/configuration.properties

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

Compiling Source Code

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

`code-INSTANCE-update`

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
```

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/0
01/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,/qa
d/local/sandbox/cache/packages/mfg-ee2016/2016/0/16/209/src/validation,/qad/local/sa
ndbox/cache/packages/base-api/1/1/0/79/src,/qad/local/sandbox/cache/packages/mfgcore
plus-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/cac
he/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/20
16/0/16/440/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/de
fault/src
code.mfg.threads=1
```

To print the documentation for all *code* settings:

```
> yab 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-updat
e
process.alias2.id=cpla
process.alias2.depends=code-mfg-customizations-customizations-another-updat
e
```

```
> 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 overlapping files.

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
```

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.)

Auditing

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

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* document ation, but the location of the audit policy files has changed. See Importing Policy Files f or more details.
Creating Optional Archive Database	The system is pre-configured with an archive database (qadarc).
Setting Archive Database Connection	See Manage Archive Database Server for more information on setting up a database server for 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.

Enable Auditing

> The database must be offline to enable auditing.

To enable auditing on all databases, execute the command:

```
> yab database-auditing-enable
```

Alternatively to enable auditing on a specific database, execute the command:

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

The (-deactivateidx) option will deactivate all non-primary indexes for the auditing tables. Deactivating non-primary indexes is available as an option to improve performance when using database auditing. Deactivated indexes may be activated using PROUTIL IDXBUILD. The non-primary indexes are useful for reporting and should be activated on your audit archive database.

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

Disable Auditing

> The database must be offline to disable auditing.

To disable auditing on all databases, execute the command:

```
> yab database-auditing-disable
```

Alternatively to disable auditing on a specific database, execute the command:

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

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.

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
```

The archive command consists of two steps. In the first step audit records are exported into a directory within *build/work/auditing* which removes the records from the source database and in the second step the records are loaded into the archive database. The audit records in the work directory are not deleted when the command completes as a precaution to allow the records to be reloaded if the second step fails. If a failure occurs the (-audit.workdir) option can be specified to locate the work directory containing the audit records to load. When the archive process is successful the work directory can be removed.

The following settings configure the operation of the archive command.

```
# The account to use when archiving audit data or empty to use the current OS
account.
#
# NOTE: If an audit.user is not configured the 'Audit Administrator', 'Audit Data
Archiver',
#       and 'Audit Data Reporter' roles will be granted to the OS account that was
used to
#       create the database so auditing functionality works out of the box. If an
audit.user
#       is configured we assume we are working in a restricted environment where
auditing
#       authorization will be handled directly using the Progress data dictionary.
audit.user=

# The password for the audit.user account.
audit.password=

# The database where archived audit records will be stored.
audit.archive.database=db.qadarc

# The directory where exported audit records will be stored.
audit.archive.dir=${appdir.work}/auditing
```

> If the `audit.user` was not defined when the environment was created, the operating system account that was used to install the environment, would need to be setup as an application user to configure auditing within the application. The *Configuring Database Options and Audit Permissions* section within *QAD Security and Controls* provides instructions for configuring audit users and roles that provides a better segregation of responsibilities.

Manage Archive Database Server

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

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

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.

```
> 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.propert
ies]
    languages=us
```

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.

> yab -instances config dbdb.qadadmdb.qadarcdb.qadcpldb.qaddbdb.qadhlpdb.qadrcodedb.qxeventsdb.qxodb

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
```

help

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

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

```
> yab help

PROCESSES

     clean           Removes temporary files.
     config          Prints configuration settings.
     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
     Called without any arguments, all configuration settings with a value will be
printed  (and the option '-all' will include the configuration
     settings without a value). Otherwise, arguments can be used to select the
settings to print. The meta character '*'  is used to match 0 or more
     characters.

     TIP: When using meta characters, quote the argument to prevent the shell from
processing the meta character.

     Ex.

     packages.qracore.version

     "packages.*.version"

     "packages.*"

OPTIONS

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

                         Default: false

     skip-resolution     When true references are not resolved.

                         Default: false

     skip-value          When true values will not be printed.

                         Default: false

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

                         Default: false
```

```
> yab help appserver.crm.srvrloggінglevel

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-rebuild           Perform an index rebuild.
     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-list          Prints the structure of the 'qaddb'
database.
     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.
...
```

info

The *info* command displays the packages configured in an environment.

The third column will have the value *local* if the package is referenced from the local software catalog and *remote* if it is referenced from a remote software catalog. The fourth column will have the value *(new)* for 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                                 2016.0.0.2     local
base-api                                           1.1.0.79       local
dde-ant                                            2.2.0.1        local
dde-build                                          2.2.0.49       local
dde-core                                           2.2.0.14       local
dde-registry                                       2.2.0.4        local
(new)
demo-data-ee2016                                   2016.0.16.209  local
fin-bin64-proxy                                    2016.0.80.5    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 updates application configuration files and database settings.

```
> yab reconfigure
```

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.properti
es]
    # @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 com mand.

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 *system-diagnostics* command creates an archive that contains system configuration and log files.

The archive stores all files within the configuration directory (`appdir.config` setting) and the logs directory (`appdir.logs` setting) as well as the output of the info command with the (-more) flag enabled. If a file exceeds the configured threshold, the threshold number of megabytes will be captured from the end of the file. The archive is created in the current working directory using the naming pattern:

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

This can be adjusted using the (-archive) option.

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

```
> yab system-diagnostics
```

Ex. Create a diagnostics archive using the specified file name.

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

The (-threshold) option puts an upper limit on the size of any file stored in the archive.

Ex. Create a diagnostics archive in the current working directory where no stored file can be larger than 1MB.

```
> yab -threshold:1 system-diagnostics
```

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
...
```

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 appserver
appserver.fin
appserver.mfg
appserver.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 "appserver.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

```
appserver.mfg.srvrlogginglevel=4
appserver.mfg.srvrlogentrytypes=ASPlumbing,DB.Connects,4GLTrace
```

Execute the `appserver-mfg-update` command to apply the configuration change to the environment (which calls the Progress *mergeprop* utility to merge the MFG application server configuration into *build/work/generated/ubroker.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 appserver-mfg-update
```

The changes to *ubroker.properties* will be picked up by the application server without restarting because we have enabled runtime updates (other Progress settings may not support dynamic updates).

```
> yab config appserver.mfg.allowruntimeupdates
appserver.mfg.allowruntimeupdates=1
```

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 appserver-mfg-update
```

General Information

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]`

The Progress Admin Server and Progress Name Server are examples of this type of resource.

Ex. Admin Server

```
> yab config "adminserver.*"
adminserver.adminport=22082
adminserver.conmgr=/qad/sandbox/user/wtb/02/sc2-core/build/work/generated/conmgr.pro
perties
adminserver.plugins=/qad/sandbox/user/wtb/02/sc2-core/build/work/generated/plugins.p
roperties
adminserver.plugins.jvmargs.property=jvmargs
adminserver.plugins.jvmargs.section=PluginPolicy.Progress.AdminServer
adminserver.plugins.jvmargs.value=-Xmx256m -Djava.awt.headless=true
-Dsun.lang.ClassLoader.allowArraySyntax=true -Dserver.start.retryCount=10
-Dserver.start.retryInterval=3
adminserver.port=22001
adminserver.ubroker=/qad/sandbox/user/wtb/02/sc2-core/build/work/generated/ubroker.p
roperties
```

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 setup 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 will be 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 (inherited: db._base)


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

Here is a table listing some of the important configuration types in the system.

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

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
```

Configuration Files

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. Configure the server log file for the MFG application server.

```
appserver.mfg.srvrlogfile=${appdir.logs}/${name}.server.log
```

A reference is resolved using the following algorithm:

- Resolve the reference relative to the "parent" of the referencing key.
- Resolve the reference as an absolute reference.
- Resolve the reference as a Java system property.
- Replace the reference with an empty string.

Ex. Hello World

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

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

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}
```

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 defines the setting "b" with the value "bar" and the setting "a" with the value "foo" if the setting "someprop" is defined.

```
# @if someprop
a=foo

b=bar
```

To temporarily remove the setting "a" from the system the file should be backed up. Commenting out "a" would have the unintended consequence of associating the "@if" annotation with the next setting which in this case is "b".

Ex. Wrong

```
# @if someprop
# a=foo


b=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.

NOTE: Tests that reference configuration settings should only reference settings defined by higher precedence sources, because tests are evaluated immediately as sources are processed.

Variants

```
# @if [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.

NOTE: Tests that reference configuration settings should only reference settings defined by higher precedence sources, because tests are evaluated immediately as sources are processed.

Variants

```
# @unless [TEST]
# @unless FINAL [TEST]
```

@end

Ends the scope of one or more tests.

Built-in If/Unless Tests

Test	Example	Description
KEY	foo	Tests if the property 'foo' is defined.
KEY = VALUE	foo = bar	Tests if the value assigned to the property 'foo' equals 'bar'.
KEY ~ VALUE	foo ~ bar	Tests if the value assigned to the property 'foo' contains 'bar'.
KEY < VALUE	foo < bar	Tests if the value assigned to the property 'foo' is less than 'bar'. (Uses a numeric comparison if appropriate.)
KEY <= VALUE	foo <= bar	Tests if the value assigned to the property 'foo' is less than or equal to 'bar'. (Uses a numeric comparison if appropriate.)
KEY > VALUE	foo > bar	Tests if the value assigned to the property 'foo' is greater than 'bar'. (Uses a numeric comparison if appropriate.)
KEY >= VALUE	foo >= bar	Tests if the value assigned to the property 'foo' is greater than 'bar'. (Uses a numeric comparison if appropriate.)
KEY =~/REGEX/	foo =~/bar/	Tests if the value assigned to the property 'foo' is completely matched by the regex '/bar/'.
KEY =* VERSION RANGE	foo =* [1.2)	Tests if the value assigned to the property 'foo' is a version that is a member of the '[1.2)' version range.
KEY : ALIAS	foo : ALIAS	Tests if the key is aliased or not.

Care should be taken when nesting if/unless tests. 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
```

@extends

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

Variants

The key to extend.

```
# @extends [KEY]
```

In the following example, bar would inherit the property (bar.greeting=Hello) from foo while preserving

(bar.farewell=Hasta Luego).

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

# @extends foo
bar=
bar.farewell=Hasta Luego
```

@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 this equivalence relationship is formed by adding to A all child properties of B which are not already defined in A and adding/replacing all child properties in A with those defined in 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 (normally it is discarded).

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]
```

@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.

An ordering hint is defined using the syntax *[+|-]ID* where the *ID* corresponds to the *@id* of another group member and (-) is interpreted as an instruction to order the appended value before the referenced value and (+) as an instruction to order the appended value after the referenced value. When the *@grouporder* annotation is defined for a group it takes precedence over all ordering hints for that group.

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=Standard *****

***** The standard group is the implied group when a group is not defined. To allow for the possibility of introducing additional groups in the future, members of the standard group should not explicitly define a group identifier.

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.

Variants

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

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

Orders the members of a specific group:

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

@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]
```

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.

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
```

@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.

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`

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.

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 YAB 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 t he 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 YAB 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 4GL Broker Network Support

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 port range.

Ex. Configure the QADDB database to accept connections 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 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
```

By default the application will use shared memory connections (for performance reasons) even when the 4GL broker is configured to allow network connections.

This can be changed with the following setting.

```
# Configures whether application components should connect to databases
# over the network or use shared memory. The usual limitations apply, shared
# memory connections only work when components are deployed on the same host
# and network connections require the database server to be configured to
# accept network connections.
progress.database.network=true
```

Use the `reconfigure` command to apply this change.

```
> yab reconfigure
```

Configuring a SQL-92 Secondary Login Broker

To enable the secondary broker for a specific database use the setting:

`dbserver.[INSTANCE].sql.network=true`

```
dbserver.qaddb.sql.network=true
```

Use the `database-script` command to regenerate the database start scripts.

```
> yab database-script
```

Configuring Before Imaging

To enable database before-imaging on a database:

`dbserver.INSTANCE.beforeimageprocess=true`

```
dbserver.qaddb.beforeimageprocess=true
```

Use the `database-script` command to regenerate the database start scripts.

```
> 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
```

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.qaddb.afterimageprocess=true
```

Use the `database-script` command to regenerate the database start scripts.

```
> yab database-script
```

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
```

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 YAB Installer.)

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.

Each database is associated with zero or more files defining the schema for the database. If the -clean option is used, a new file is added, or an existing file changes, the database will be reevaluated. Reevaluation consists of comparing the configured schema with that of the target database producing an incremental schema file that is capable of upgrading the target database to the configured schema:

`[DATABASE DIRECTORY]/.yab/[PHYSICAL NAME]/schema/incremental.df`

> When an environment is created or a database is rebuilt, the schema files are directly applied to the database without first generating an incremental schema file as an optimization.

> The default behavior is to compare the configured schema files to the target database. If tables or sequences are defined in the database outside of the system they will be removed when the database is reevaluated. The following setting can change this behavior for a database at the expense of additional processing time.
>
> `db.INSTANCE.allowunrecognizedschema=true`
>
> NOTE: This only applies to tables and sequences. Fields, triggers, and indexes added to tables recognized by the system will always be removed if the system is unaware of the additions. Reference the *incremental* property on the *schema* type (below) for more information on configuring the system to be aware of these changes.

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-ee2016/201
6/0/16/209/schema/qadfin/finempty.df
schema.fin-qaddb-qadcpl.version=2016.0.16.209
...
```

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.database                A reference to the database where the schema
should be applied.

     schema.dir                     The root directory containing the schema files
to process.

                                    Use either 'file' or 'dir' to locate schema
files.

     schema.direct                  Deprecated

                                    This is a synonym for incremental.

     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.incremental             Whether the schema files are incremental or
full.

                                    Full schema files should be configured allowing
the system to calculate the
                                    incremental difference between the schema file
and the target database. The
                                    only exception to this rule is when adding
fields or triggers to tables
                                    defined in another schema file.

     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.
```

Using Demo 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 Upgrade

Demo data is distributed in a package whose name starts with "demo-data". First verify that the environment does not already have the demo data with the following query:

Ex. Environment that has release data installed.

```
> yab config packages.ee-data
packages.ee-data=release-data-ee2016-2016.0.16.209
```

Load Demo Data

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 YAB installer is used to reconfigure the environment to use the demo data.

```
> yab install /dr01/installs/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
> 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

To restore the original data.

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

```
> yab -tag:initial-backup database-restore update
```

Reconfiguring Tomcat

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* th at 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*"
appserver.fin.propath
appserver.mfg.propath
appserver.qra.propath
appserver.qxosi.propath
appserver.qxoui.propath
appserver.qxtnative.propath
clientscript._base.properties.propath
code.fin.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 appserver.fin.propath
appserver.fin.propath

    [1:
build/config/packages/yab-ee-foundation/1/4/0/93/default/yab-ee-foundation.properties]
    # @ref propath.fin
    appserver.fin.propath=

    [2:
build/config/packages/yab-ee-foundation/1/4/0/93/default/yab-ee-foundation.properties]
    # @ref propath.base
    propath.fin=

    [3:
build/config/packages/yab-ee-foundation/1/4/0/93/default/yab-ee-foundation.properties]
    # @append
    # @group 3
    propath.fin=${dist.dir}/fin/patch,${appdir}/dist/fin

    [4:
build/config/packages/yab-ee-foundation/1/4/0/93/default/yab-ee-foundation.properties]
    # @append

propath.fin=${packages.fin-bldata.dir},${packages.fin-bin64-qadfin.dir}/qadfin.pl

    [5:
build/config/packages/yab-ee-foundation/1/4/0/93/default/yab-ee-foundation.propertie
```

```
s]
    # @unique
    propath.base=

    [6:
build/config/packages/yab-ee-foundation/1/4/0/93/default/yab-ee-foundation.propertie
s]
    # @append
    # @group 0
    # @id base
    propath.base=${appdir}/config

    [7:
build/config/packages/yab-ee-foundation/1/4/0/93/default/yab-ee-foundation.propertie
s]
    # @append
    # @group 3
    propath.base=${netui.pro.dir}/com/mfgpro

    [8:
build/config/packages/yab-ee-foundation/1/4/0/93/default/yab-ee-foundation.propertie
s]
    # @append
    propath.base=.,${packages.qra-oe11.dir}/lib/qra.pl

    [9:
build/config/packages/yab-ee-foundation/1/4/0/93/default/yab-ee-foundation.propertie
s]
    # @append
    # @id mfg-rcode
    propath.base=${code.mfg.dir},${code.mfg.dir}/us,${code.mfg.dir}/us/bbi

    [10:
build/config/packages/yab-ee-foundation/1/4/0/93/default/yab-ee-foundation.propertie
s]
    # @id mfg-customizations-rcode
    # @append
    # @group 2 -ict-customizations
    propath.base=${code.mfg-customizations.dir}

    [11: build/config/packages/yab-qra/1/4/0/52/default/yab-qra-webui.properties]
    # @append
    # @path
    propath.base=${code.activity-feed.dir}

    [12: build/config/packages/yab-qra/1/4/0/52/default/yab-qra.properties]
    # @path
    # @append
    # @group 1
    propath.base=${packages.qracore.dir}/qad.qra.core/bin/qracore.pl
```

```
[13: build/config/packages/yab-qxtend/1/4/0/25/default/yab-qxtend.properties]
# @append
propath.base=${code.qxi.dir}
```

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
(undefined)	Standard

See the documentation for the *group* annotation in Configuration Files for more details.

Ex. Add some test programs to the operational compile.

```
# @id test
# @append
code.mfg.propath=/test/programs
```

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=
```

See the documentation for the *grouporder* annotation in Configuration Files for more details.

Reconfiguring AdminServer

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
```

Migrating to a New Host

Preconditions

To migrate an environment to a new host using this procedure the following preconditions must be met:

- The paths locating 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.

Procedure

Step 1: Stop the environment (and any manually controlled servers) on the source host.

```
> yab stop
```

Step 2: Copy all environment files to the destination host (if files are on a local file system).

Step 3: Configure the host setting on the destination host.

build/config/configuration.properties

```
host=[DESTINATION HOST]
```

Step 4: Update and restart the environment on the destination host.

```
> yab update restart
```

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 Assigment

Alternatively ports can be directly assigned to servers.

Ex. Configure the Progress Admin Server to use port 22001.

```
# @port
adminserver.port=22001
```

The statement "# @port" in the example above is a port annotation. The annotation simply serves to let the system know that the port number (22001) has been assigned and should not be allocated to any other server 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
Webspeed	ws.[INSTANCE].srvrminport	ws.[INSTANCE].srvrmaxport
Application Server	appserver.[INSTANCE].srvrminport	appserver.[INSTANCE].srvrmaxport
Database Server (4GL)	dbserver.[INSTANCE].fourgl.maxdynamicport	dbserver.[INSTANCE].fourgl.maxdynamicport
Database Server (SQL Broker)	dbserver.[INSTANCE].fourgl.mindynamicport	dbserver.[INSTANCE].sql.maxdynamicport

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:

Code	Language
us	English
ch	Simplified Chinese
cs	Spanish
cz	Czech
du	Dutch
fr	French
ge	German
it	Italian
jp	Japanese
ko	Korean
ls	Spanish (Mexico)
pl	Polish
po	Portuguese (Brazil)
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 `additional.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

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.

To run programs in the .NET client in terminal mode, however, the client must have the Granados SSH library for .NET (Routrek.Granados.dll) installed. If the *Routrek.Granados.dll* file is copied into the Home Server web application directory, clients will download the DLL as necessary when they connect to the Home Server. Use the following command to determine the location of the Home Server web application.

```
> yab config webapp.homeserver.dir
```

> QAD cannot redistribute the Granados SSH library due to export restrictions. This library can be downloaded from:
>
> http://granados.sourceforge.net/

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.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/glo
bal-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/foundationbootstr
ap.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-loc
ator.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 $CODEPAGE -p
com/qad/qra/core/ClientBootstrap.p -param
bootstrap=bootstrap-network.xml,startup=mf.p,logfile=/qad/sandbox/user/wtb/02/sc2-co
re/build/logs/client/session-chui-${USER}.log
```

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 is an application character session run in Progress batch mode (-b) where input is read from one or more files. Typically a batch job is used to automate a character session workflow so it can be executed non-interactively. A batch job is configured using the *batch* configuration type.

```
# 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=

# A program to run before processing the batch session input.
batch.initprogram=
```

Ex. Configure a new batch job (job1).

```
batch.job1.workdir=/qad/sandbox/user/wtb/batch/job1
batch.job1.progress.params=-cpstream iso8859-1 -cpinternal iso8859-1
batch.job1.in=../login.in,job1.in,../logout.in
batch.job1.out=job1.out
batch.job1.out.timestamp=true
batch.job1.initprogram=someinit.p
batch.job1.lockfile=${batch.job1.workdir}/job1.lock
```

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
#!/bin/sh
STARTUP=batch.p; export STARTUP
PROGRESS_PARAMS_APPEND="-b -cpstream iso8859-1 -cpinternal iso8859-1"; export
PROGRESS_PARAMS_APPEND
APPLICATION_PARAM_APPEND="batchIn=../login.in,batchIn=job1.in,batchIn=../logout.in,b
atchOut=job1.out,batchOutTimestamp=true,initProgram=someinit.p"; export
APPLICATION_PARAM_APPEND
WORKDIR=/qad/sandbox/user/wtb/batch/job1; export WORKDIR
LOCKFILE=/qad/sandbox/user/wtb/batch/job1/job1.lock; export LOCKFILE

/qad/sandbox/user/wtb/01/scripts/client-xx.sh
```

Alternatively you can execute the `scripts/client-xx-sh` script directly setting environment variables to configure the batch session before executing the script or passing a reference to a file that sets the environment variables for the batch session.

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. We use the "xxx" prefix to avoid the possibility of colliding with other process settings configuring the shared `database-backup` command .

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-cleanup.id=database-backup-cleanup
process.database-backup-cleanup.args=/dr01/scripts/backup-cleanup
process.database-backup-cleanup.impl=exec

process.xxx-database-backup.id=database-backup
process.xxx-database-backup.anchorbefore=database-backup-setup
process.xxx-database-backup.anchorafter=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

A command to invoke an executable program or script is defined by setting the *impl* setting of the process to "exec".

Ex. Define a command 'greeting' that executes a shell script of the same name.

```
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.xxx-start.id=start
process.xxx-start.anchorafter=greeting
```

Ex. A contrived example exposing the long form of the "ls" command as the process "ll".

```
process.ls.id=ll
process.ls.args=ls -l
process.ls.impl=exec
process.ls.console=true
process.ls.status=false
process.ls.greedy=true
```

Using the process...

```
> yab -F ll build
total 16
drwxrwxr-x 37 mfg qad 4096 Mar  3 12:17 work/
drwxrwxr-x  5 mfg qad 4096 Mar  6 14:21 logs/
drwxrwxr-x  6 mfg qad 4096 Mar  7 06:05 config/
drwxrwxr-x  3 mfg qad 4096 Feb 24 08:07 catalog/

BUILD SUCCESSFUL (3.545 s)
```

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.update.id=update
process.update.anchorbefore=ant-test
```

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
```

Key Settings

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 package configuration settings (i.e. settings that begin with "packages") are automatically re-evaluated when the configuration changes. A value of false skips the evaluation of packages.

```
check-for-updates=false
```

When *check-for-updates* is configured as false, the setting can be temporarily overridden to process and apply package changes.

```
> yab -check-for-updates update
```

The *check-for-updates* setting is designed for production environments to strictly control the interaction between the instance and the configured catalogs setting.

Default: true

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.

dependency settings

A family of settings to fine tune the evaluation of package settings.

dependency.evaluation

Configures a strategy for choosing an optimal solution when the evaluation of package settings can be satisfied by multiple solutions.

```
dependency.evaluation=[HighestVersion|LeastChange]
```

Default: HighestVersion
HighestVersion

Prefer solutions that include the highest versions of packages. (Default)
LeastChange

Prefer solutions that include packages that have already been applied to the application.

Ex. Configure the LeastChange evaluation strategy.

```
dependency.evaluation=LeastChange
```

dependency.excludes

Configures a comma-delimited list of package ranges that should be excluded from the solution.

```
dependency.excludes=[PACKAGE RANGE],[PACKAGE RANGE]...
```

Ex. Exclude all 'abc' 1.x packages from the solution.

```
dependency.excludes=abc[1,2)
```

dependency.excludesreferences

Configures a comma-delimited list of package ranges whose dependencies should be excluded/ignored.

```
dependency.excludesreferences=[PACKAGE RANGE],[PACKAGE RANGE]...
```

Ex. Excludes the dependencies of all abc 1.x packages from the evaluated solution.

```
dependency.excludesreferences=abc[1,2)
```

dependency.overrides

Configures a comma-delimited list of package ranges whose dependencies should be overridden.

```
dependency.overrides=[PACKAGE RANGE]=[DEPENDENCY STATEMENT],[PACKAGE
RANGE]=[DEPENDENCY STATEMENT]...
```

Ex. Replaces the dependency information associated with abc 1.x packages with a dependency on any version of the xyz package.

```
dependency.overrides=abc[1,2)=xyz
```

dependency.redirects

Configures a comma-delimited list of dependency redirections.

```
dependency.redirects=[PACKAGE RANGE]=[PACKAGE NAME],[PACKAGE RANGE]=[PACKAGE NAME]...
```

Ex. Restate all references to 1.x versions of the abc package as references to version 3.4.12 of the abc package.

```
dependency.redirects=abc[1,2)=abc-3.4.12
```

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)
```

Conditions

A package can be configured so that it is included only when other packages are configured.

Syntax:

```
packages.NAME.if=PACKAGE CLASS, PACKAGE CLASS...
packages.NAME.unless=PACKAGE CLASS, PACKAGE CLASS...
```

Ex. Enable the 'yab-event-service' package if the 'event-service' package is configured.

```
packages.yab-event-service=1.3.0.12
packages.yab-event-service.if=event-service
```

Ex. Enable the 'mongodb' package if either the 'event-service' or 'collaboration' package is configured.

```
packages.mongodb=mongodb-rhel5-3.0.3.0
packages.mongodb.if=event-service,colloboration
```

> The conditions are evaluated before the package versions are resolved. The conditions may not reference the version of a package.

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, the delay between status checks, and the handling of failures can be configured:

```
> 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.maxwait             The maximum amount of time to wait for the
condition to be satisfied as measured in seconds or 0 to wait indefinitely.

                                This setting configures verifications (enabled with
the -verify option) that wait for some condition to be true.

                                NOTE: The 'maxwait', 'retryinterval', and
'timeoutexception' settings are configured using an algorithm where
                                the first defined setting takes precedence. Using
the 'database-qaddb-stop' process and the 'maxwait' setting
                                as an example, the following settings would be
evaluated in this order:

                                verify.database-qaddb-stop.maxwait
                                verify.database-stop.maxwait
                                verify.maxwait

     verify.retryinterval       The amount of time to wait after testing the
condition before trying again.

                                This setting configures verifications (enabled with
the -verify option) that wait for some condition to be true.
                                See 'maxwait' for more details on how verification
settings are resolved.

     verify.silent              When true the output from verification will be kept
to a minimum.

                                This setting configures verifications (enabled with
the -verify option) that wait for some condition to be true.

     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.
                                See 'maxwait' for more details on how verification
settings are resolved.
```

Ex. Configure all verifications to wait at most for 120 seconds

build/config/configuration.properties

```
verify.maxwait=120
```

Ex. Configure all database stop verifications to wait at most for 120 seconds

build/config/configuration.properties

```
verify.database-stop.maxwait=120
```

Ex. Configure the QADDB database stop verification to wait at most for 120 seconds

build/config/configuration.properties

```
verify.database-qaddb-stop.maxwait=120
```

Only some commands have associated verifications.

Upgrades, Customizations, and Patches

Upgrades, Customizations, and Patches describes how to manage the software running in an environment.

Product Upgrades

Overview

Product updates are delivered as a zip file. This zip file contains the packages to be installed in the QAD Enterprise Edition instance. Product updates may provide their own upgrade notes / steps that must be carried out after installation of the product zip. These upgrade notes should be reviewed before upgrading any product.

To install the zip file:

```
> yab install product-x.x.x.x.zip
```

Alternatively to make the upgraded packages available without applying to the environment execute the following:

```
> yab install product-x.x.x.x.zip -install-update:false
```

This allows you examine the environment package versions before applying the change.

To apply the changes

```
> yab update
```

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* command.

```
customizations.dir=${appdir}/customizations
```

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
```

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
```

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-customiz
ation/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 appserver.fin.propath
appserver.fin.propath=/dr01/qadapps/qea/config,/dr01/qadapps/qea/build/catalog/packa
ges/qracore/2/17/0/32/qad.qra.core/bin/qracore.pl,/dr01/qadapps/qea/dist/fin/patch,/
dr01/qadapps/qea/dist/fin,
/dr01/qadapps/qea/dist/pro/com/mfgpro,/dr01/qadapps/qea/build/catalog/packages/fin-b
ldata/2016/0/80/5,/dr01/qadapps/qea/build/catalog/packages/fin-bin64-qadfin/2016/0/8
0/5/qadfin.pl,.,
/dr01/qadapps/qea/build/catalog/packages/qra-oe11/1/1/166/0/lib/qra.pl,/dr01/qadapps
/qea/dist/mfg,/dr01/qadapps/qea/dist/mfg/us,/dr01/qadapps/qea/dist/mfg/us/bbi,/dr01/
qadapps/qea/dist/qxtadpt
```

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
```

Adding Custom Database

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
```

Update

To apply the configuration changes execute the *update* command.

```
> yab 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:

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). (This is required to configure the PROPATH to support developing customizations in application sessions.)

build/config/configuration.properties

```
ict.toolkit=true
```

To install ICT using the ICT installation media:

```
> yab install [ICT INSTALLATION MEDIA]
```

Or to install ICT with packages:

build/config/configuration.properties

```
packages.integrated-customization-toolkit=[VERSION]
packages.yab-ict=[VERSION]
```

```
> yab update
```

Enter Toolkit License (Development Environments)

Start a character client session

```
> scripts/client-us.sh
```

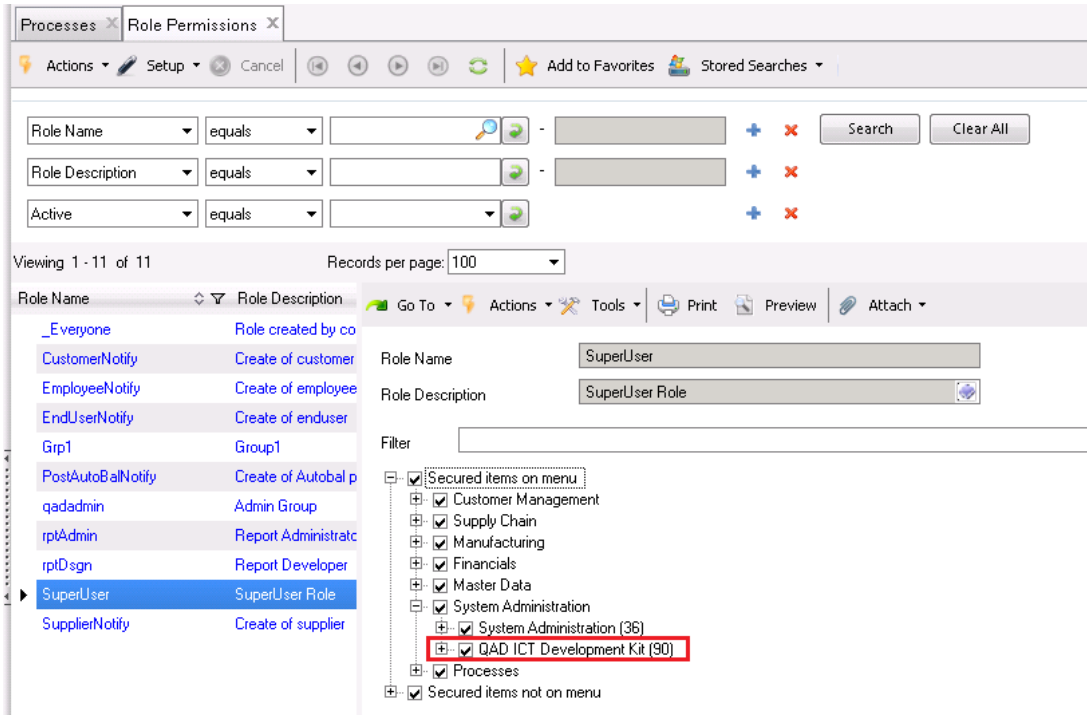
Register the toolkit license

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.


Processes
Role Permissions
Actions
Setup
Cancel
Add to Favorites
Stored Searches
Role Name
equals
Role Description
equals
Active
equals
Search
Clear All
Viewing 1 - 11 of 11
Records per page: 100
Role Name
Role Description
_Everyone
Role created by co
CustomerNotify
Create of customer
EmployeeNotify
Create of employee
EndUserNotify
Create of enduser
Grp1
Group1
PostAutoBalNotify
Create of Autobal p
qadadmin
Admin Group
rptAdmin
Report Administratc
rptDsgn
Report Developer
SuperUser
SuperUser Role
SupplierNotify
Create of supplier
Go To
Actions
Tools
Print
Preview
Attach
Role Name
SuperUser
Role Description
SuperUser Role
Filter
Secured items on menu
Customer Management
Supply Chain
Manufacturing
Financials
Master Data
System Administration
System Administration (36)
QAD ICT Development Kit (90)
Processes
Secured items not on menu

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 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.

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.
```

Adding Custom Data

Use the *data* configuration type to define data to load into the system.

Ex. Loading data in Progress native (.d) format.

```
data.custom.database=db.qaddb
data.custom.dir=/dr01/custom/data
data.custom.format=dotd
```

In the preceding example this configuration would create the command *data-custom-update* to load the data and the command would be processed during a create/update and whenever destination database was rebuilt. The name "custom" was used to identify this set of data but could be any unique value.

To see more options for the *data* configuration type.

```
> yab help data.
```

To list the ID's of databases.

```
> yab config db.* | grep physicalname
```

The *data* configuration type can also be used to load data serialized in QAD XML format.

Patches

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.

Product Configurations

A product configuration is a set of packages whose compatibility has been validated. The product configuration is defined by the system documents:

`build/config/system`

A system can be upgraded by updating the product configuration (pulling in new packages) or by choosing packages directly in the instance document:

`build/config/configuration.properties`

Upgrading the product configuration has the following advantages:

- Ensures the system is using a combination of packages that has been widely used and tested together.
- Avoids typing errors.
- More clearly shows how the system differs from a known base configuration.
- A Product Configuration is the listing that defines the packages to be put into a *bundle* that can be installed by YAB.

Products are upgraded in an environment in a two step process:

1. Configure the new package versions.
2. Execute the update command with the *check-for-updates* option to process the changes.

Ex. Apply package changes (see check-for-updates setting).

```
> yab -check-for-updates update
```

Upgrading Product Configuration

Backup Configuration Files

The following command creates a ZIP file in the working directory that includes the configuration files.

```
> yab system-diagnostics
```

Convert System Configuration Files

A conversion that concatenates all system configuration files into a single file (build/config/system/base).

```
> yab -consolidate-settings:base
```

Review Instance Configuration File

Packages that are configured in the instance document may conflict with packages configured in the new product configuration. Review the instance document for obsolete patches and updates and remove the settings as appropriate.

`build/config/configuration.properties`

The *system-check-for-updates* command can show the impact settings in the instance configuration document would have on the environment were it upgraded to the new product configuration, without having any side-effects on the environment.

```
> yab -local -p1:[NEW PRODUCT CONFIGURATION FILE|URL]@base system-check-for-updates
```

Upgrade

Installs the new product configuration and then upgrades the system.

```
> yab -p:[NEW PRODUCT CONFIGURATION FILE|URL]@base update
```

Upgrading Individual Packages

Configuring

Edit the instance configuration document adding or updating packages settings:

`build/config/configuration.properties`

Ex.

```
packages.fin-src-proxy=2015.0.80.11
```

Applying

Executing the *update* command applies the change.

```
> yab update
```

Troubleshooting

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).

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.

```
> 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.

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* creates 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

Interactive Execution

The request option (-debug-pause) puts YAB into a mode where the end user is prompted before each step in a command is executed. When prompted the user has the choice of skipping the step, executing the step, executing the step and all subsequent steps, or exiting the request. 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
                            update (313 tasks)
------------------------------------------------------------------------------
1/313   qxtend-stage
Press ENTER to run 'qxtend-stage' ('s' skip, 'a' run all, 'q' quit).
>
SKIPPED (0.003 s)
2/313   adminserver-script
Press ENTER to run 'adminserver-script' ('s' skip, 'a' run all, 'q' quit).
>
OK (0.037 s)
3/313   nameserver-script
Press ENTER to run 'nameserver-script' ('s' skip, 'a' run all, 'q' quit).
> q
------------------------------------------------------------------------------
BUILD CANCELLED (23.590 s)
```

A "breakpoint step" may be specified at which to begin prompting. Steps that precede the breakpoint will be executed without prompting.

```
yab -debug-pause -break:netui-pro-compile update
```

Alternatively the steps that precede the breakpoint may be skipped. This latter approach can be useful to continue a command that consists of many steps at the point of failure.

```
yab -debug-pause -break:netui-pro-compile -skip update
```

Use the system-process-list command to list the "steps" associated with a command:

```
yab system-process-list update
1. qad-rd-permissions-mkdirs
2. adminserver-script
3. nameserver-script
...
```

Skipping 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 commands that should not be executed in this environment.
#
# Each command should be listed on a new line and lines beginning with
# the '#' character are handled as comments. When asked to run a
# command on the list YAB will skip the command.
#
# Adding a command to the list only ignores that command and has
# no effect on other commands implied by the command. You can use the
# system-process-list command to enumerate the commands that are
# implied by a command.
#
# Ex.
# yab -nonumber system-process-list start
#
```

The process-ignore file is re-processed when the system is refreshed.

```
> yab -r ...
```

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
```

Failonerror Option

The *failonerror* option is used to control whether an error raised while processing a command should halt processing subsequent commands.

This option is typically used as a request parameter to get around a transient problem. For example, in an environment where one of the servers was no longer controllable, the option might be added to the *stop* command to continue to shut down the environment in a normal manner.

```
> yab -failonerror:false stop

                              stop (16 tasks)
--------------------------------------------------------------------------------
1/16  tomcat-default-stop                                 ERROR   (2.587 s)
2/16  appserver-fin-stop                                  STOPPED (3.930 s)
3/16  appserver-mfg-stop                                  STOPPED (0.993 s)
4/16  appserver-qra-stop                                  STOPPED (0.566 s)
5/16  appserver-qxosi-stop                                STOPPED (0.232 s)
6/16  appserver-qxoui-stop                                STOPPED (0.679 s)
7/16  appserver-qxtnative-stop                            STOPPED (0.328 s)
8/16  webspeed-default-stop                               STOPPED (0.368 s)
9/16  database-qadadm-stop                                STOPPED (0.421 s)
10/16 database-qaddb-stop                                 STOPPED (0.031 s)
11/16 database-qadhlp-stop                                STOPPED (0.027 s)
12/16 database-qadmodule-stop                             STOPPED (0.044 s)
13/16 database-qxevents-stop                              STOPPED (0.022 s)
14/16 database-qxodb-stop                                 STOPPED (0.025 s)
15/16 nameserver-stop                                     STOPPED (0.000 s)
16/16 adminserver-stop                                    STOPPED (0.984 s)
--------------------------------------------------------------------------------
```

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.error               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.

Appendix

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 -t: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 -t: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
```

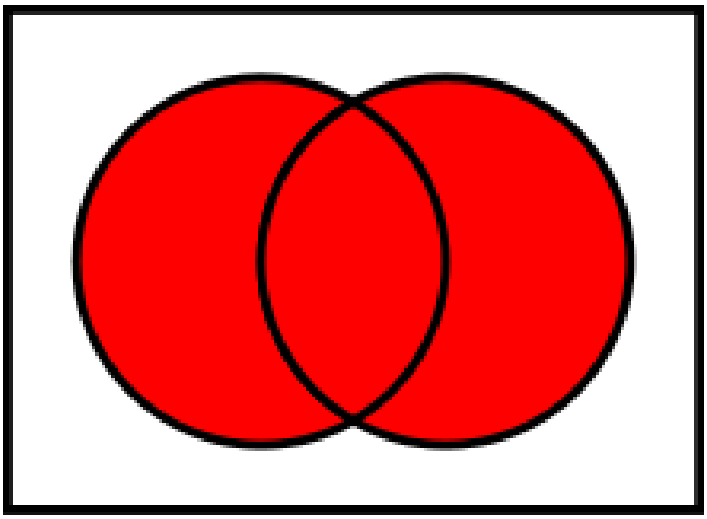
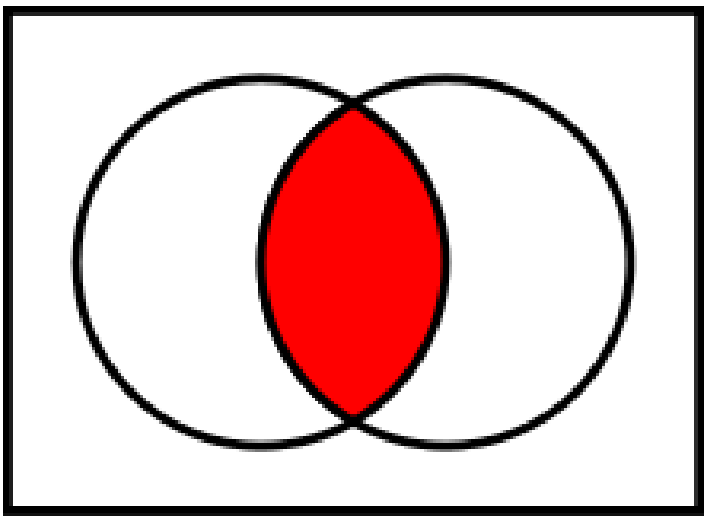
Command Expressions

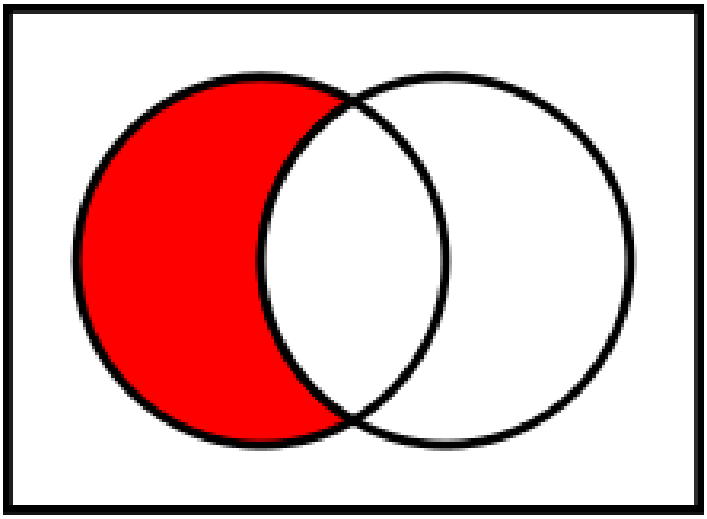
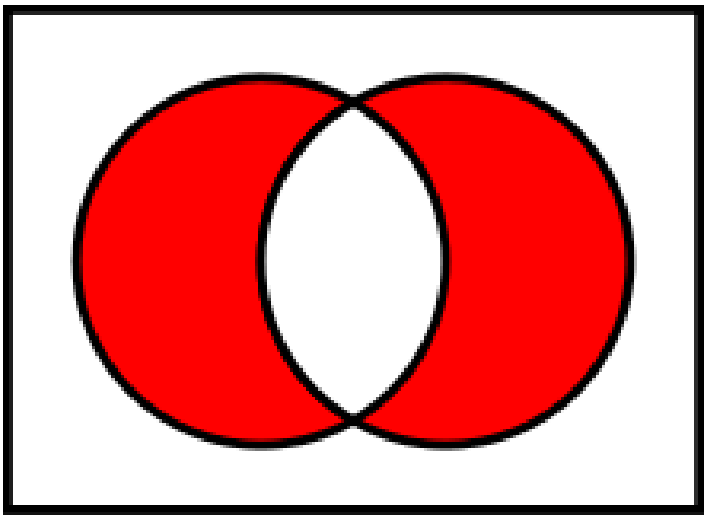
A command expression is a statement that operates on commands as sets.

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
```