



QAD Enterprise Applications
Enterprise Edition

Training Guide Installation and Administration

70-3072-2014EE
QAD 2014 Enterprise Edition
April 2014

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Installation and Administration Change Summary

The following table summarizes significant differences between this document and the last published version.

Date/Version	Description	Reference
April 2014/2014 EE	Numerous revisions	---
	Updated What's New in EE Installation and Administration?	30
	Updated required and supported operating systems information	40, 41
	Updated SSH Set Up section	104
	Updated the QXtend Configuration section	118
	Revised Reporting Framework section	171
	Documented new live main databases start up and shut down options	198
	Documented adding custom databases using extradbs.pf file	198
October 2013/2013.1 EE	Updated What's New information	30
	Updated supported operating systems and required software information	40, 42, 41
April 2013/2013 EE	Numerous editorial changes	---
	Updated screenshots	30, 84, 109, 126, 127, 128, 129
	Updated supported operating systems and required software information	40, 41, 42
December 2012/2012.1 EE	Numerous editorial changes	---
	Removed redundant page	---
October 2012/2012.1 EE	Numerous editorial changes	---
September 2012/2012.1 EE	Numerous editorial changes	---
October 2010/2010.1 EE	Not applicable. Initial version of guide	---

About This Course

Course Description

This course is designed to build your expertise in installing, configuring, and maintaining QAD Enterprise Edition. It consists of five modules:

- Planning and Deployment Considerations
- QAD Enterprise Edition Installation
- Validate, Configure, and Extend QAD EE
- Database Administration and High Availability for QAD EE
- QAD EE Performance

Course Objectives

By the end of this class, students will:

- Understand basic QAD Enterprise Edition architecture
- Be able to plan a QAD Enterprise Edition installation
- Know how to install QAD Enterprise Edition
- Know how to configure the installation
- Be able to set up reporting
- Understand how to validate and troubleshoot a QAD Enterprise Edition installation
- Know how to extend the installation
- Know how to administer and tune the QAD EE Progress database
- Understand the concepts related to high availability and disaster recover planning

Audience

This course is intended for system administrators and other technical users who install, configure, and maintain QAD Enterprise Edition products.

Prerequisites

This course requires experience in database administration and familiarity with QAD products.

System Requirements

This course uses the QAD Enterprise Applications Enterprise Edition database. Whether you are studying this material in a classroom or as a self-study exercise, this database is launched in a virtual environment management system. QAD instructors prepare the classroom environments.

QAD Resources

If you have questions or difficulties with QAD software that are not addressed in this book, several resources are available.

Product Help

All QAD products ship with integrated help systems. A properly installed QAD application displays help when you press the Help key (F1), or access it through the menu. The help covers the normal use of the product.

QAD Web Resources

The QAD website provides product and company overviews. The Print Solution option on the opening page provides a means of compiling desired content into a document specialized to your industry, business implementation, and needs.

<http://www.qad.com/>

You can access the QAD learning or support sites from the main QAD site.

QAD Learning Portal for Training Opportunities

To view available training courses, locations, and materials, use the QAD Learning Portal. Choose Learning under the Global Services tab to access this resource.

QAD Support for Product Documentation and the QAD Knowledgebase

To access release notes and user, installation, and conversion guides by product and release, visit the Support website. Support also offers an array of tools depending on your company's maintenance agreement with QAD. These tools include the Knowledgebase and direct links to QAD Support experts.

Choose Support Under the Global Services Tab

Any QAD customer can register for a QAD web account by accessing the Support web site and clicking the Accounts link at the top of the screen. Your customer ID number is required. Access to certain areas is dependent on the type of agreement you have with QAD.

Chapter 1

Planning and Deployment Considerations

Introduction and Agenda

Introduction and Agenda



Your Instructor

Your Instructor

- Previous experience
- QAD experience



Your Instructor

Introduction

QAD Enterprise Edition Planning and Deployment Considerations

- This training material is part of the QAD Release Foundation Certification Initiative
 - The intended audience for this course is QAD technical installers
- IT managers, system administrators, and project managers can also benefit



Introduction

Introduction 2

QAD Enterprise Edition Planning and Deployment Considerations

After this section of the class, you should:

- Understand the basic QAD Enterprise Edition architecture and installation prerequisites
- Be aware of some of the key deployment considerations
- Understand the supported hardware and software environments



Introduction

Topics Covered

QAD Enterprise Edition Planning and Deployment Considerations

- QAD Enterprise Edition Architecture
And comparisons to QAD Standard Edition
- Hardware and Operating System Considerations
Processor and Storage
- Deployment Considerations
 - Hosting
 - Internationalization
 - Virtualization
 - Availability and Disaster Tolerance



Agenda

Topics Covered 2

QAD Enterprise Edition Planning and Deployment Considerations

- Performance Considerations
 - Scale-up versus scale-out
 - Load Balancing
 - Network
- Software
 - Prerequisites
 - Minimum versions
- Summary



Agenda

QAD Enterprise Edition

QAD Enterprise Edition

More efficient

Faster performance

Better visibility



QAD Enterprise Edition

What is QAD Enterprise Edition?

More Functionality, Easier Deployment, Better Visibility, Tighter Security and Auditing, Unicode

QAD Enterprise Edition is the current flagship and latest software in the core ERP area

The major architectural changes are

- Completely rewritten Enterprise Financials module
- Service Oriented Architecture (SOA) features
- New security model
- End to End Unicode for Internationalization
- New Deployment Tool (QDT)
- Component Based Framework (CBF) Development



Introduction to Enterprise Edition

In the past, QAD released the core ERP product with such versions as eB2, eB2.1 and QAD 2007.

New Financials Module

New Financials Module

Old Module

Standard Financials	General Ledger	Multi Currency	Accounts Receivable	Accounts Payable	Cash Management	Cost Management
	Fixed Assets	Enhanced Controls	Vertex Sales and Use Tax Interface		Logistics Accounting	

New Module

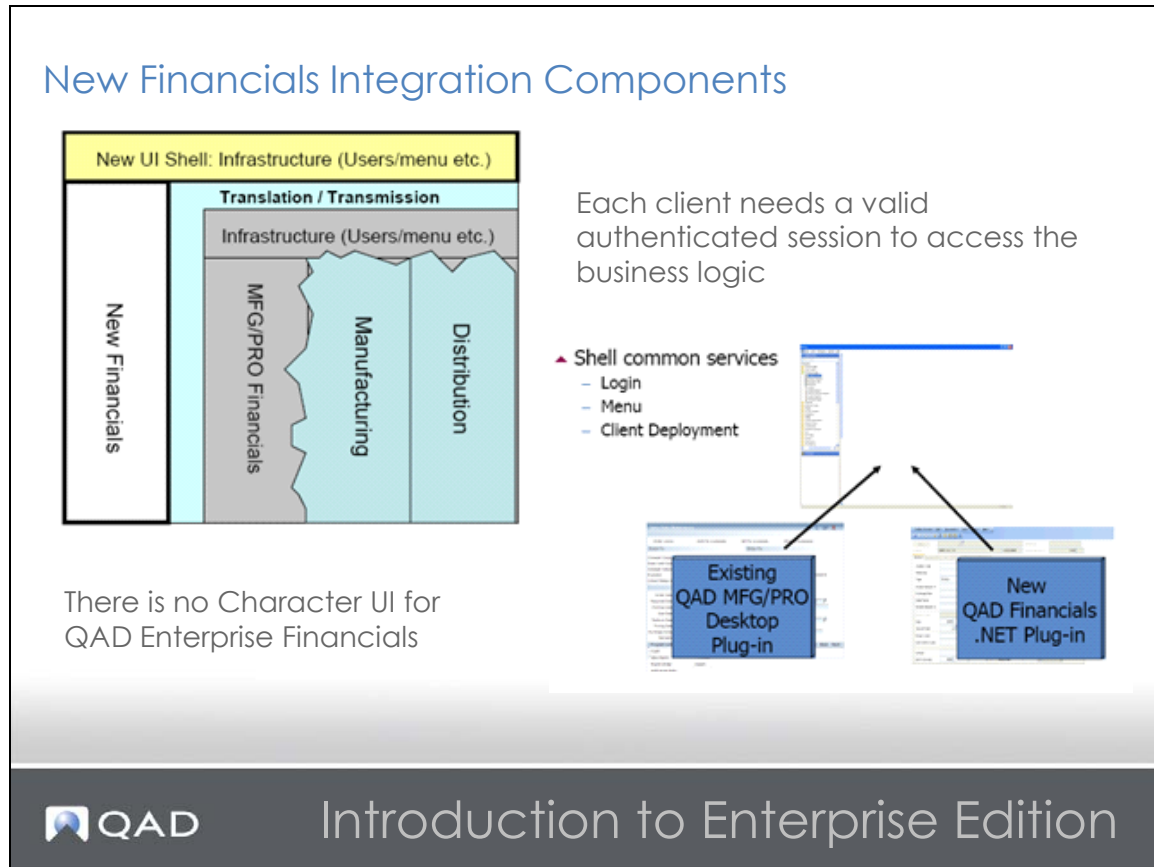
Enterprise Financials	Financial Analytics	Management Reporting	Multi-GAAP	Budgeting	Governance, Risk & Compliance
	Consolidations	Allocations	Financial Shared Services	Credit Management	Tax Management
	General Ledger	Multi Currency	Accounts Receivable	Accounts Payable	Banking / Cash Management
	Fixed Assets	Enhanced Controls	Vertex Sales and Use Tax Interface		Logistics Accounting



Introduction to Enterprise Edition

The previous Financials module was rewritten. None of the earlier code or schema remain. The architecture of the code is also new. It was written in a business-object / SOA style.

New Financials Integration Components



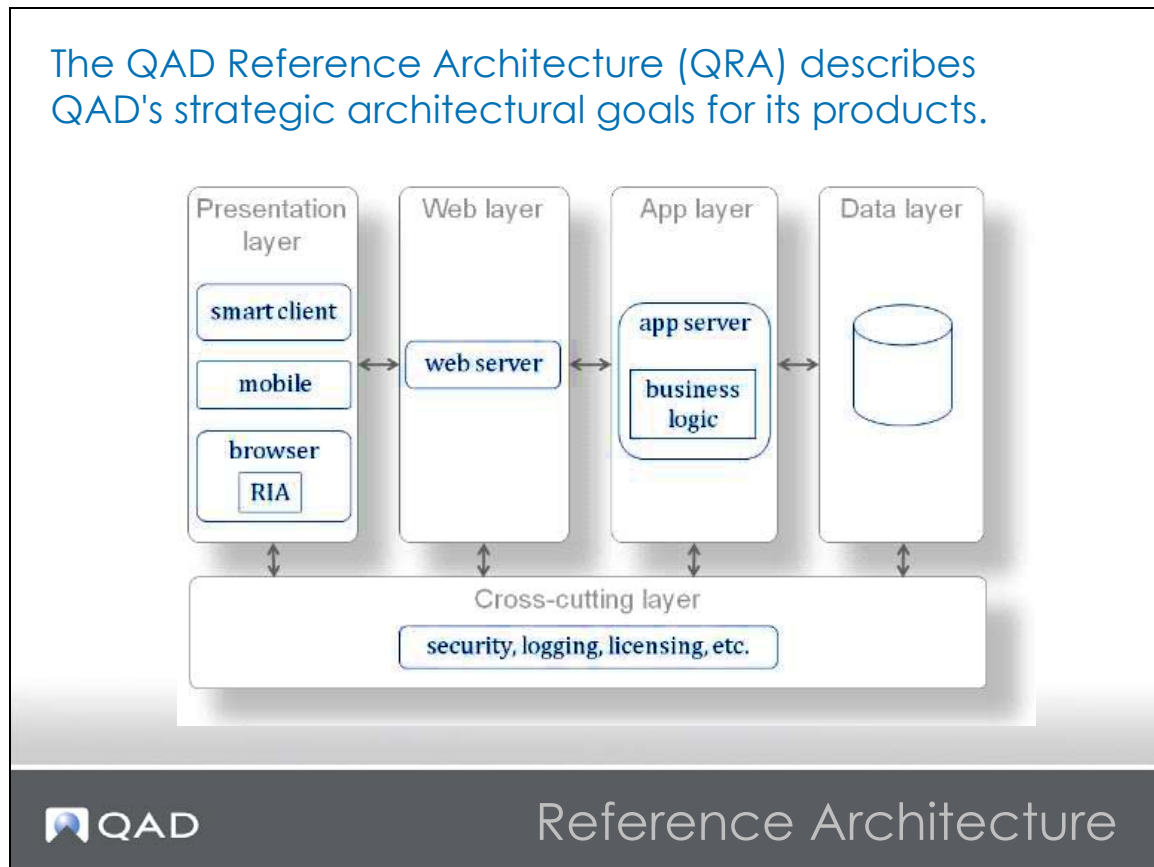
The first level is the .NET UI with this plug-in model. It provides a perfect home for an integration point.

The Finance product was already written in a native .NET User Interface. It is the only interface in the product; there is no character interface for Finance.

As a result, there are already the outer wrapping applications for things like logging in. The first step was to pull that out into its own, really to conform to the plug-in interface. At that point, the plug-in interface was being defined and used the Finance product as the prototype model.

This first level of integration is similar to putting the plug-in interface around the Finance product and allowing it to be launched from .NET UI menu system.

QAD Reference Architecture



Encapsulation of Services:

Each layer offers several clearly defined services. These services have interfaces that describe how the services can be used.

For example, on the presentation layer, the AppShell offers a plug-in architecture of a framework that calls/combines services.

For example, on the app layer, specific components provide central functionality for the backend, like Session (for session management), Transaction (for logical transactions), and Translations. These components have clearly defined interfaces that any external consumer (whether it is the UI, or another party that integrates with the application core services) can call.

For example, on the data access layer, the connection to the database, the possible queries, and updates are implemented in a component. This component has a clear interface. All business components in the system use it to get to the data. This functionality brings a powerful level of abstraction to the application.

Responsibility of each layer:

Presentation: User interaction. Provide the user access to the data (show the data on the screen), navigation in the system, provide the application menu, integration of the application on the client/UI level, and so on.

Web: Transport Mechanism

Application: Access to the data, calculation of data, validation of data, updates in related objects, query capabilities, meta information about objects, and so on.

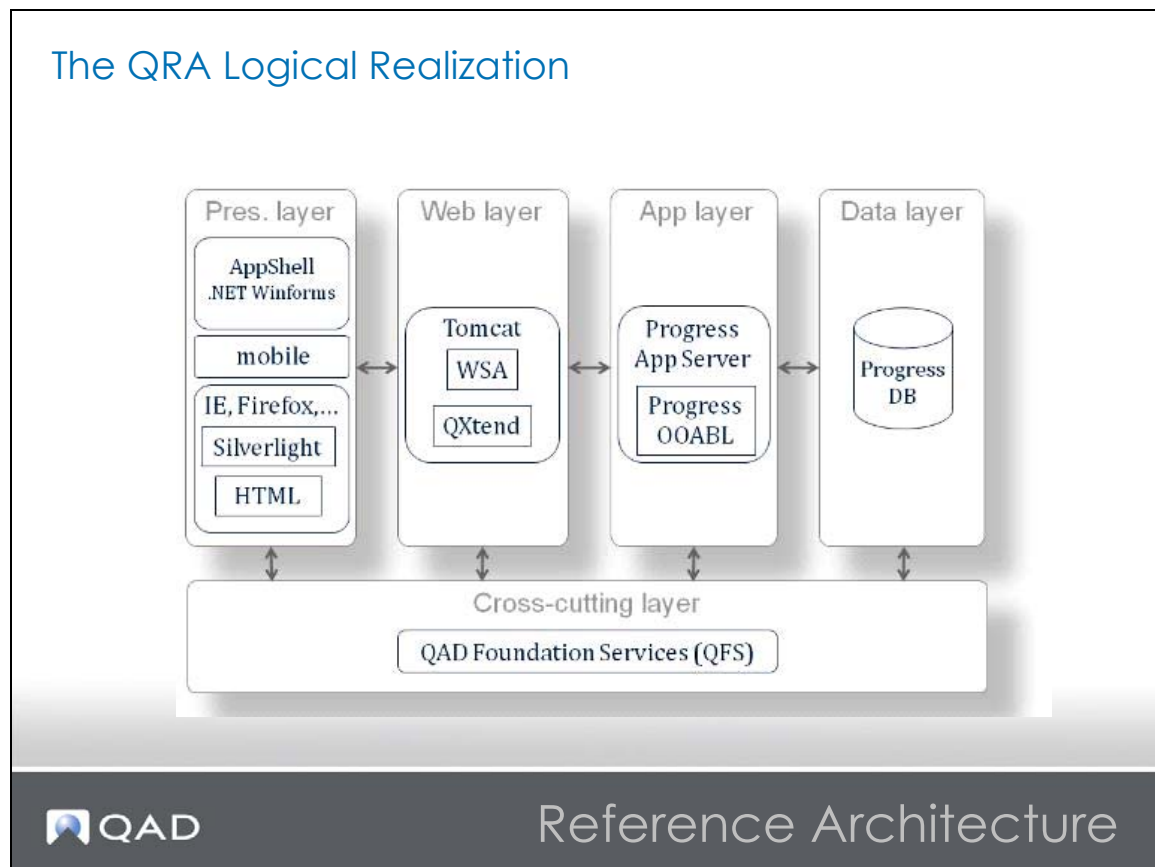
Data access: Data retrieval and data update.

The layering of the application allows components to more easily to evolve to other technologies and to be more independent. UI technology is moving much faster than the technology used for the business logic. This difference is why it is important to have the separation in layers and for the access to the services in the layers to always go through predefined interfaces.

It is also important that the application functions follow a limited number of application patterns. This approach allows for easier customization and extensions of the standard functionality at a later stage.

Note Technical or performance constraints can, in specific areas, override the QRA.

QAD Reference Architecture 2



This architecture is fully implemented for Enterprise Financials.

The Standard Edition / Core ERP codebase still uses the legacy MFG/PRO architecture with the Presentation and Web Layers wrapped around it.

Enterprise Financials

Combined Schema and Object Datasets



Enterprise Financials has completely new tables and entity relationships

- But they are defined in the existing mfg schema
- The data associated with business objects is passed between the different layers using an object dataset
 - OpenEdge ProDatasets (business logic layer)
 - Microsoft .NET data sets (presentation layer)



Data Management

It is important to have a uniform way to pass object data between the layers. As soon as a business component is instantiated, and an object from the database is “loaded”, all relevant information is stored in the object dataset. The object dataset is the only way of passing the object state / information between the different layers.

Besides being used as a transportation vehicle, the dataset also lends its structure to external parties wanting to integrate with the business application. For example, when the business application exposes objects through configured events, the data that is published always has the same format. The XML schema of the object dataset for the specific component defines the format. Also, when data is loaded, the business application backend requires that the data be in the official object dataset format.

What's New?

What's New in EE Installation and Administration?

- The Edit Database Locations screen allows you to specify the live main databases start up and shut down processes
- Delta schema changes with indexes are now loaded as inactive, and activated after loading. This greatly reduces the required schema load time



Changes Since Last Release

Standard Edition versus Enterprise Edition

Standard Edition versus Enterprise Edition

QAD Enterprise Edition has:

- An additional Financials AppServer
 - Additional Financials Proxies and APIs
 - AppServer Integration between Financials and legacy ERP
- XML-based configuration files for Financials
- QAD Financials AppShell plug-in (Silverlight)
- Financials Schema Replacement
- QAD Deployment Toolkit (QDT)
- Daemons
- New Security Model
- Financials Business Logic supplied in .pl library files



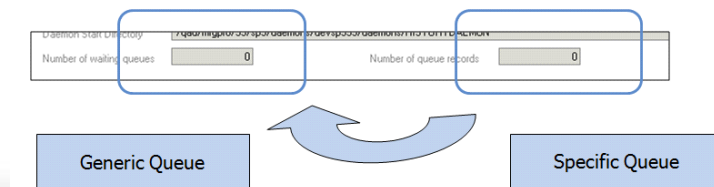
Technical Differences

Daemons

Daemons

Daemons are a headless (no UI) background process that perform specific tasks

- Configuration, Control and Monitoring possible from the command line
- Tasks are typically such functions as Data Manipulation, Integration, Transformation
- Daemons Process data via work queues



New Software Infrastructure

There are two queues:

- The specific queue that the application delivers (represented by Q-table)
- The generic daemon queue itself (represented by fcDaemonQueue)

The daemon treats the application queue in chunks of maximum 100 (see flow).

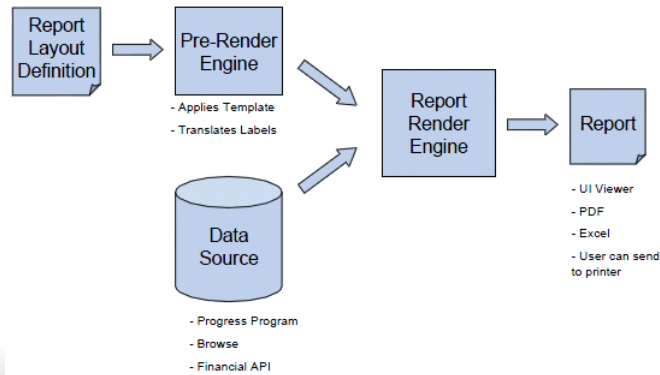
Daemons are Progress processes which are launched from the financial AppServer process. The process is the Progress executable `_progres` but is renamed to `D_<DaemonName>_<env>`.

You can see if the process is running on the server by using `ps`. It is possible to use another separate server instead of the production server.

Reporting Framework

Reporting Framework

The QAD Reporting Framework is a reporting solution that delivers the infrastructure necessary to create and run reports against the QAD Enterprise Applications suite of products.



New Software Infrastructure

It leverages a modern report rendering engine, complete with its own design layout program, that allows reports to contain formatted text, images, charts, and other rich content.

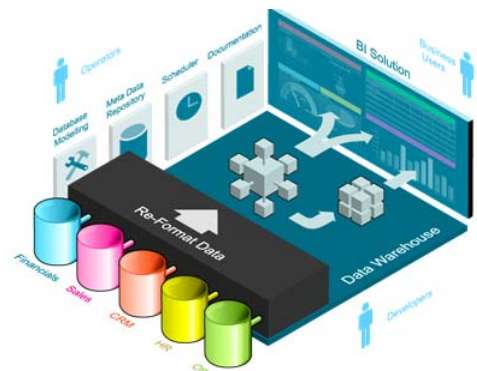
It provides several data sources types that allow access to various layers of the QAD product suite to facilitate data integration with the page layouts.

It is deployed as part of the QAD .NET UI interface and requires no separate installation or run-time licensing for customers.

Business Intelligence

Business Intelligence

QAD BI provides a complete business intelligence solution consisting of three major components: QAD BI Data Warehouse Designer, QAD Modules and the QAD BI Portal to support Analytics, through Dashboards and reporting...



New Software Infrastructure

QAD Business Intelligence (QAD BI) unifies data from multiple sources across the enterprise and enables key enterprise decision makers to access, analyze, and share critical information. This functionality allows for a better understanding of how the business is performing and improved decision making throughout the organization.

QAD BI Data Warehouse Designer: Allows data consolidation, optimization, multi-currency consolidation, continuous support for database maintenance tasks and impact analysis and a single repository for any needed transformation logic.

QAD BI Modules: Integrated with QAD apps out of the box. They are organized to make the data easy to access without complex database queries and programming resources. Support for predefined OLAP cubes for various areas of analysis is available.

QAD BI Portal: A framework to design, deploy, and use dashboards, reports, and visualizations. The modular, component-based approach makes it easy to create and reuse dashboard components and deploy the dashboards to users in a secure manner. This approach provides the decision maker with information in a timely manner. A set of sample dashboards and reports to enable users to get a quick start.

Deployment Planning

Deployment Planning



Planning for a QAD Deployment

Key Considerations

Key Considerations

- Understand the business context
This ultimately drives the deployment architecture
- Distributed versus Centralized Hosting
 - Sites, regional hubs, global hub?
 - Onsite versus Hosted versus QAD On Demand
- Sizing Considerations
 - Scale up (monolithic) versus Scale out (multi-tier)
 - Planning for Growth / Capacity Planning



Planning for a New Deployment

Example Business Context Goals:

- Simplify and standardize processes
- Enable self service
- Compliance
- Database Consolidation
- Hardware Consolidation
- Hardware Centralization
- Distributed Reporting
- Fault Tolerant

Key Considerations 2

Key Considerations *continued*

- Multi-tenant versus Multi-instance
Will business units be consolidated into one DB?
- High Availability design?
- Disaster Tolerant design?
- Preferred hardware vendor?
- Preferred operating system?
- Localizations
Languages, time zones, character sets, and taxes
- Application Management and Monitoring



Planning for a New Deployment

Deployment Architecture Definition

Definition of the QAD Technical Architecture

Driven from the Key Considerations and aligned with the business unit

- Definition of Upgrade / Migration Process
Strategy, Data Cleansing, Data Archiving
- Definition of Key Interfaces
- Additional Development / Customizations required
- Key Integration Decisions
QXtend, Security, Technology, Compliance, Impact on other systems



Deployment Architecture Definition

You can now define, document, and scope the proposed QAD technical architecture for the deployment.

Operating Systems



Operating Systems

Supported Operating Systems

Operating Systems

- AIX 6.1 and 7.1 (64-bit)
- HP-UX 11i v3 (64-bit)
 - Expat XML Parser req'd
- Sun Solaris (SPARC) 10 and 11 (64-bit)
- Windows
 - Windows 2003 R2
 - Windows Server 2008 R2
- Windows Server 2012 (32- and 64-bit)
- Red Hat Enterprise Linux 5 and 6 (32- and 64-bit)
- SuSE Enterprise Server 11 (64-bit)



Supported Operating Systems

For the most current supported operating system and requirements information, refer to the QAD Platform & Product Compatibility and Availability Guide on the QAD Online Support Center at:

<http://support.qad.com>

Supported Operating Systems 2

Supported Clients

- Windows 7, 8
- Windows XP Professional SP3
- Adobe 10



Supported Operating Systems

Required Software

QAD Enterprise Edition

Server

- OpenEdge 10.2B07, 11.1, and 11.2
- Java J2SE 5.0+, Java 6, and Java 7 (Java 7 required for Tomcat 7)
- Tomcat 5.5.20+ to Tomcat 7
 - No longer on media. Must be downloaded
- Georgia Softworks Telnet Server
 - Windows only. No longer on media. Download from www.georgiasoftworks.com

Client

- QAD .NET UI 3.0.1
- Microsoft .NET 4
- Adobe SVG 3.03+
- Internet Explorer 9
- Microsoft Silverlight 4.0.5+



Required Software

Google Chrome: Not officially supported, but seems to work fine.

IE versions: 5.5 SP2 or higher.

Versions 8 and 9 run in compatibility mode.

Vista/7: Install as administrator.

Hardware Considerations

Hardware Considerations



Hardware Introduction

QAD Does Not Endorse Any Vendor

- QAD does not have a preferred platform
Each supported operating system and its associated hardware have strengths and weaknesses
- QAD supports the “mixing” of hardware platforms
Example: HP-UX database server, Linux Tomcat Server, Windows Reporting Server
- The Primary Consideration should be
Does the platform meet the stated business, technical and cost requirements?



Hardware Introduction

Choosing a solution based purely on cost can result in a system that under-performs or lacks critical business requirements (for example, no disaster recovery).

Non-functional Requirements

Does the hardware meet the business goals?

A hardware solution may be able to meet the defined performance, price, and capacity goals, but may be unable to meet non-functional business goals

- Fault Tolerance and High Availability
- Same day expert vendor support
- Advanced Security and Management
- Utility Pricing
- “Green” Computing Guidelines

Heating and cooling , Blade architecture



Non-functional Requirements

Hardware Guidelines

Some “very” broad guidelines

- Consider UNIX for
 - Advanced partitioning, Utility Pricing
 - Reduced Systems Administration Costs and Massive Vendor support organizations
 - Scalability, Fault ToleranceVery Demanding Workloads
- Consider Linux for excellent Price / Performance ratios
- Consider Windows Server for ease of use and lighter workloads



Generally Speaking

Windows solutions perform comparably to Linux deployments - to a point. After about 200 concurrent users, Linux starts to outperform Windows Server on the same hardware.

Storage

Don't forget to design the I/O Subsystem

The old rules of disk storage still hold true with this version of QAD Enterprise Edition

- Use SAS or Fiber Channel Disks only
- Don't use RAID 5 for databases or temporary files
Use RAID 10 for database files
- Install as many physical disks as possible
- High Availability requires the use of SAN technology
- Be careful when using virtual storage on a shared SAN



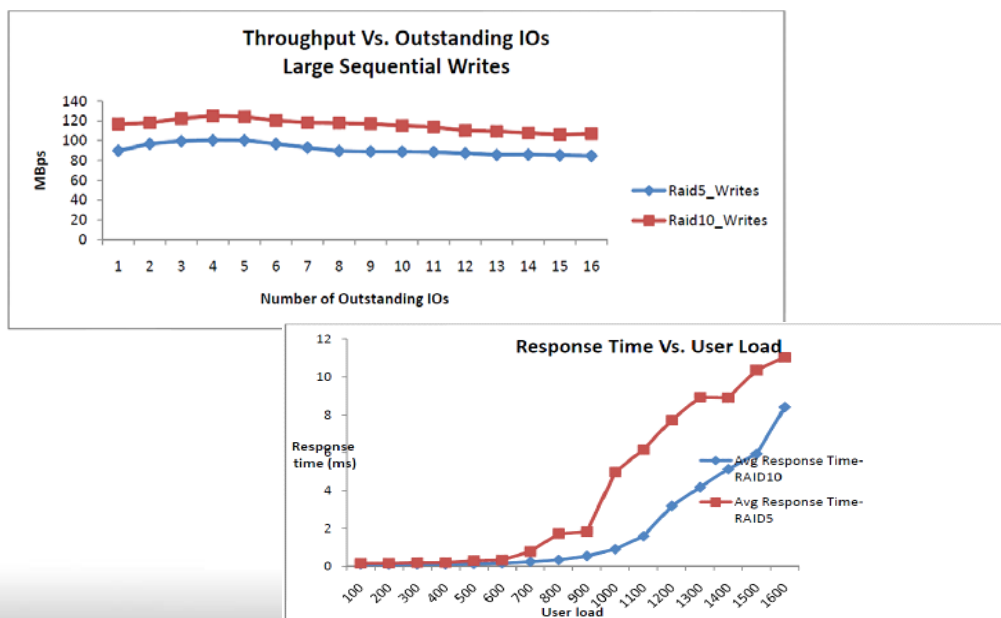
Storage

When storage is virtually provisioned from a SAN, there can be hidden dangers.

If the SAN is supplying multiple customers or business units, the disks, adapters, and cache on the SAN can be overloaded (due to the other users). This overloading can happen even though the QAD deployment is lightly loaded. This overloading can affect the I/O performance of the QAD system, even when the disks presented to the operating system are showing as lightly utilized.

RAID 5

Don't believe hardware vendors. RAID 5 is bad.



No RAID 5 for Database Volumes

RAID 5 and RAID 10 provide equivalent performance when the disks are not under load. However, when disks are placed under load, RAID 5 shows the following characteristics.*

IBM states “Because the number of disk level operations per write is greater for RAID-5 compared to mirroring (4 operations per write versus 2), mirroring performs better than RAID-5. With a 50:50 read/write ratio, RAID-5 can handle only about 60% of the ops that mirroring can handle.”

*From the whitepaper “Comprehending the Tradeoffs between Deploying Oracle® Database on RAID 5 and RAID 10 Storage Configurations.” A Dell® Technical White Paper Database Solutions Engineering by Sudhansu Sekhar and Raghunatha M, Dell Product Group, April 2009.

Network Considerations

Network Considerations



Networks

Acceptable Performance

Acceptable Performance

QAD Enterprise Applications can deliver acceptable to good application responsiveness at latencies of up to 250ms, and remain usable for latencies of up to 325ms

- Enterprise Financials Slightly Lower
- For WAN deployments, QAD recommends the use of Tomcat Compression (covered later in this course)
- Thin Clients such as Citrix can be used in very high latency deployments (up to 450ms)



Networks

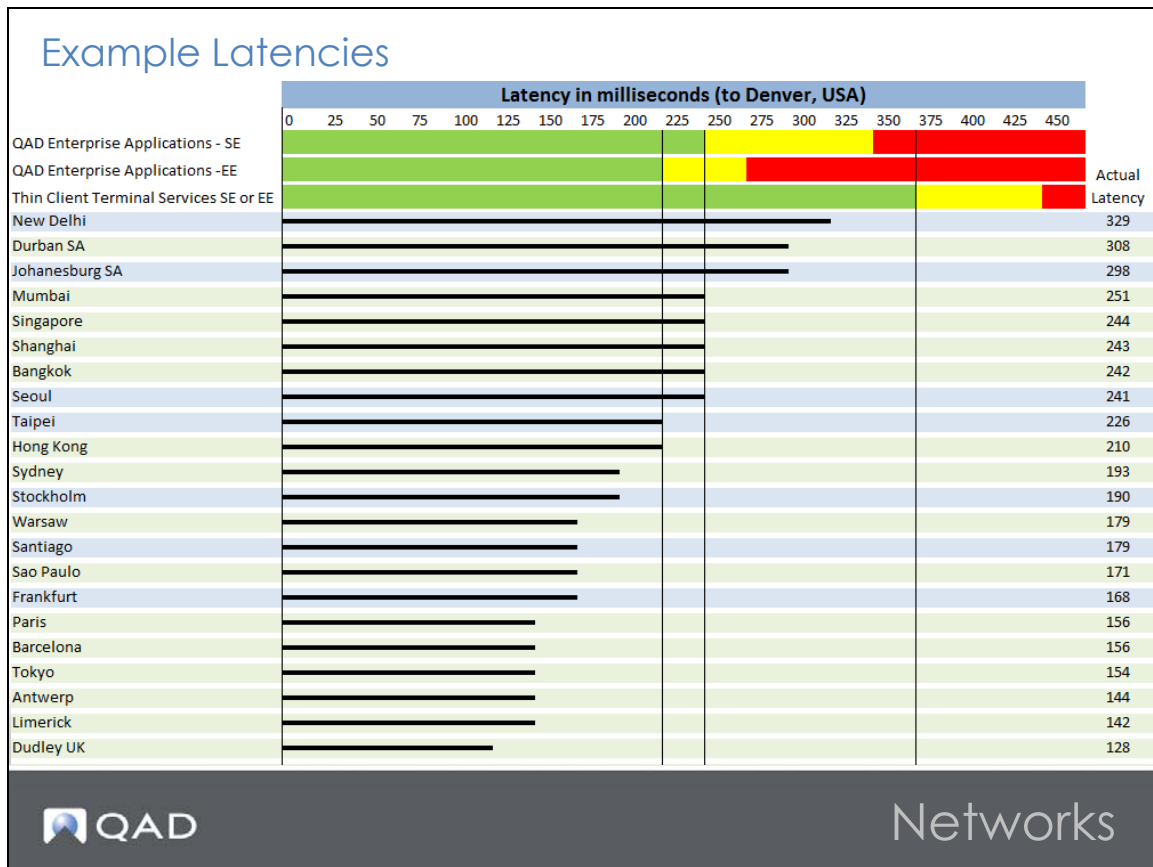
Given good server performance, optimal routing, adequate bandwidth, and low rates of data collision, sessions connecting from a remote network in the 50ms to 250ms latency range show the following:

- Remote reporting takes a similar time to process as local reporting.
- Transferring the generated report over the network to remote printers can take extra time.
- If output files generated to the server or submitted as batch, remote batch/intensive tasks (such as Invoice Print, Cost Rollups) take a similar time to process as local tasks.
- Some processes which interactively update the terminal screen (such as MRP) can take up to twice as long on slow networks.

Given good server performance, optimal routing, adequate bandwidth, and low rates of data collision, sessions connecting from a remote network in the 50ms to 250ms latency range show the following:

- Interactive/data entry tasks can take several times longer than local tasks to provide a response.
- However, the absolute end-user response times are still expected to be within the typical boundaries of service level agreements / user acceptance.
- Less than 0.5 seconds for field-to-field and less than 1 second for screen-to-screen navigation
- Good levels of sustained end-user productivity

Example Latencies



Green: Acceptable

Yellow: Be aware

Red: Generally unacceptable

Virtualization

QAD Supports Virtualization – Sort Of

- There is little risk with UNIX logical partitioning
 - Using VMware vSphere-style technology carries a greater risk
 - QAD recommends the use of virtualization for application tiers, web servers, reporting, business intelligence and test/pilot/sandbox QAD environments
 - QAD databases should only be virtualized after a comprehensive analysis of the limitations, risks and benefits
- Contact the QAD performance team for more information (PDL_RaD_Performance@qad.com)
- Progress and QAD may require problems to be duplicated on a non-VM instance before offering support



Virtualization

VMware vSphere can supply up to 85% of the responsiveness and capacity of a native system install.

VMware has an absolute maximum ceiling on disk I/Os per second. The ceiling is 120k per VM and 350k per host.

An entry-level SAN provides around 140k per second.

A mid- to high-level SAN can provide around 350k per second with bursts up to 1000k per second.

High Availability

High Availability

- QAD Enterprise Edition supports High Availability
- Discussed later in this class



High Availability

Internationalization

Internationalization

QAD Enterprise Edition supports Internationalized Deployments

- Unicode End-to-End
- Languages
 - Several languages currently supported
 - Each user has a base language
 - Each domain has a base language
 - Each deployment has a base language (cannot be changed)



Internationalization

Internationalization 2

QAD Enterprise Edition – Unicode End-to-End

Allows data to be stored from a number of different code pages in a single database

- Data is sorted linguistically
- Unicode is optional

When two or more languages with conflicting code pages are installed, the system is automatically configured for Unicode

- A Unicode database can be up to 25% larger due to the increased size of the index keys
- Presentation Layer performance is about the same as with a non-unicode database



Internationalization

But some batch processes can run up to 20% slower.

End of Lesson

Next: Installing QAD Enterprise Edition



End of Lesson

Chapter 2

QAD Enterprise Edition Installation

Introduction and Agenda

Introduction and Agenda



Introduction

QAD Enterprise Edition Installation

After this section of the class, you should:

- Know the key tasks needed to prepare the operating system for QAD installation
- Understand the QAD Deployment Tool (QDT)
- Be able to install, configure, and start QAD EE
- Be able to install the QAD .NET UI Client



Introduction

Topics Covered

What is in this Lesson?

- Operating system preparation
- QAD Deployment Toolkit installation
- QAD Enterprise Edition installation
- QAD Enterprise Edition initial configuration



Agenda

QAD Enterprise Edition Installation

QAD Enterprise Edition Installation



QAD Enterprise Edition

Installation Prerequisites

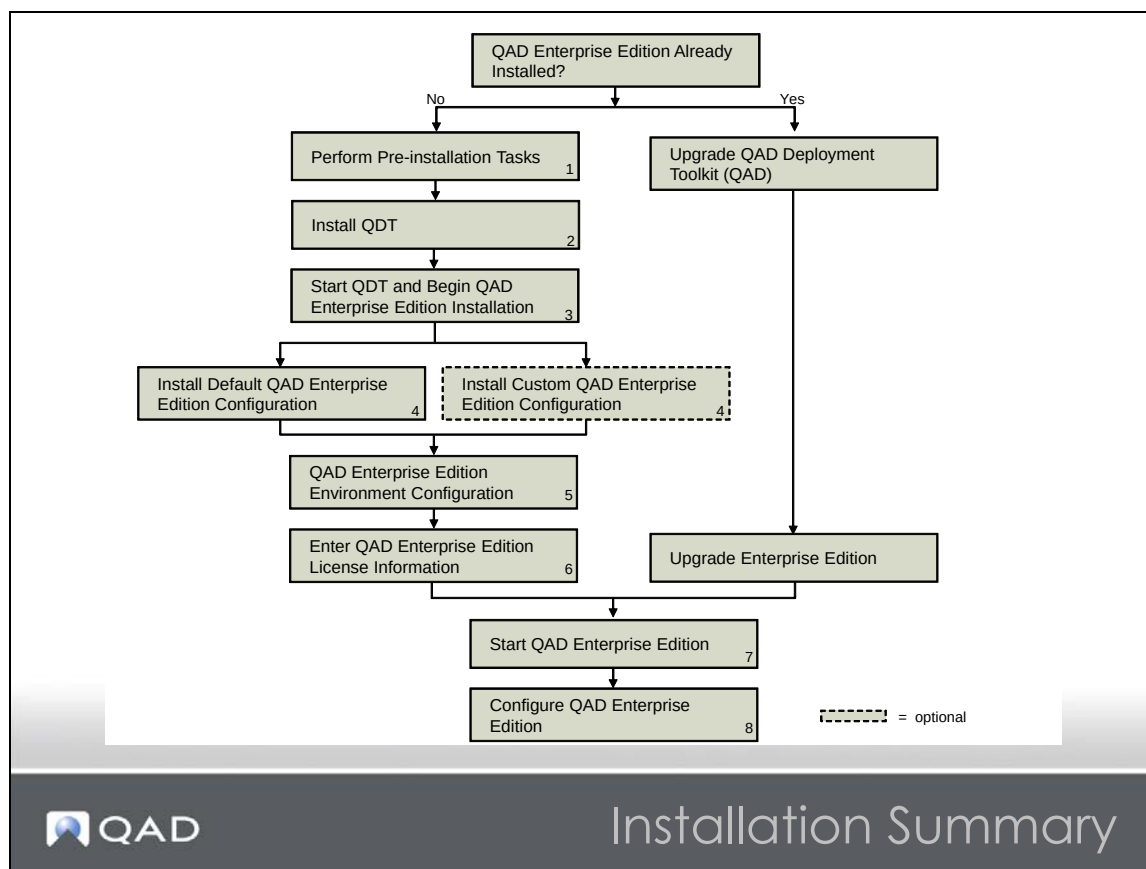
Installation Prerequisites

- The required hardware is installed
- The operating system is installed and configured
The root/administrator password is available for the initial installation phase
- File systems have been provisioned
- The QAD software is available
- OpenEdge and Java J2SE are installed
- A client computer is available to assist with the testing and installation
That is, desktop PC, laptop PC, Citrix Client



Ready to Install?

Installation Summary

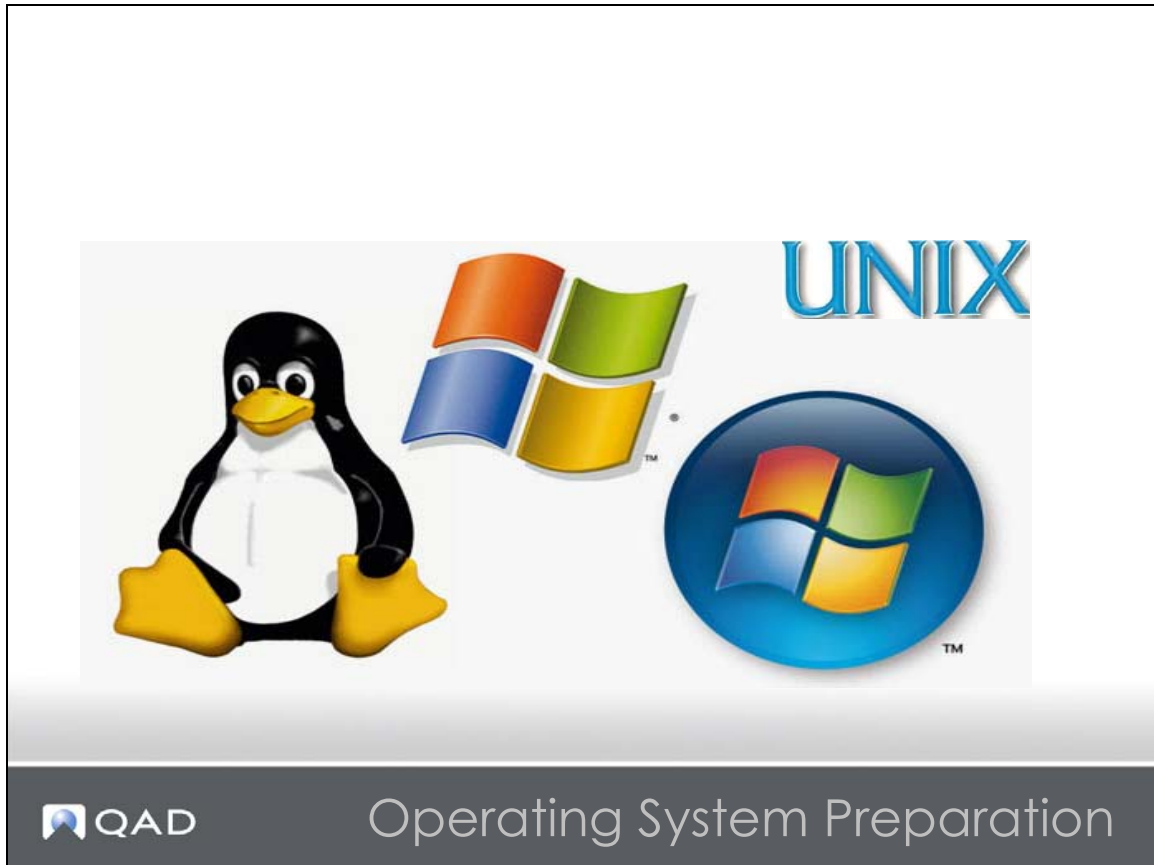


The procedure for installing QAD Enterprise Edition is as follows:

- 1 Determine if your system hardware, software, and configuration meet the requirements for Enterprise Edition installation. Set up your system according to the requirements defined in this chapter or with the assistance of QAD Services.
- 2 Install QDT.
- 3 Launch QDT. It reads the product image and displays a choice of products and components to install.
Select the appropriate products and components.
QDT automatically discovers system information, such as the location of required software, by reading environment variable settings.
- 4 You perform a default or custom Enterprise Edition installation. QDT installs and configures the selected products and components using default configuration values generated during the auto-discovery process or using your custom configuration values.
- 5 Following QAD Enterprise Edition installation, you configure the Enterprise Edition environment.
- 6 You start up a character-based user interface (CHUI) session and enter license information.
- 7 You start your new Enterprise Edition installation and log in.

- 8 You perform any needed post-deployment configuration.

Operating System Preparation



Operating System Preparation

Summary of Changes Required

- Telnet Server must be available and configured with high user counts
- Shared Memory and Semaphores should be high enough to support QAD requirements
- Operating System limits must be raised to support QAD requirements
Maximum open files, processes, file size
- Nagle's Algorithm must be disabled, if necessary (TCP_NODELAY)
- X Terminal Server is installed



General Operating System Tips

Nagle's Algorithm:

- Added to operating systems to increase network efficiency
- Tries to send full-sized data packets
- Poorly behaved applications could, in theory, send a few hundred thousand single-byte packets in a short time, and flood the network.

The algorithm states that every time you try to send unacknowledged data, delay until:

- All data is acknowledged or
- You have a full data packet to send

Data is acknowledged when:

- The program sends an acknowledgment or
- Two segments are received or
- 200ms expires since first piece of data was received

Performance Penalty with QAD:

- Does not work well with the “headless” QAD Connection manager code
 - Built-in delayed acknowledgment comes into play
 - Data should be delivered as soon as it is ready
- Increases network throughput and efficiency

- Decreases network responsiveness

For further performance tuning, see the Performance section of this course.

Operating System Preparation 2

Enterprise Linux

- Shared Memory, Semaphores, and Filehandles
 - /etc/sysctl.conf
 - # sysctl -e -p /etc/sysctl.conf
 - /etc/security/limits.conf
- Telnet
 - #chkconfig --list telnet
 - Service defined in /etc/xinetd.d
 - Instances = unlimited
- Check libperl.so linked correctly
- Disable performance limiting services
 - #chkconfig cpuspeed off
 - #chkconfig portmap off
 - #chkconfig kudzu off



Operating System Preparation

On 64-bit systems, `libperl.so` can be linked incorrectly. As a result, the qadui WebApp to fail to authenticate.

2010-09-27 00:01:41,466 ERROR com.qad.desktop.cgi.CGIServlet [Thread-36] runCGI (stderr):perl: error while loading shared libraries: libperl.so: cannot open shared object file: No such file or directory

Linking `libperl.so` solves this issue:

```
ln -s /lib64/perl5/5.8.8/x86_64-linux-thread-multi/CORE/libperl.so
/usr/lib64/libperl.so
```

Operating System Preparation 3

IBM AIX

- Nagle's Algorithm
 - Use the sysadmin tool (smitty)
 - TCP_NODELAY or TCP_NAGLE_LIMIT should be off
 - FASTTIMO should be lowered from 200ms to 50ms
- Use Enhanced JFS Filesystems
 - Mount with "noatime" and "rbrw"



Operating System Preparation

Operating System Preparation 4

HP-UX

- Shared Memory and Semaphores and Filehandles
 - Can be set with kctune, kcweb, SAM, or SCM.
 - semaem, semmni, semmns, semmsl, nproc, maxfiles, maxfiles_lim, ninode, nkthread, nstrtel

Consult your HP-UX documentation for the appropriate usage
- Lower the Dynamic Buffer Cache / Filecache
 - filecache_min to 3%
 - filecache_max to 10%
- Increase Telnet Psuedo Terminals
- Install Expat XML Parser



Operating System Preparation

After the `nstrtel` kernel parameter has been increased, you can increase the Telnet ptys.

To support an increased number of incoming Telnet sessions (up to the value of `nstrtel` kernel parameter), the Telnet devices were recreated:

```
# cd /
# rm /dev/pty/*
# rm /dev/pts/*
# insf -e
# cd /dev
# insf -d telm
# insf -d tels
```

The Expat XML Parser is a free, open-source project that provides this functionality.

The source code is available on the project's SourceForge page at:

<http://expat.sourceforge.net/>

Precompiled depot files for HP are available at:

<http://hpux.connect.org.uk/hppd/hpux/Development/Tools/expat-2.0.1/>

QAD Deployment Toolkit has a limitation on HP ia64 (Itanium) platforms. QAD suggests that you install the depot files on the Itanium 2 and PA-RISC 2.0 before installing the QAD software.

Operating System Preparation 5

Solaris

- Shared Memory and Semaphores and Filehandles
/etc/system
- Disable Nagle's Algorithm
ndd -set /dev/tcp tcp_naglim_def 1



Operating System Preparation

/etc/system changes:

```
set msgsys:msginfo_msgmni = 10240
set semsys:seminfo_semmni = 12288
set shmsys:shminfo_shmmax = 30813703372
set shmsys:shminfo_shmmni = 12288
# Increasing file descriptors for faster TCP/IP apps (e.g. Apache)
#
set rlim_fd_max=16384
```

Operating System Preparation 6

Windows Server

- Install GeorgiaSoft Telnet Server
- Disable unnecessary services and screen savers
- Optimize for a server application
(Windows 2003 Server example)

Network Connections-Properties on Local Area Connection.

Select File and Printer Sharing for Microsoft Networks and click the Properties button.

There are four choices for optimization:

- Minimize memory used
- Balance
- Maximize data throughput for file sharing - the Default
- ***Maximize data throughput for network applications***



Operating System Preparation

MFG User Set Up

The MFG installation user



Set Up the MFG User

MFG User Set Up 2

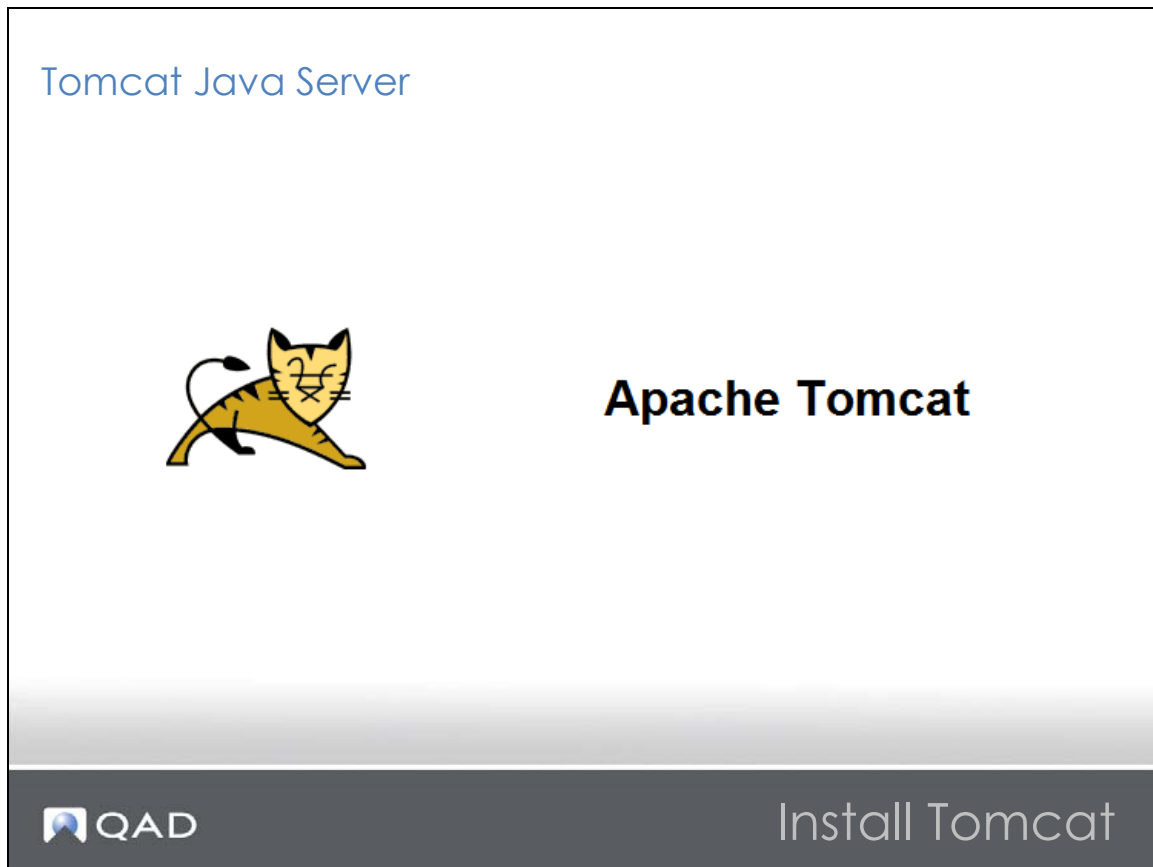
Linux / UNIX Instructions

- Create “qad” group with gid of 65535
- Create “mfg” user with uid of 65535
“umask 022”
- Setup “mfg” user profiles / environment
 - DLC set to Open Edge 10.2B install
 - JAVA_HOME set to Java J2SE Location
 - CATALINA_HOME set to Tomcat install directory
 - PATH includes
`$DLC/bin, $JAVA_HOME/bin, $CATALINA_HOME/bin`



Set Up the MFG User

Install Tomcat



Apache Tomcat is an open source software implementation of the Java Servlet and JavaServer Pages technologies. The Java Servlet and JavaServer Pages specifications are developed under the Java Community Process.

Apache Tomcat:

- Is developed in an open and participatory environment and released under the Apache License version 2
- Is intended to be a collaboration of the best-of-breed developers from around the world
- Powers numerous large-scale, mission-critical Web applications across a diverse range of industries and organizations
- Powers the QAD WebApps

Install Tomcat 2

Linux / UNIX Instructions

- From the QAD media
 - Tomcat is located in mfgprouitc/zip
 - Unzip to \$CATALINA_HOME
- From the Apache Tomcat Website
 - <http://tomcat.apache.org/download-55.cgi>
 - Download and install to \$CATALINA_HOME
 - The admin/manager role should be added to \$CATALINA_HOME/conf/tomcat-users.xml
 - Set JAVA_HOME in \$CATALINA_HOME/bin/setenv.sh
- Change the Startup and Listen port , if required
- Start Tomcat
\$CATALINA_HOME/bin/startup.sh
- Verify on <http://server:port>



Install Tomcat

Example of tomcat-users.xml:

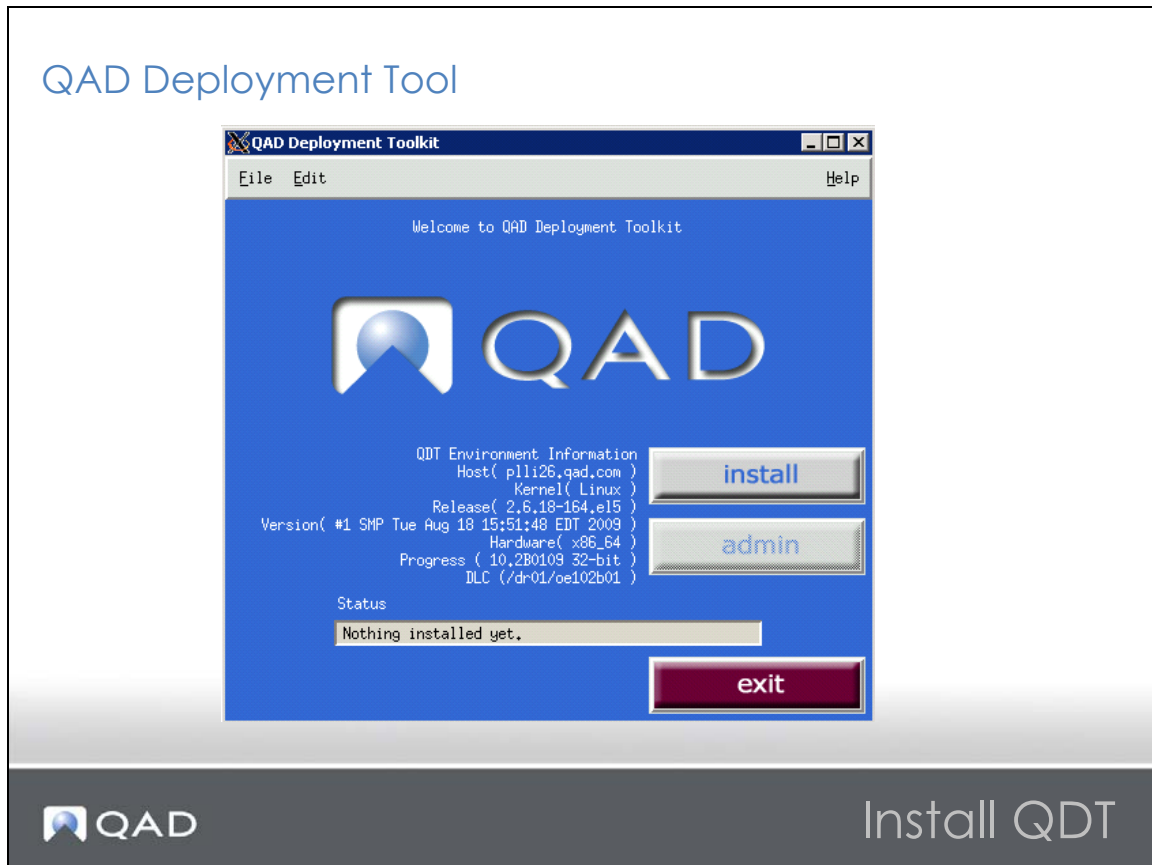
```
<?xml version='1.0' encoding='utf-8'?>
<tomcat-users>
  <role rolename="tomcat"/>
  <role rolename="role1"/>
  <role rolename="manager"/>
  <role rolename="qadadmin"/>
  <role rolename="pronav"/>
  <role rolename="admin"/>
  <user username="tomcat" password="tomcat" roles="tomcat"/>
  <user username="both" password="tomcat" roles="tomcat,role1"/>
  <user username="role1" password="tomcat" roles="role1"/>
  <user username="pronav" password="editor" roles="pronav"/>
  <user username="admin" password="mfgpro" roles
    "qadadmin,manager,admin,pronav"/>
</tomcat-users>
```

Changing the Tomcat Port

Open \$CATALINA_HOME/conf/server.xml.

Change the references to “8080” and “8005” to unused port numbers.

Install QDT



The QAD Deployment Toolkit (QDT) is a streamlined, comprehensive set of tools for product installation and configuration.

QDT is used to install QAD Enterprise Edition and other QAD products. QDT streamlines the installation process by automatically finding system information and modifying the QAD Enterprise Edition configuration profile appropriately.

QDT provides two QAD Enterprise Edition installation options:

- Default Installation, which other than setting up connection information, uses the default configuration values without modification.
- Custom Installation, where in addition to setting up connection information, one or more of the default configuration values are modified.

Install QDT before installing QAD Enterprise Edition.

Note Before installing QDT and QAD Enterprise Edition, verify the environment variables for the prerequisite Java and Tomcat installations on your target system are set.

Unpack and Install

Unpack and Install

- Prerequisites
 - X Windows Environment Available
 - Open Edge Admin and Name Servers running
 - Logged in as “mfg” user
- Install QDT
 - From installation media
 - Change to the install directory
 - Run the appropriate script for your Operating System

```
Welcome to the installation for QAD Deployment Toolkit (QDT).  
We are installing QAD Deployment Toolkit (QDT) for linux.  
Press <Enter> to view license agreement. █
```



QAD Deployment Tool

Set the CATALINA_HOME, DLC, and JAVA_HOME environment variables before running this script.

Unpack and Install 2

Unpack and Install

```
Do you accept all the terms of the preceding License Agreement?  
If you choose no, the install will stop.
```

```
To install QAD Deployment Toolkit (QDT),  
you must accept this agreement. (y/n)?  
Default is n  
->y
```

```
Please enter the the directory in which to install QAD Deployment Toolkit (QDT).  
Default is /usr/local/qdt  
->/dr01/2010.1/qdt
```

```
Please enter the location where the installation log file should be written.  
Default is /dr01/2010.1/qdt/logs  
->  
Directory /dr01/2010.1/qdt/logs does not exist.
```

```
Create it (y/n)?  
Default is y  
->y
```

```
Please enter the location where the QDT XML files should be written.  
Default is /dr01/2010.1/qdt/xml  
->  
Directory /dr01/2010.1/qdt/xml does not exist.
```

```
Create it (y/n)?  
Default is y  
->y
```



QAD Deployment Tool

Unpack and Install 3

Unpack and Install

```
Found component MFGUTIL
Found component QDT
Found component QDT_Resources
Found component QDT_Ini

Installation Summary:
  QDT Install Directory ..... /dr01/2010.1/qdt
  QDT Log Directory ..... /dr01/2010.1/qdt/logs
  QDT XML Directory ..... /dr01/2010.1/qdt/xml

Continue with install (y/n)?
Default is y
->
```

```
File copy complete.
Performing post-installation tasks
Found TAILORLIST for component QDT_Ini.
Tailoring /dr01/2010.1/qdt/ini/QDTenv.ini using section Tailor_QDTENV.

Installation completed

Log written to /dr01/2010.1/qdt/logs/qdt.log

Press <enter> to end script.
```



QAD Deployment Tool

Verify that everything was OK by reviewing the log file.

Launch QDT

Launch (X client required)

- From the QDT install directory
./qadinst or ./qadinst.ksh
- Launches the QDT X-Windows Session



QAD Deployment Tool

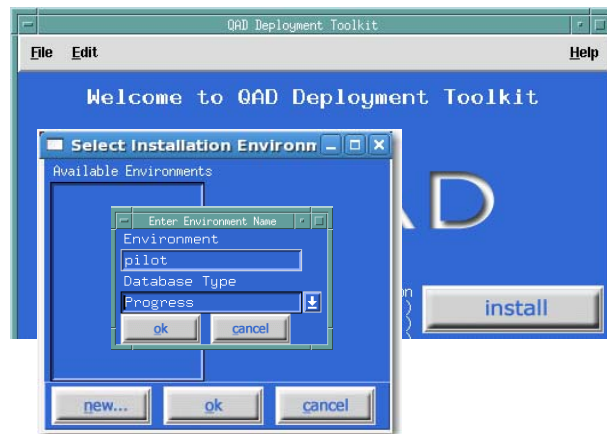
Only the person who installed the QDT can use it. To add extra authorized users, edit the file in QDT INSTALL/xml/users.xml.

The performance of the QDT is not good over high latencies. Try to launch it locally or via a remote desktop.

Using Xming or Cygwin combined with Putty (X11 forwarding enabled) are good ways to achieve X sessions from a Windows Client.

Select Install and Add New Environment

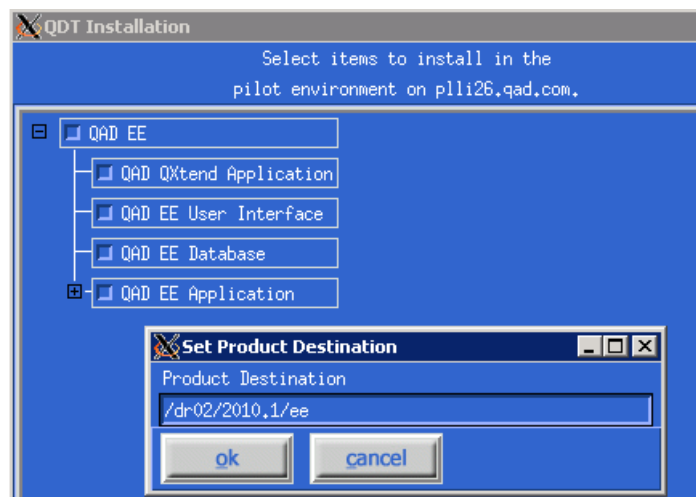
Select “Install” and Add “New” Environment



QAD Deployment Tool

Select Items to Install and Specify Destination

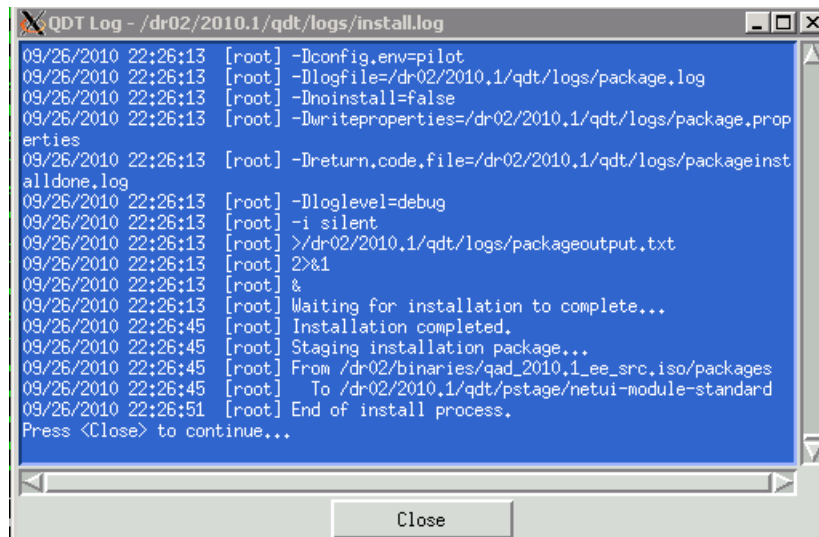
Select All Items to Install and Destination



QAD Deployment Tool

File Copy and Install

Wait for Files to Copy and Install

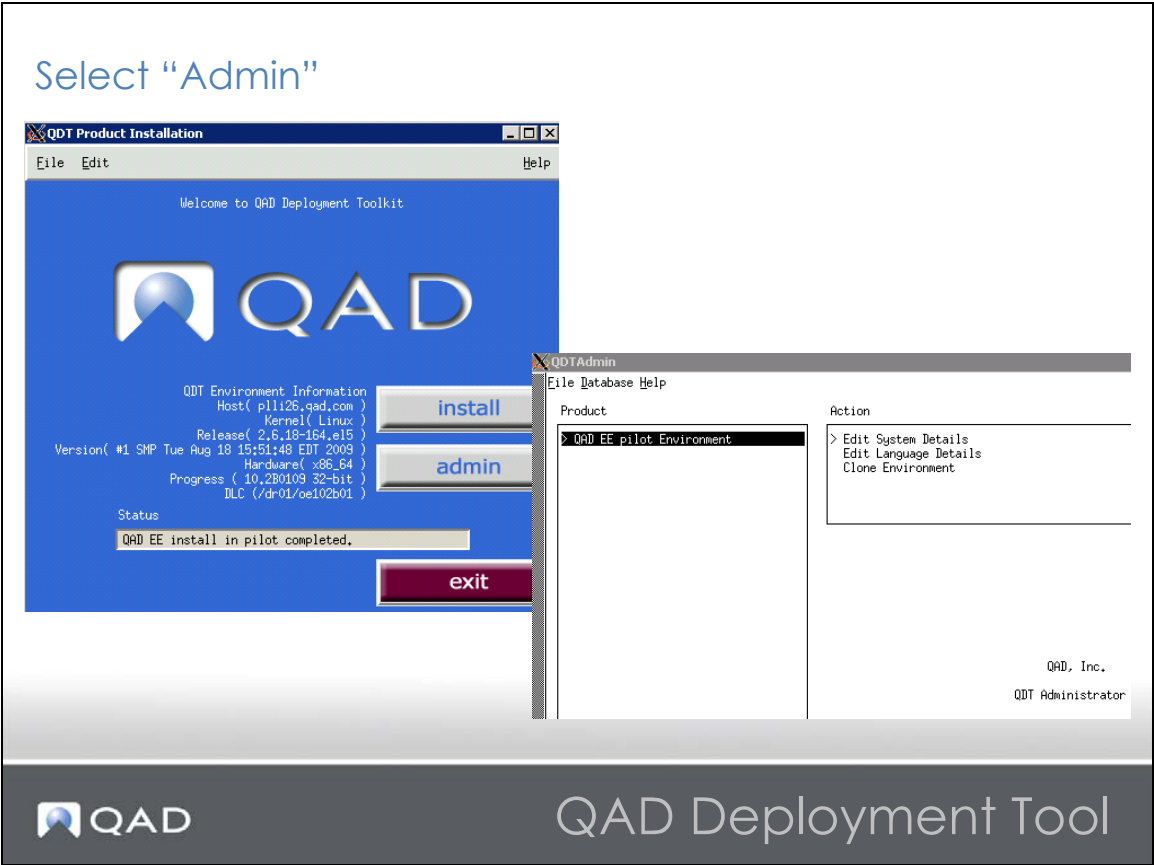


```
QDT Log - /dr02/2010.1/qdt/logs/install.log
09/26/2010 22:26:13 [root] -Dconfig.env=pilot
09/26/2010 22:26:13 [root] -Dlogfile=/dr02/2010.1/qdt/logs/package.log
09/26/2010 22:26:13 [root] -Dnoinstall=false
09/26/2010 22:26:13 [root] -Dwriteproperties=/dr02/2010.1/qdt/logs/package.properties
09/26/2010 22:26:13 [root] -Dreturn.code.file=/dr02/2010.1/qdt/logs/packageinstall.done.log
09/26/2010 22:26:13 [root] -Dloglevel=debug
09/26/2010 22:26:13 [root] -i silent
09/26/2010 22:26:13 [root] >/dr02/2010.1/qdt/logs/packageoutput.txt
09/26/2010 22:26:13 [root] 2>&1
09/26/2010 22:26:13 [root] &
09/26/2010 22:26:13 [root] Waiting for installation to complete...
09/26/2010 22:26:45 [root] Installation completed.
09/26/2010 22:26:45 [root] Staging installation package...
09/26/2010 22:26:45 [root] From /dr02/binaries/qad_2010.1_ee_src.iso/packages
09/26/2010 22:26:45 [root] To /dr02/2010.1/qdt/pstage/netui-module-standard
09/26/2010 22:26:51 [root] End of install process.
Press <Close> to continue...
```



QAD Deployment Tool

Configure Enterprise Edition



Select Environment and Edit System Details

Select Environment and “Edit System Details”

Edit System Details Container: QAD EE pilot Environment

Host ID: vmlinux
 Host Name: vmlinux.qad.com
 Host URL: vmlinux.qad.com
 Log Directory: /qadapps/qdt/logs <Browse>
 Environments Dir: /qadapps/qdt/envs <Browse>
☐ Use RAM Disk
 RAM Disk Dir: <Browse>

Select a system component to edit details

Type	Description
* adminserver	Progress AdminServer
* java	Java Runtime Environment
* nameserver	Progress NameServer
* tomcat	Tomcat Web Apps
*	
*	

< Back >> Next > < Done >> Cancel >

 QAD QAD Deployment Tool - Edit

Select each component and verify that the details are correct. The Admin Server port number and the Tomcat Port number often need to be changed.

Edit Tomcat Details

Example: Editing Tomcat details

> QAD EE pilot Environment | > Edit System Details

Edit Tomcat Web Apps Details

WARNING: It is recommended that you only change these values before configuring your QAD environment. Changing these values after the environment has been configured should only be done by advanced users of the QAD Deployment Toolkit. In some cases, components of the environment must be re-configured in order for these changes to take effect. Please consult the user documentation for more details.

Version: Unknown

Install Dir: /dr02/2010.1/tomcat6 <Browse>

Port #: 9040

< OK > < Cancel >



QAD Deployment Tool - Edit

Languages

Languages

- The following languages come with the default QAD EE installation media:
 - Simplified Chinese (ch), Castilian Spanish (cs), Czech (cz), Dutch (du)
 - French (fr), German (ge), Italian (it), Japanese (jp)
 - Korean (ko), Latin American Spanish (ls), Polish (pl), Portuguese (po)
 - Thai (ti), Traditional Chinese (tw), English (us)
- The default install language is US English
- Choose Edit Language Details to add new languages



QAD Deployment Tool - Edit

Each user is assigned a default language.

You can Modify the code page settings by entering the new information in the Internal Codepage or Stream Codepage fields.

Limit your modifications to the codepage settings because erroneous modifications can cause unexpected behavior.

A single QAD database can be set up with multiple domains.

- Each domain can have its own language.
- Unicode allows for support of multiple code pages at the database level.
- Some languages can operate within the same code page, others cannot. English/Chinese is OK, but Japanese/Chinese is not.
- The QAD programs (r-code and libraries) support multiple languages.
- Separate compiles are not required.
- Core languages are released with the QAD base media.
- Language updates are bundled on individual CDs/media.
- Update the QAD .NET User Interface after installing a new language.

When logging in via the .NET UI:

- The user can access any domain in a Unicode database regardless of their default language.

- The .NET UI clients are fully Unicode compliant.

When logging in via Character UI, users must log in to a domain with a code page that is compatible with their default language.

All labels, menus, messages, and field-level help are stored dynamically in the QAD databases. For each installed language, there is a complete set of this data.

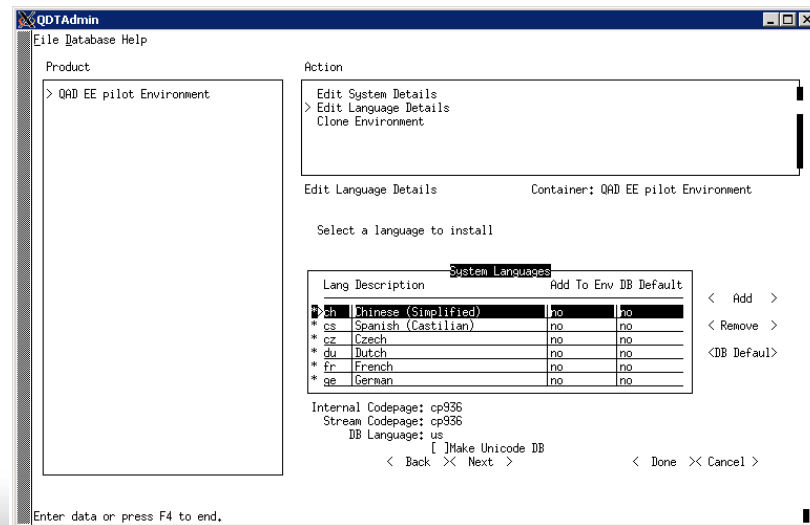
Some customer-specific data such as order comments, accounts, and sub-accounts can be assigned language translations.

Language Maintenance Activities are defined in the QAD Financials User Guide:

- Load the appropriate language data
- Create countries for users (country create)
- ISO display defaults
- Assign each user a language and country code

Edit Language Details

When selecting two or more languages with a conflicting codepage, Unicode is automatically configured



QDT - Edit Language Details

Adding Additional Languages

Adding Additional Languages

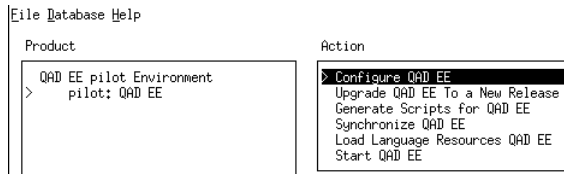
- If you require new languages not supplied on the QAD Enterprise Edition installation media, you must order them from QAD
- Installing a new language requires a re-installation of QAD Enterprise Edition via the QDT
- Only Languages compatible with the existing databases for a given environment will be displayed in the QDT



Languages

Configure QAD Enterprise Edition

Select Instance and “Configure”



Step through each item and review

Steps In Action Set

```
> QAD EE: Configure QAD EE
  QAD EE: Generate Scripts for QAD EE
    QAD EE Database: Generate Scripts for QAD EE DB
    QAD EE Database Set: Create Live Database Scripts
    QAD EE Application: Generate QAD EE Application Scripts
    Character Client Code: Generate Client Scripts
    Financials AppServer: Generate Scripts for Financials AppServer
    UI Configuration: Generate Scripts for UI Configuration
    UI AppServer: Generate Scripts for UI AppServer
    UI WebSpeed Broker: Generate Scripts for WebSpeed Broker
    QAD EE Database: Configure QAD EE Database Sets
    Empty Database Set: Create QAD EE Empty Database Set
```

[] Pause Before Executing Each Action

[Edit...]

[Execute] > [Cancel] >



QAD Deployment Tool - Configure

Configure Connection Manager Settings

When reviewing, be careful of Connection Manager Settings

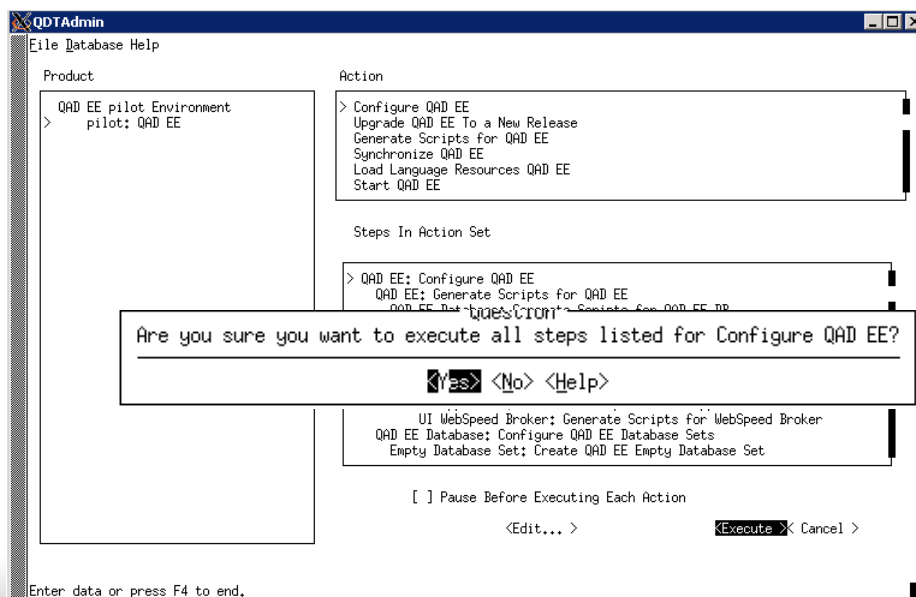
The screenshot shows a configuration window titled "Update UI Configuration" with a subtitle "Container: UI Configuration". The main heading is "Connection Manager Script". Below this, the "Working Directory" is set to "/dr01/gea2". The "OS Prompt" is set to "\$". The "Connection Method" is "ssh" with a dropdown arrow, and the "Port" is "22". There are fields for "Login:", "Password:", and "Confirm Password:". To the right, "Minimum Connections" is set to "1" and "Maximum Connections" is set to "5". At the bottom, there are navigation buttons: "< Back", "> Next >", "< Done", and ">> Cancel >".

Update UI Configuration	
Container: UI Configuration	
Connection Manager Script	
Working Directory: /dr01/gea2	
OS Prompt: \$	
Connection Method: ssh	Port: 22
Login:	Minimum Connections: 1
Password:	Maximum Connections: 5
Confirm Password:	
< Back > Next >	
< Done >> Cancel >	

Also, make sure that your port numbers are OK for the AppServers on the other screens, as well as the min/max agents.

Execute Environment Generation

“Execute” the Generation of the new environment



QAD Deployment Tool

QDT environment details are stored in \$QDT/xml.

Log Screen

Watch the Log Screen for Errors

```

/dr01/oe102b01/prolang/ame/empty8, (1365)
09/26/10 @ 23:03:14 [root] - Procopy session end, (334)
09/26/10 @ 23:03:18 [root] - Loading Schema for database mfgempty...
09/26/10 @ 23:03:18 [root] - Running command... /dr01/oe102b01/bin/progres
-pf /dr02/2010.1/qdt/envs/pilot/scripts/batchDfLoad,pf -param
"DFName=/dr02/2010.1/ee/db/mfgempty.df" >>
/dr02/2010.1/qdt/envs/pilot/scripts/batchDfLoad,log 2>%1
09/26/10 @ 23:03:18 [root] - All status information written to
/dr02/2010.1/qdt/envs/pilot/scripts/batchDfLoad,log
09/26/10 @ 23:03:18 [root] - Processing. Please wait...
09/26/10 @ 23:03:18 [root] - Running command... /dr01/oe102b01/bin/progres
-pf /dr02/2010.1/qdt/envs/pilot/scripts/batchDfLoad,pf -param
"DFName=/dr02/2010.1/ee/db/mfgempty.df" >>
/dr02/2010.1/qdt/envs/pilot/scripts/batchDfLoad,log 2>%1

```

< Cancel >

Processing.

```

09/26/10 @ 23:29:17 [root] - Ready for package install...
09/26/10 @ 23:29:17 [root] - Installing package...
09/26/10 @ 23:30:13 [root] - netui-module-standard package installed.
09/26/10 @ 23:30:13 [root] -
09/26/10 @ 23:30:13 [root] - End execution.
09/26/10 @ 23:30:13 [root] - Action:   Configure QAD EE
09/26/10 @ 23:30:13 [root] -
Press CLOSE to continue.

```



QAD Deployment Tool

Watch the screen for errors and review the log files under the QDT/logs directory as well.

For example:

```

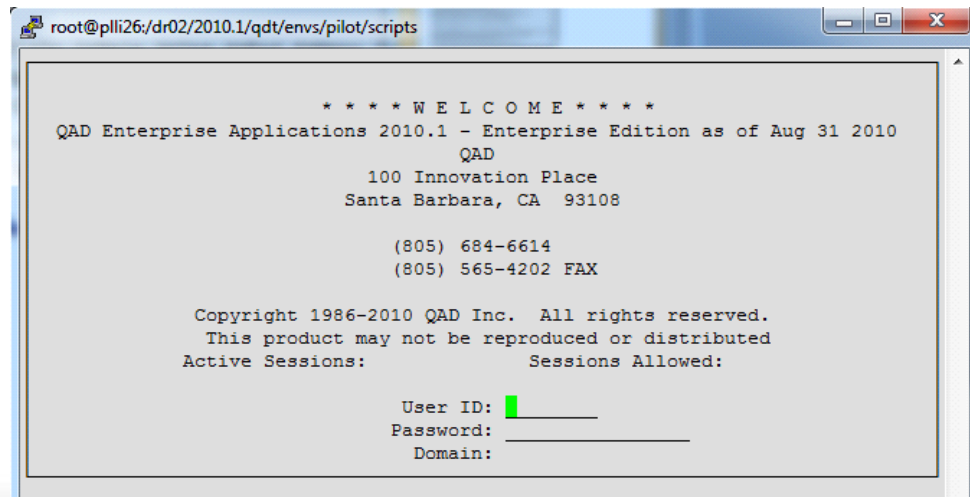
[logs]# ls
01batchCompile.log  packageinstalldone.log  package.properties
install.log         package.log             qdtadmin.log
jar.log             packageoutput.txt      qdt.log

```

QAD Enterprise Edition

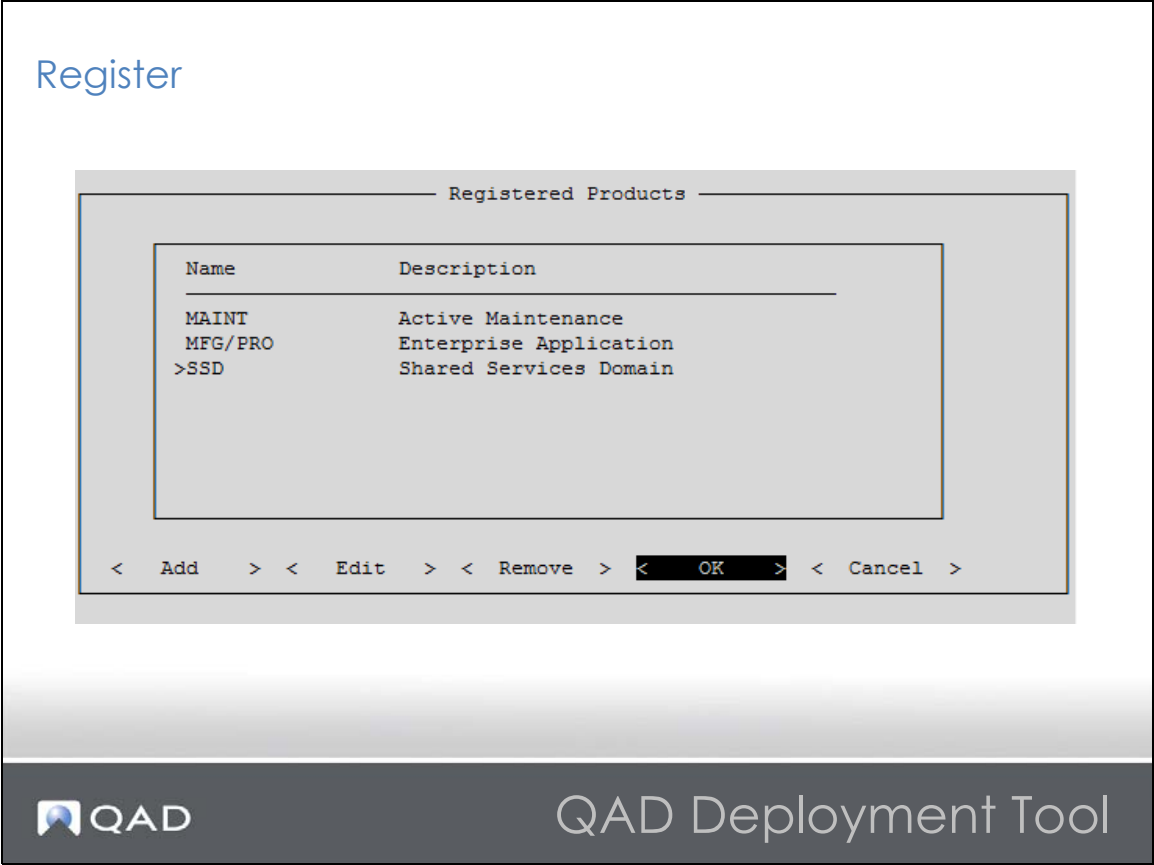
Launch QAD Enterprise Edition

```
$QDT_INSTALL/envs/[system name]/scripts/client.[systemname]
```



QAD Deployment Tool

Register



Have your registration information ready.

QAD Enterprise Edition Login

Log Back In – QAD Enterprise Edition is installed!

System Domain : qaddd		
mfmenu	Main Menu	09/26/10
1. Items/Sites	13. Product Structures	25. General Ledger
2. Addresses	14. Routings/Work Center	26. Multiple Currency
3. Inventory Control	15. Formula/Process	27. Accounts Receivable
4. Warehousing	16. Work Orders	28. Accounts Payable
5. Purchasing	17. Lean Manufacturing	29. Tax Management
6.	18. Repetitive	30. Cost Management
7. Sales Orders/Invoice	19. Quality Management	31. Banking/Cash Mgmt
8. Configured Products	20. Product Line Plan	32. Fixed Assets
9.	21. Resource Plan	33. Enterprise Ops Plan
10.	22. Forecast/Master Plan	34.
11. Service/Support	23. Materials Rqmts Plan	35. EDI eCommerce
12. Distribution Plan	24. Capacity Rqmts Plan	36. System Admin

Please select a function. F4 or blank to EXIT █ _____



QAD Deployment Tool

Next Steps

Next Steps

- Load Field Level Help
- Database Backup
- User Option Telnet maintenance
- [SSH for terminal mode]
- Install Client
- [Set up Client Compression]
- QXtend Interoperability



Configure Enterprise Edition

Daemons, Reporting Service, and other additional configuration options are discussed later in this course.

Load Field Level Help

Load Field Level Help (36.4.13.14)

mgflld.p 3+ 36.4.13.14 Field Help Load 09/27/10

Language: us english (U.S.)
 Field:
 To:
 Procedure:
 To:
 Status: To:
 Text Type: To:

Field Help
 Load File: db/us/fieldhlp.fhd

Skip loading help with lower status: Yes

Loaded flhm_mst: 590	Loaded flhd_det: 44,800
Read flhm_mst: 590	Read flhd_det: 44,900
Expected flhm_mst: 0	Expected flhd_det: 0



Configure Enterprise Edition

Back up the database after this step:

```
probkup dbname dbname.probkup
```

Telnet Maintenance

User Option Telnet Maintenance (36.4.14)

mgusrtmt.p 1+ 36.4.14 User Option Telnet Maintenance 09/27/10	
User ID:	
Telnet Options	
Host: plli26.qad.com	Script Timeout: 30
Host O/S: UNIX Port: 23 Image:	Idle Timeout: 90
Script Lines	
Sequence: 1	
Script Lines Data	
Script Pattern: login	
Script Value: mfg	
Script Status:	
Telnet Connections	
Maximum: Unlimited Min Telnet Connect: 1	

Sequence: Script Lines		Sequence: Script Lines	
Script Pattern: Password:		Script Pattern: #	
Script Value:		Script Value: /dr02/2010.1/qdt/envs/pilot/scripts/telnet.pilot	
Script Status:		Script Status:	

 **Configure Enterprise Edition**

Used for running terminal mode sessions from within the .NET UI.

The values are examples only.

- Script Pattern: The operating system string to scan for. Example - Login:
- Script Value: The value to enter. Example – mfg
- Script Status: The optional value used for debugging (appears in the Java Console on the client when tracing is enabled).

When the screen detects a script value of “Password” it prompts for a password, with verification. This password is blanked out on the screen.

Once the sequences for logging in are entered, enter the sequences for running the telnet script that QDT created. It is worth running the script manually to see if it works.

SSH Set Up

Optional for US English UNIX / Linux – Set Up SSH

- For terminal mode display, SSH can be used instead of Telnet. SSH uses encryption and compression to pass data between the client and the server
- Download VaraTerm Terminal Emulator
<http://www.routrek.co.jp/en/product/varaterm>
- Extract and Install `Routrek.granados.dll`
- Configure `qaduiConfig.xml` & `default.xml`
- Edit User Option Telnet Maintenance settings to use the SSH port 22 (instead of Telnet port 23)



Configure Enterprise Edition

To set up SSH, follow these steps:

- 1 If you installed QAD 2013 EE, go directly to step 2. If you upgraded to QAD 2013 EE, do the following:
 - a Back up the existing `$TOMCAT/webapps/$QADUI/WEB-INF/conf/connectionManagerConfig.xml` file.
 - b Copy the template `$TOMCAT/webapps/$QADUI/WEB-INF/conf/defaults/connectionManagerConfig.xml` to `$TOMCAT/webapps/$QADUI/WEB-INF/conf/connectionManagerConfig.xml`.
 - c Edit the new `connectionManagerConfig.xml` in the QAD UI: Administration - Connection Manager screen.
- 2 Download `granados200.tar.gz` from the following link to a temporary directory:
<http://www.routrek.co.jp/en/product/varaterm>

Note This file is not included with QAD software because of encryption export control laws.
- 3 Extract `Routrek.granados.dll` from the archive using `gunzip` and `tar`. Use version 2.0.0.0 of the DLL signed by Routrek Networks or SSH does not work.

The gunzip and tar programs are Linux/UNIX utilities. Some WinZip versions support *.tar.gz files.

- a** Create granados200.tar:

```
gunzip granados200.tar.gz
```

- b** Extract the tar archive:

```
tar -xf granados200.tar
```

The DLL file is located in the temporary directory's /bin directory.

- 4 Copy the DLL to <tomcat_install_directory>/webapps/<qadhome>. This path is the default location.
- 5 Open qaduiConfig.xml in <tomcat_install_directory>/webapps/<qadhome>/client/configs where qaduiConfig is your QAD UI configuration name.

Note The client session file defines the client session characteristics of the QAD .NET UI. By default, the file is located in:

```
<tomcat_install_directory>/webapps/<qadhome>/configurations/default/client-session.xml
```

In the following step, the elements you must edit in client-session.xml include <ssh_provider_url> and <terminal_protocol>.

- 6 Make the following changes:

- a** Update the DLL file location:

```
<add key="SshProviderUrl" value="{HomeServer}/ Routrek.granados.dll" />
```

{HomeServer} is automatically replaced with the HomeServer configuration value defined at installation time. All \${<variable>} references are resolved against other configuration keys. If a key is not found, the string is not replaced.

- b** Change the terminal protocol entry from telnet to SSH1 or SSH2 (SSH2 is preferred because it is more secure):

```
<add key="TerminalProtocol" value="SSH2" />
```

- 7 Save the configuration file.
- 8 Repeat these steps for default.xml in the same directory.
- 9 In User Option Telnet Maintenance (36.4.14), change the port from 23 to 22. This value is the default port for SSH.

Check Connection Manager

Verify the Connection has Idle Connections

<http://host:port/qadui>

User ID:

Password:

Login

The screenshot shows the QAD Connection Manager interface. The left sidebar contains a 'Functions' menu with options like 'Close Connection Manager', 'Restart Connection Manager', 'Reset failed init count', 'Delete HTML cache', 'Message of the day', and 'Update configuration settings'. Below this is a 'Connections' section with 'All', 'Busy', 'Idle', and 'Initializing' filters. The main area displays 'Connection Manager - Default/Desktop' with a timestamp 'Mon Sep 27 16:32:56 PDT 2010' and a 'Name: All' filter. A table lists connections with columns: Status, ID, Process ID, User ID, Device, User IP, and Maximum Connection. All listed connections are 'Idle'.

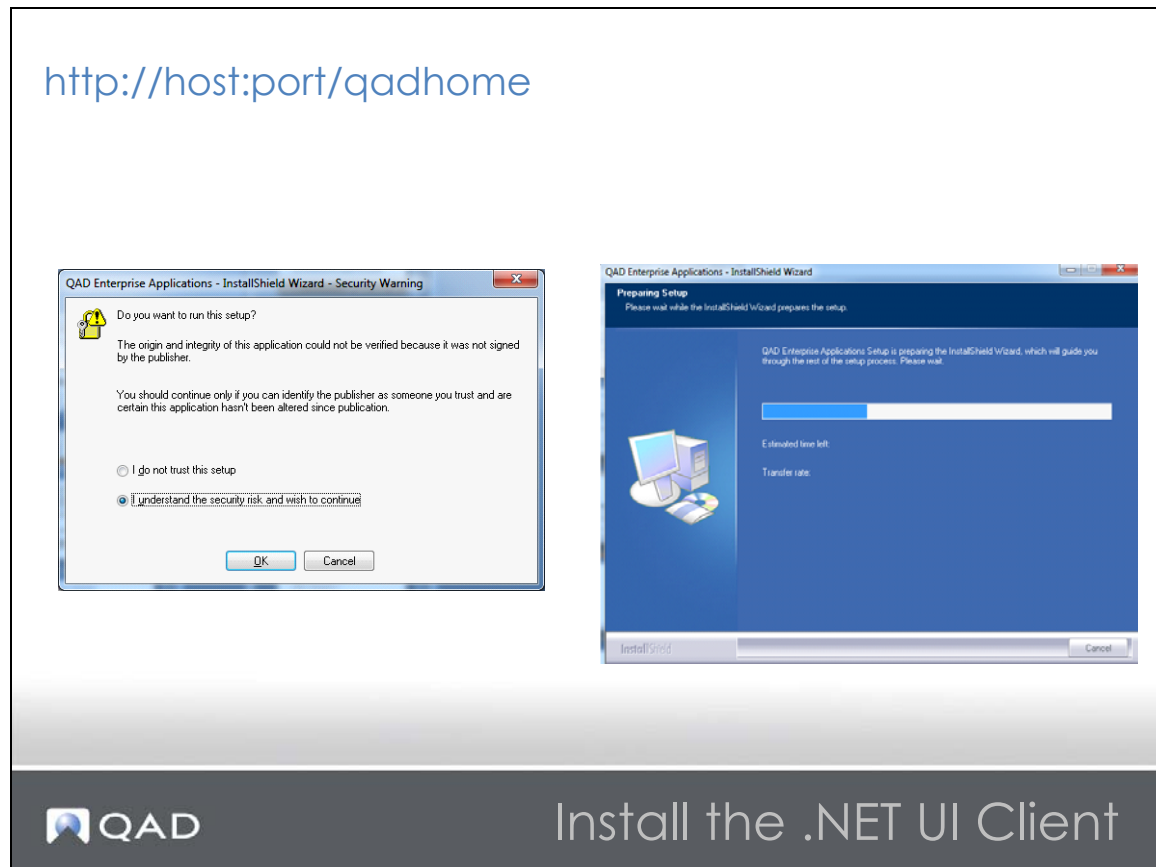
Status	ID	Process ID	User ID	Device	User IP	Maximum Connection
Idle	15	0	null		null	0
Idle	16	0	null		null	0
Idle	17	0	null		null	0
Idle	18	0	null		null	0
Idle	19	0	null		null	0
Total	5					



Check Connection Manager

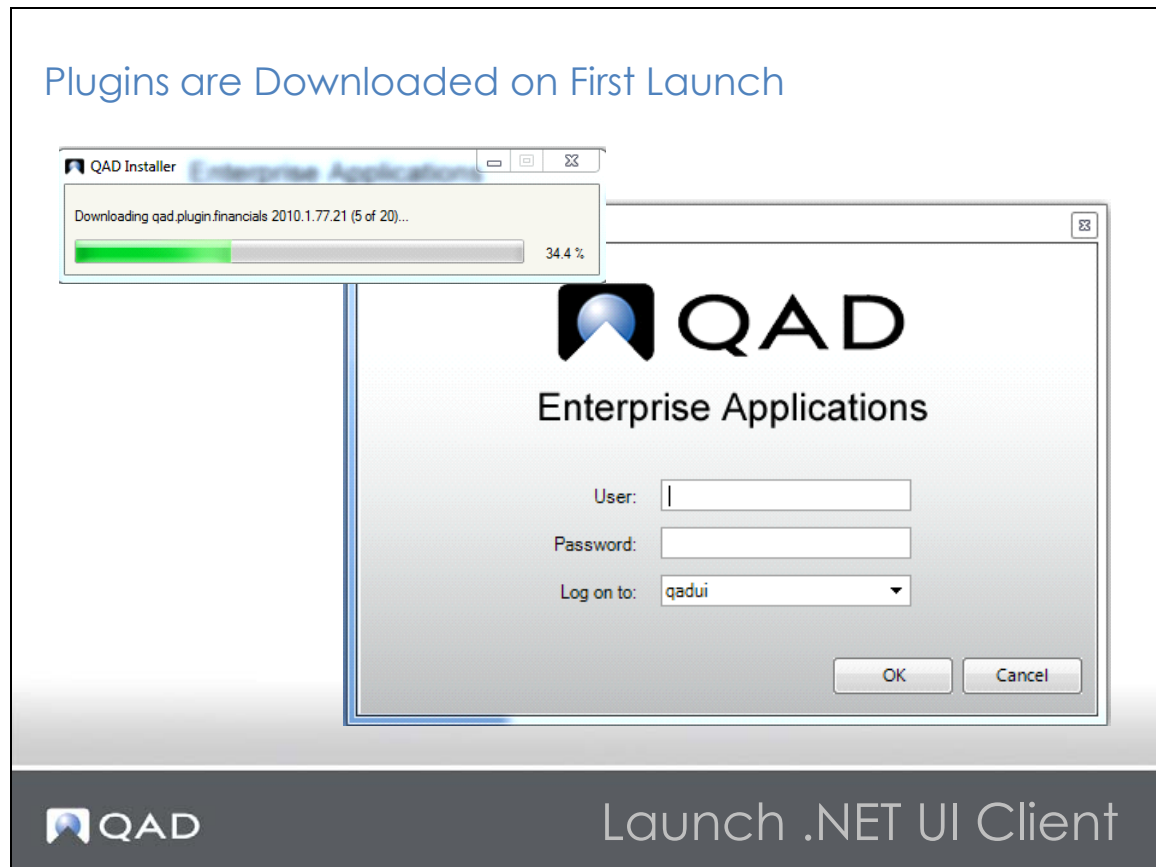
If there are no idle sessions, enter Update Configuration Settings and verify that the Startup Script settings are correct. The QDT initially sets these settings during the configuration phase. Once they are correct, restart the connection manager and check for green/idle sessions.

Install .NET UI Client

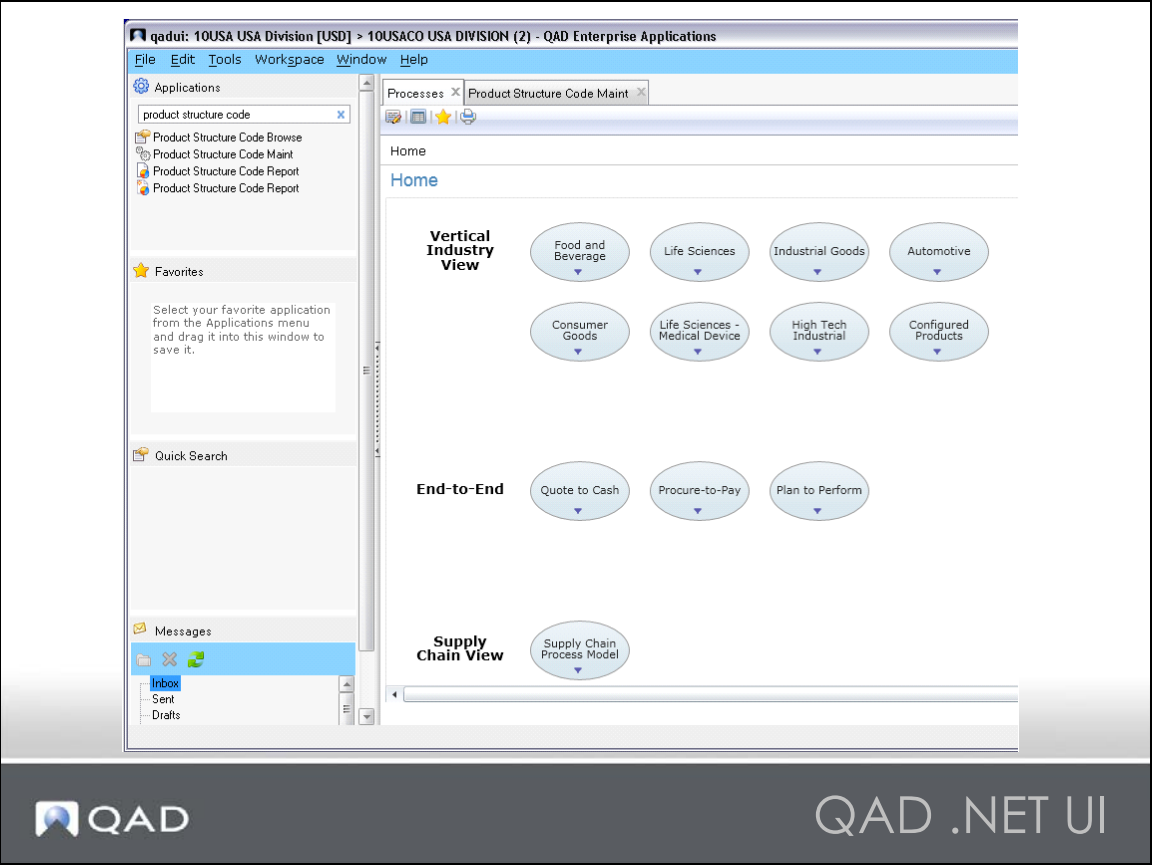


The installation can take quite a while across a Wide Area Network.

Launch .NET UI Client



.NET UI



.NET UI Client Compression Set Up

Optional: QAD UI Client Compression

- Starting with QAD .NET UI 2.8.2, the client can compress traffic to and from the QAD Server
 - This functionality is achieved by tunneling all traffic via HTTP, through the OpenEdge AIA Interface and Tomcat
 - Bytes sent to the client can be reduced up to a factor of 10.
- Procedure
 - Turn on AIA
 - Turn on Tomcat Compression
 - Tell the client to use AIA



Setting Up Compression

.NET UI Client Compression Set Up 2

Optional: QAD UI Client Compression

- Check tomcat/conf/server.xml

In the '<Connector port=[tomcat port]' section ->

```
compression="on"
```

```
compressableMimeType="text/html,text/xml,application/xml,application/octet-stream"
```

- Copy AIA

```
cp -r $DLC/servlets/aia $CATALINA_HOME/webapps
```

- Edit \$DLC/properties/ubroker.properties

[AIA] section must have httpsEnabled=0 & allowAIACmds=1

- Restart Tomcat

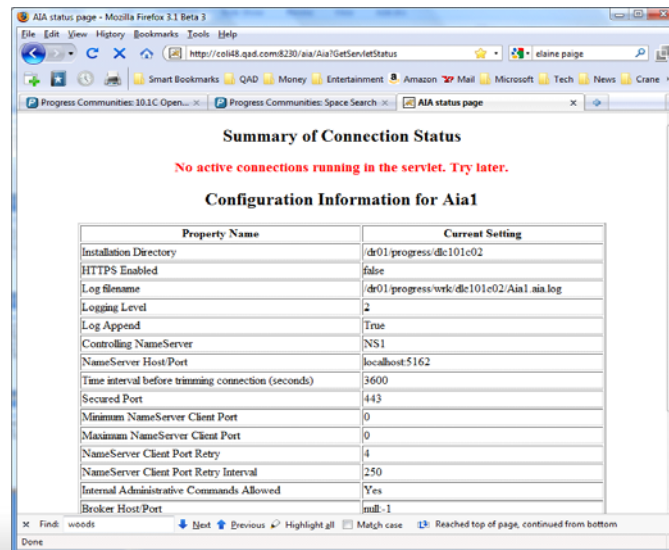


Setting Up Compression

.NET UI Client Compression Set Up 3

Verify AIA Configuration –

<http://server:port/aia/Aia?GetServletStatus>



Setting Up Compression

.NET UI Client Compression Set Up 4

Update client-session.xml to Use AIA

- Backup \$CATALINA_HOME/webapps/qadhome/configurations/qadui
 - Edit qadui/client-session.xml
- Replace AppServer with http in:
- ConnectionProtocol , ConnectionSecureProtocol , qad.appserver
- Replace NameServer port defined for the AppServer with Tomcat port
- That is, 5162 becomes 8080 in:
- ConnectionPort , ConnectionSecurePort , qad.appserver
- Add AIA pathing to front of Appserver Service Name
- That is, aia/Aia?AppService=[qadfinappserver] in :
- connectionService, connectionSecureService, qad.appserver

Test it!



Setting Up Compression

.NET UI Client Compression Set Up 5

Example extracts from client-session.xml

```
<ConnectionProtocol>http</ConnectionProtocol>  
<ConnectionPort>8080</ConnectionPort>  
<ConnectionSecureProtocol>http</ConnectionSecureProtocol>  
<ConnectionSecurePort>8080</ConnectionSecurePort>  
<!-- Financials AppServer URL -->  
<qad.appserver  
  url="http://p11i26.qad.com:8080/qadhome/Aia?AppService=qadfinpi">  
</qad.appserver>
```



Setting Up Compression

QXtend Configuration

Optional: Install QXtend using default values

- Once QAD EE is installed, QDT provides the option to install QXtend interoperability using default values
- This QXtend configuration will be “ready to use”
- Ensure Tomcat, the Progress AdminServer and the Progress NameServer are running before beginning this step
- Launch the QDT
 - Select the newly installed EE environment
 - Select QAD QXtend Application



QXtend Configuration

Ensure the codepage in `$CATALINA_HOME/conf/tomcat-users.xml` is utf-8 (Linux/UNIX/Windows) or windows-1252 (Windows).

QXtend Configuration 2

Set the Core QXtend Configuration Properties

QDTAdmin

File Database Help

Product

- QAD EE pilot Environment
 - pilot: QAD EE
 - pilot: QAD EE Database
 - pilot: QAD EE Application
 - pilot: QAD EE User Interfac
 - pilot: QAD QXtend Applicati

Action

- > QXtend Configuration
- QXtend Build

QXtend Configuration Container: QAD QXtend Application

QXtend Directory: <Browse>

QXtend Interface:

Tomcat Admin User ID:

Tomcat Admin Password:

QXevents DB Service Port:

QXevents DB Service Name:

QXOutbound DB Service Port:

QXOutbound DB Service Name:

< Back > Next > < Done > Cancel >

Enter data or press F4 to end.

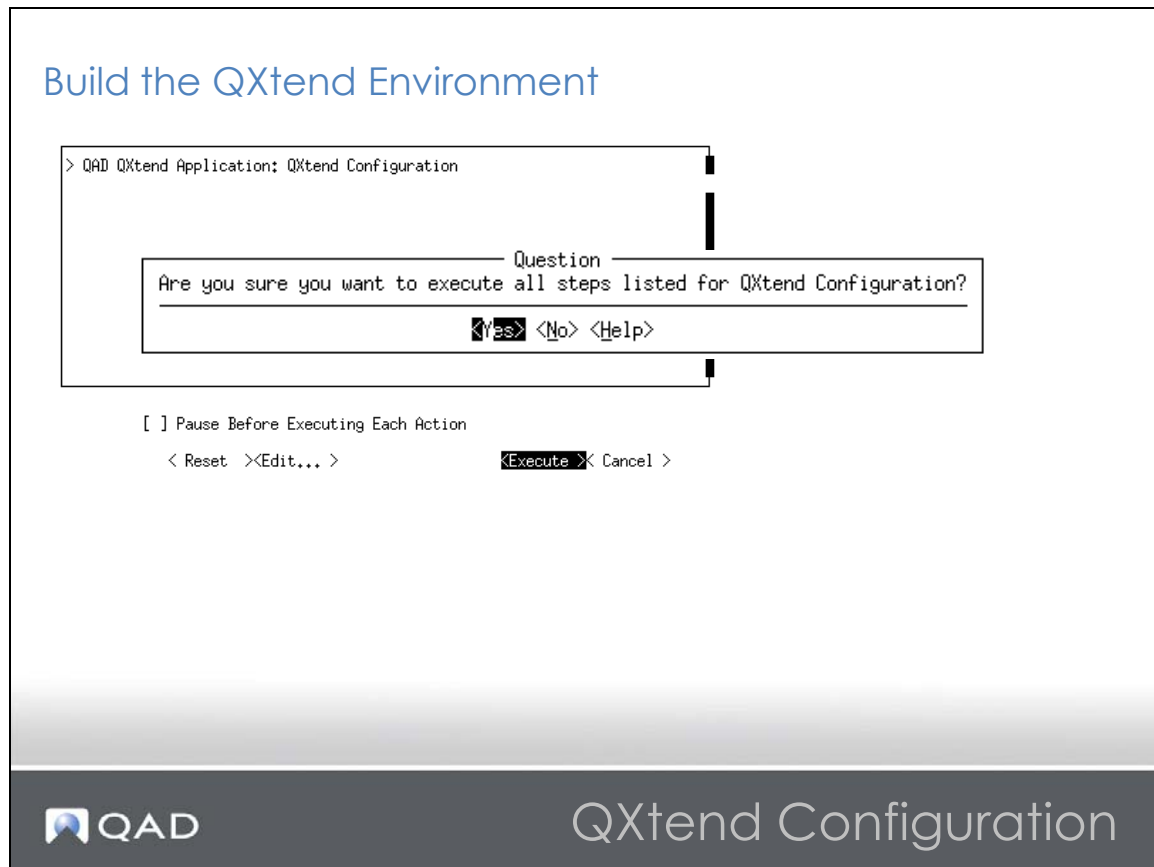


QXtend Configuration

The Tomcat user ID and password are in `$CATALINA_HOME/conf/tomcat-users.xml`.

Ensure the codepage in `$CATALINA_HOME/conf/tomcat-users.xml` is utf-8 (Linux/UNIX/Windows) or windows-1252 (Windows).

QXtend Configuration 3



Select Execute.

The QXtend installation is integrated within QDT and usually occurs successfully. However, user errors such as providing incorrect installation parameters or changing the environment (for example, shutting down Tomcat during the installation) can result in an unsuccessful QXtend installation.

Two files are key to resolving an unsuccessful QXtend installation:

- `<qxtend_install_directory>/repository.xml` controls the QXtend installation. It holds all of the installation configuration parameters propagated from QDT. It also holds the Progress information about which components were installed.
- `<qdt_install_directory>/envs/<environment>/scripts/antCmd.log` records all of the QXtend status installation output information.

If you first look at `<qxtend_install_directory>/repository.xml`, you can identify which components are marked as “Incomplete” and which subsequent routines have a status of “error.” Once you identify the routine, you can look for it in the log file.

There are three ways to correct an unsuccessful installation. The first is to reattempt the QXtend installation from QDT.

Another option is to totally remove QXtend and use QDT to install QXtend again. This task is done as follows:

- 1 Move `$TOMCAT/webapps/qxo.war` to
`<qdt_install_directory>\build\QXRepository\Outbound\qxo-ui.war`.
- 2 Move `$TOMCAT/webapps/qxi.war` to
`<qdt_install_directory>\build\QXRepository\Inbound\qxtendserver.war`.
- 3 Remove the qxi and qxo Web applications. This action includes the qxi and qxo directories under the Tomcat webapp directory and `qxi.war` and `qxo.war`.
- 4 Remove the QXtend destination directory (the qxodb and qxoserver directory).
- 5 Remove the QXtend adapter from the qxtend directory under QAD_HOME.
- 6 Remove the qxevents database from the QAD_HOME db directory.
- 7 Remove the `<qdt_install_directory>\envs\<environment_name>\scripts\antCmd.log` file.

QDT checks the log file for errors.

Note If you encounter an error on the initial run, successive runs add lines to the bottom of the log. This behavior causes previous errors to remain in the log file where they can incorrectly be interpreted as real errors when you rerun the process.

- 8 Back up the `ubroker.properties` file and remove references to qxo and qxi from the file.
- 9 Attempt to reinstall QXtend using QDT's QXtend Configuration option.

The final option is to install QXtend using the stand-alone QXtend installer (not QDT) to resume the QXtend installation at the point where it failed. This approach provides greater insight into the installation process, but without the benefits that QDT offers.

The QXtend installer is available from the QAD download center. See *Installation Guide: QAD QXtend* for information about how to point to your configuration as a local file (`<qxtend_install_directory>/repository.xml`).

Note You can change the parameters or configuration that QDT defines, but only using the QXtend installer's GUI mode. See *Installation Guide: QAD QXtend* for more information.

Summary

QAD Enterprise Edition

- At this point, you should have a working QAD Enterprise Edition deployment.
- The future sections of this course will introduce some more advanced topics
 - How to ensure good performance and stability
Tuning and Monitoring
 - Maintaining Reliability and Availability
Maintenance, Backups, Redundancy
 - Daemons, Reporting, Business Intelligence and other configuration options



Summary

End of Lesson

Next: Validating, Configuring and Extending QAD Enterprise Edition



End of Lesson

Exercise: Install QAD Enterprise Edition

Exercise 1: Install QAD Enterprise Edition



Validate, Configure, and Extend QAD Enterprise Edition

Introduction and Agenda

Introduction and Agenda



Introduction

QAD Enterprise Edition Validate, Configure, and Extend

After this section of the class, you should be able to:

- Validate and troubleshoot a QAD Enterprise Edition installation
- Configure infrastructure components such as the Connection Manager and OpenEdge AppServers
- Understand and configure the Reporting Service and daemons



Introduction

Topics Covered

What is in this lesson?

- Validating a QAD Enterprise Edition Install
- Explanation of default QDT/EE deployment infrastructure
 - Locations, Scripts, Connection Manager, Progress Admin Server, XML configuration files
- Troubleshooting and Error Reporting
- QAD Reporting Service
- QAD EE Daemons
- Advanced Configuration
 - Tips and Tricks



Agenda

Validate, Configure, and Extend QAD Enterprise Edition

QAD Enterprise Edition

Validate, Configure, Extend



QAD Enterprise Edition

QAD Enterprise Edition Validation



The image shows a login window for QAD Enterprise Applications. At the top is the QAD logo, which consists of a blue sphere with a white arrow pointing upwards, followed by the letters "QAD" in a bold, black, sans-serif font. Below the logo, the text "Enterprise Applications" is displayed in a large, black, sans-serif font. Underneath this, there are three input fields: a "User:" field, a "Password:" field, and a "Log on to:" dropdown menu. The dropdown menu currently shows "qadui" with a small downward arrow to its right. At the bottom of the window, there is a dark gray bar. On the left side of this bar is the QAD logo and the text "QAD". On the right side of the bar, the text "Validating QAD Enterprise Edition" is displayed in a white, sans-serif font.

QAD
Enterprise Applications

User:

Password:

Log on to:

QAD Validating QAD Enterprise Edition

Connectivity Check

Quick Connectivity Check

Can you log in via character UI?

[QDT]/envs/[envname]/scripts/client.[envname]

System Domain : qaddb		
Main Menu		
09/28/10		
1. Items/Sites	13. Product Structures	25. General Ledger
2. Addresses	14. Routings/Work Center	26. Multiple Currency
3. Inventory Control	15. Formula/Process	27. Accounts Receivable
4. Warehousing	16. Work Orders	28. Accounts Payable
5. Purchasing	17. Lean Manufacturing	29. Tax Management
6.	18. Repetitive	30. Cost Management
7. Sales Orders/Invoice	19. Quality Management	31. Banking/Cash Mgmt
8. Configured Products	20. Product Line Plan	32. Fixed Assets
9.	21. Resource Plan	33. Enterprise Ops Plan
10.	22. Forecast/Master Plan	34.
11. Service/Support	23. Materials Rqmts Plan	35. EDI eCommerce
12. Distribution Plan	24. Capacity Rqmts Plan	36. System Admin

Please select a function. F4 or blank to EXIT

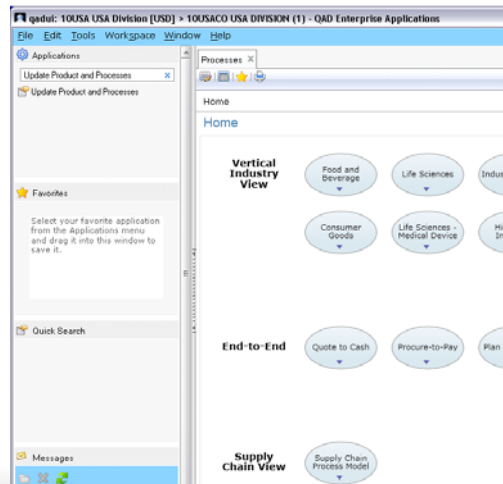


Validating QAD Enterprise Edition

Connectivity Check 2

Quick Connectivity Check

Can you log in via the QAD .NET UI?



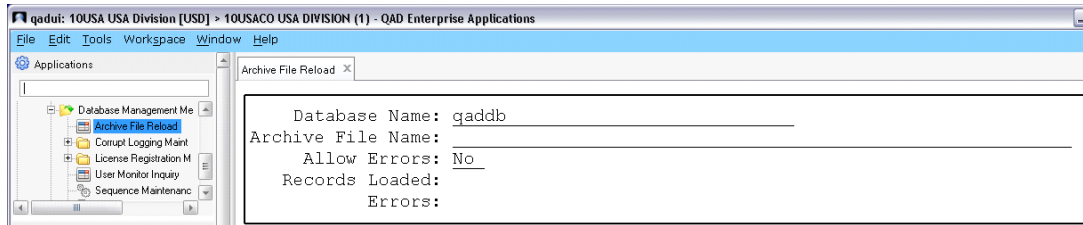
Validating QAD Enterprise Edition

Connectivity Check 3

Quick Connectivity Check

Can you launch embedded Telnet?

Example “Archive File Reload” or “License Registration”



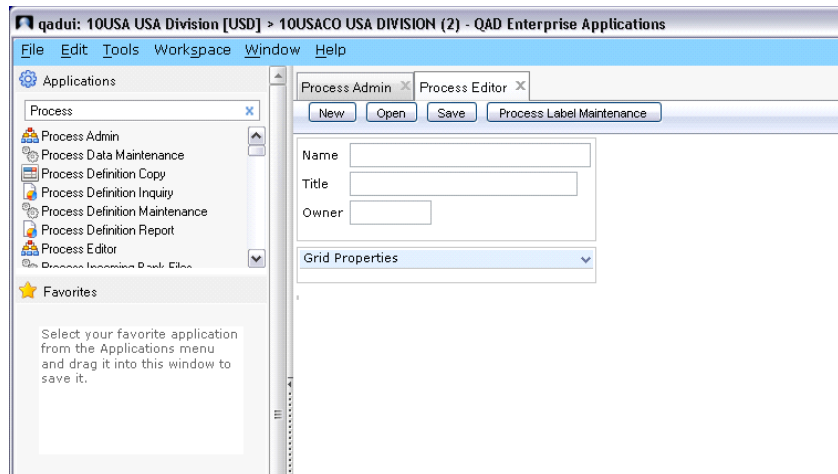
Validating QAD Enterprise Edition

Archive File Reload is a good test, as is License Registration.

Connectivity Check 4

Quick Connectivity Check

Do the Process Maps and Process Editor Work?

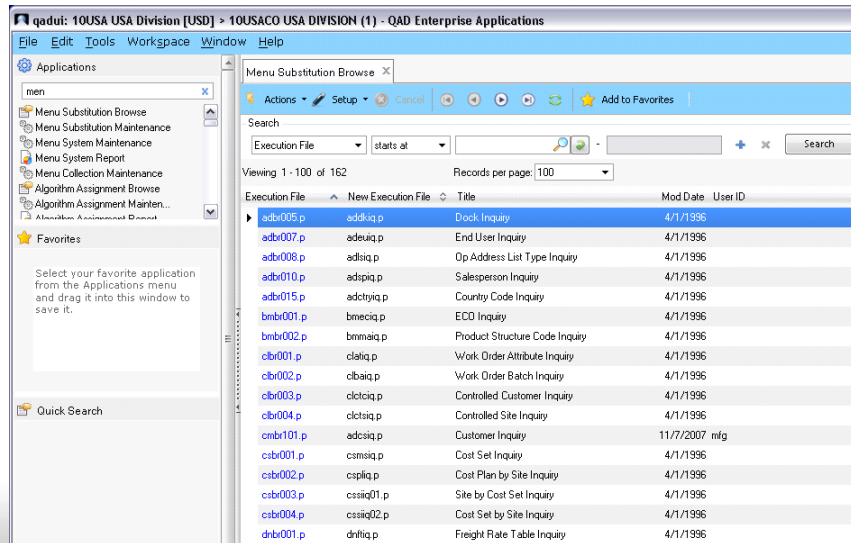


Validating QAD Enterprise Edition

Connectivity Check 5

Quick Connectivity Check

Do Browsers Work?



Execution File	Title	Mod Date
adbr005.p	Dock Inquiry	4/1/1996
adbr007.p	End User Inquiry	4/1/1996
adbr008.p	Op Address List Type Inquiry	4/1/1996
adbr010.p	Salesperson Inquiry	4/1/1996
adbr015.p	Country Code Inquiry	4/1/1996
bmb001.p	ECD Inquiry	4/1/1996
bmb002.p	Product Structure Code Inquiry	4/1/1996
clbr001.p	Work Order Attribute Inquiry	4/1/1996
clbr002.p	Work Order Batch Inquiry	4/1/1996
clbr003.p	Controlled Customer Inquiry	4/1/1996
clbr004.p	Controlled Site Inquiry	4/1/1996
cmb0101.p	Customer Inquiry	11/7/2007 mfg
cstr001.p	Cost Set Inquiry	4/1/1996
cstr002.p	Cost Plan by Site Inquiry	4/1/1996
cstr003.p	Site by Cost Set Inquiry	4/1/1996
cstr004.p	Cost Set by Site Inquiry	4/1/1996
drbr001.p	Freight Rate Table Inquiry	4/1/1996



Validating QAD Enterprise Edition

Most browsers are empty on a new system. Menu Substitution Browse is a good test.

Functionality Check

Functionality Check

- Check login, menu security, domain access, and so on for each installed user
- Add new user and ensure new security is correct user--domains, menus, etc
- Test User Monitor Inquiry for login/licensing information (lvmon.p)
- Ensure browses are displayed in correct language via both character and .NET UI clients
- Ensure menu displays in proper languages
- Ensure field help displays in proper languages
- Test print via character and .NET UI client for each language



Validating QAD Enterprise Edition

Tests the Financials AppServer. Supplier Invoice Create is a good example.

Connection Manager and Idle Sessions

Quick Connectivity Check

Connection Manager? Idle Sessions?

Status	ID	Process ID	User ID	Device	User IP	Maximum Connections	Program	User Connect
Idle	119	0	null		null	0	null	
Idle	114	0	null		null	0	null	
Idle	115	0	null		null	0	null	
Idle	120	0	null		null	0	null	
Idle	116	0	null		null	0	null	
Idle	117	0	null		null	0	null	
Idle	118	0	null		null	0	null	
Total	7							



Validating Enterprise Edition

Verify that all sessions are idle or busy, and not initializing. You should also be able to log in:

`http://server:port/[webapp]`

For example, `http://p11i26:8080/qadui`.

Validate Scripts

Check the Start / Stop / Connect Scripts

- Scripts are located by default, in
\$QDT/envs/[envname]/scripts
- Check the following scripts (replace “pilot” with your environment name)

```
checkqadfinpilot.ksh    checkqadui_ASpilot.ksh    checkqxosi_ASpilot.ksh
checkqadsi_ASpilot.ksh  checkqadui_WSpilot.ksh    checkqxoui_ASpilot.ksh

client.pilot           telnet.pilot              conmmgr.pilot

startenv.pilot          startqadsi_ASpilot.ksh    startqxosi_ASpilot.ksh
start.pilot             startqadui_ASpilot.ksh    startqxoui_ASpilot.ksh
startqadfinpilot.ksh    startqadui_WSpilot.ksh    startqxtendpilot

stopenv.pilot           stopqadsi_ASpilot.ksh     stopqxosi_ASpilot.ksh
stop.pilot              stopqadui_ASpilot.ksh     stopqxoui_ASpilot.ksh
stopqadfinpilot.ksh     stopqadui_WSpilot.ksh     stopqxtendpilot
```



Validate Scripts

For further information about performance tuning, see the Performance section of this course.

On-64 bit systems, libperl.so can be incorrectly linked. Incorrect linking causes a qadui WebApp authentication failure.

2010-09-27 00:01:41,466 ERROR com.qad.desktop.cgi.CGIServlet [Thread-36] runCGI (stderr):perl: error while loading shared libraries: libperl.so: cannot open shared object file: No such file or directory

You can solve this issue by linking libperl.so:

```
ln -s /lib64/perl5/5.8.8/x86_64-linux-thread-multi/CORE/libperl.so
/usr/lib64/libperl.so
```


Troubleshooting and Maintenance

Troubleshooting and Maintenance



Log File Locations

The first thing is to know where to look for the logs

- Log File Locations (Client)

`[BASE]QAD\Shell\2.9\QAD.Applications.log`

Where [BASE] is

Win 7 & Vista: `\users\[username]\AppData\[profile]`

XP: `\Documents and Settings\[username]\Application Data`

- Log File Locations (Server)

`QDT,Appserver,NameServer,AdminServer,Install: $QDT/logs`

`TOMCAT: $TOMCAT/logs/catalina.out`

`.NET UI authentication, error, desktop:`

`$TOMCAT/webapps/[instance]/WEB-INF/logs`

`Desktop Build: $MFG/erp/[instance]/mkdt.log`



Log File Locations

Control the Logging Level

... and how to control the logging level

\$TOMCAT/webapps/qadhome/configurations/[instance]/client-session.xml

```
<!--
    Specify whether UI messages should be logged. If it is activated,
    then they are logged to the system Event Log and can be seen in the Event
    Viewer.
    Possible values:
    "on": Messages are logged
    "off": Logging is disabled
-->
<LogEnabling>off</LogEnabling>
<!--
    Specify detail level of messages logged by the UI.
    Possible values:
    "exception": Logs only unhandled exceptions
    "error":     Logs also expected errors
    "warning":   Logs also warning messages
    "message":   Logs all messages produced by the UI
-->
<LogLevel>0</LogLevel>

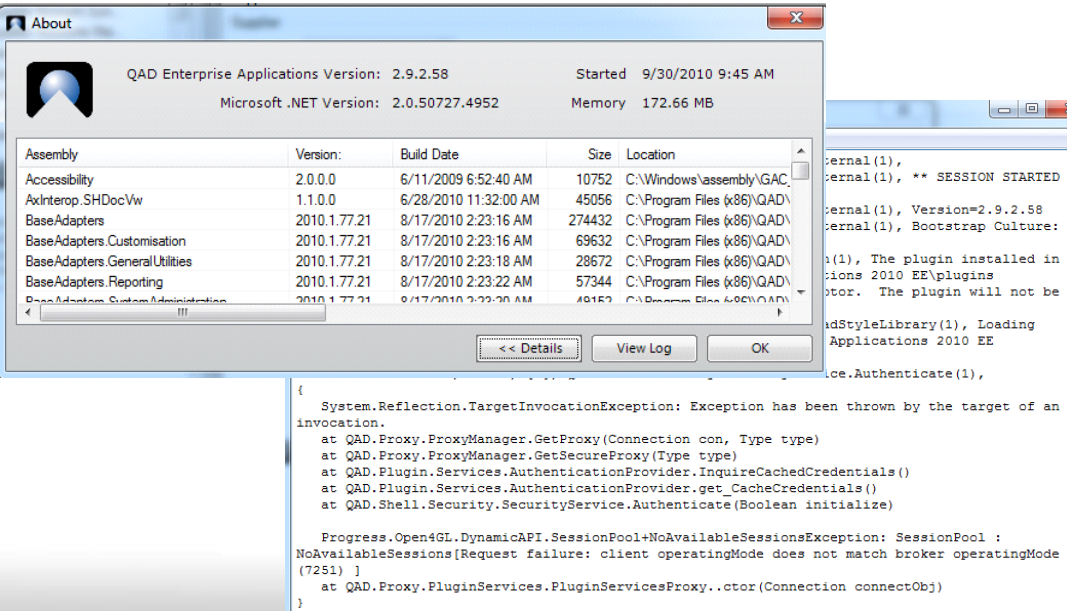
<!--
    Specify whether both business and UI debug messages are collected. They
    can be displayed in window accessible in 'Logging' menu option.
    It is recommended to disable debug messages on production systems as
    it causes performance slowdown.
    Possible values:
    "on": Debug messages are logged
    "off": Debug messages are not logged
-->
<UIDebugEnabling>off</UIDebugEnabling>
```



Log File Locations

Enhanced Client Logging

Logging through the QAD UI : Help→About→ View Log



The screenshot shows the 'About' dialog box for QAD Enterprise Applications Version 2.9.2.58. It includes fields for Version, Microsoft .NET Version, Started time, and Memory. Below this is a table listing assemblies with their versions, build dates, sizes, and locations. To the right, a log window displays error details, including a stack trace for a `System.Reflection.TargetInvocationException`.

Assembly	Version	Build Date	Size	Location
Accessibility	2.0.0.0	6/11/2009 6:52:40 AM	10752	C:\Windows\assembly\GAC\
AxInterop.SHDocVw	1.1.0.0	6/28/2010 11:32:00 AM	45056	C:\Program Files (x86)\QAD\
BaseAdapters	2010.1.77.21	8/17/2010 2:23:16 AM	274432	C:\Program Files (x86)\QAD\
BaseAdapters Customisation	2010.1.77.21	8/17/2010 2:23:16 AM	69632	C:\Program Files (x86)\QAD\
BaseAdapters.GeneralUtilities	2010.1.77.21	8/17/2010 2:23:18 AM	28672	C:\Program Files (x86)\QAD\
BaseAdapters.Reporting	2010.1.77.21	8/17/2010 2:23:22 AM	57344	C:\Program Files (x86)\QAD\
BaseAdapters.SystemAdministration	2010.1.77.21	8/17/2010 2:23:20 AM	40160	C:\Program Files (x86)\QAD\

```

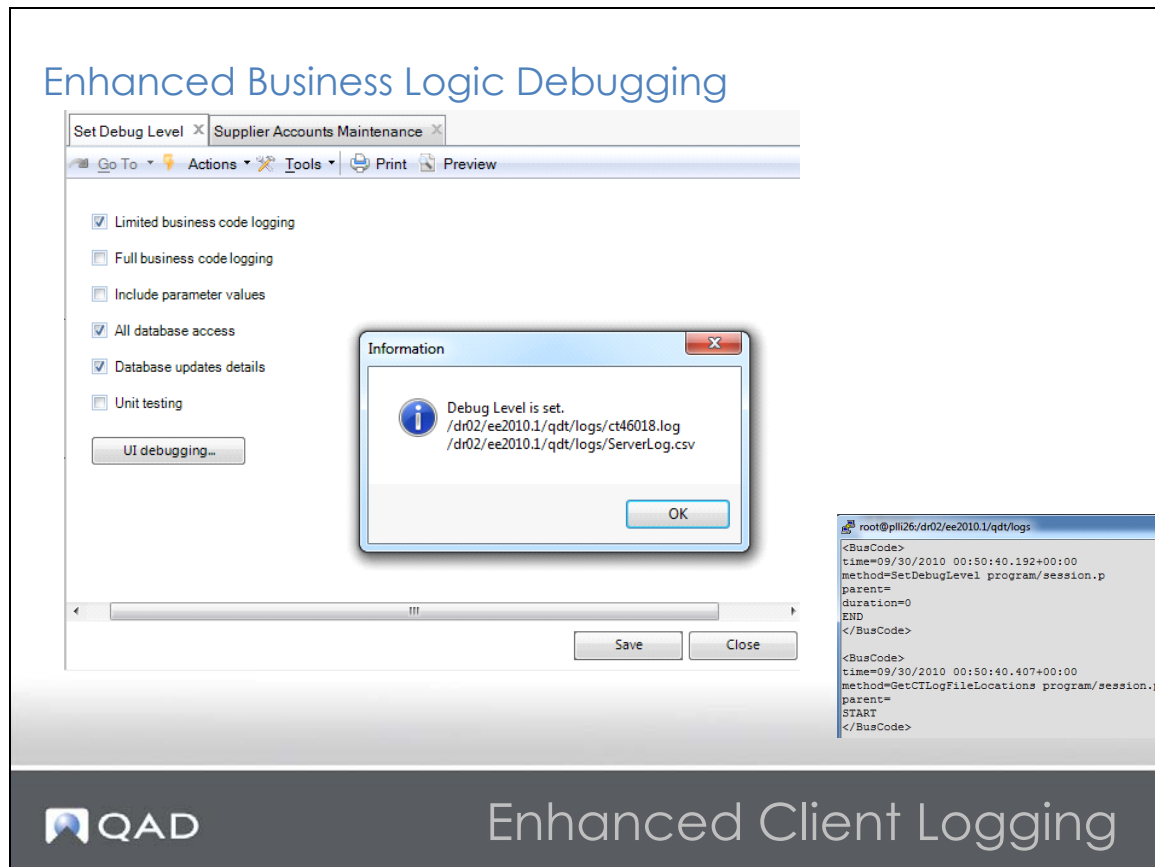
{
  System.Reflection.TargetInvocationException: Exception has been thrown by the target of an
  invocation.
    at QAD.Proxy.ProxyManager.GetProxy(Connection con, Type type)
    at QAD.Proxy.ProxyManager.GetSecureProxy(Type type)
    at QAD.Plugin.Services.AuthenticationProvider.InquireCachedCredentials()
    at QAD.Plugin.Services.AuthenticationProvider.get_CacheCredentials()
    at QAD.Shell.Security.SecurityService.Authenticate(Boolean initialize)

  Progress.Open4GL.DynamicAPI.SessionPool.NoAvailableSessionsException: SessionPool :
  NoAvailableSessions[Request failure: client operatingMode does not match broker operatingMode
  (7251) ]
    at QAD.Proxy.PluginServices.PluginServicesProxy..ctor(Connection connectObj)
}
  
```



Enhanced Client Logging

Enhanced Client Logging 2



This functionality is based on the QRA Logger project.

Logging is based on a publish-subscribe mechanism. Publish statements are generated in the code for all methods.

The ComponentPool component subscribes to certain log events based on the specified logging level.

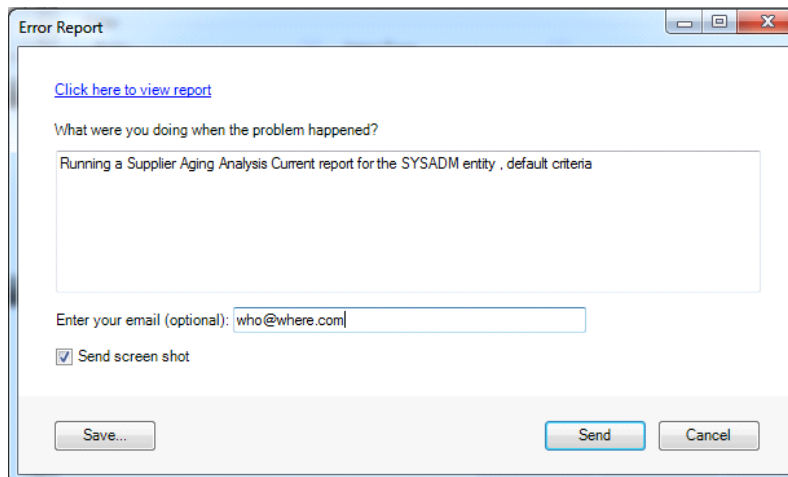
The TLogger component is responsible for writing out the logs.

Logging is written to different files, according to the type of logging, but always at the same location.

Enhanced Client Logging 3

User Generated Error Reports and Diagnostics

CTRL-SHIFT-E



The screenshot shows a Windows-style dialog box titled "Error Report". At the top left, there is a blue hyperlink: [Click here to view report](#). Below this is the question "What were you doing when the problem happened?". A text area contains the text: "Running a Supplier Aging Analysis Current report for the SYSADM entity . default criteria". Below the text area is a label "Enter your email (optional):" followed by a text input field containing "who@where.com". Below the email field is a checkbox labeled "Send screen shot" which is checked. At the bottom of the dialog are three buttons: "Save...", "Send", and "Cancel".



Enhanced Client Logging

Enhanced Client Logging 4

User Generated Error Reports and Diagnostics

[Click here to view report](#) 

Error Report

Sections

- General Information
- Shell
- Plugins
- System
- Exceptions
- Logs
- Workspaces
- Forms
- Registry
- Assemblies
- Configuration

General Information

description Running a Supplier Aging Analysis Current report for the SYSADM entity , default criteria

date Thursday, 30 September 2010 10:55:40

email who@where.com

Shell

version 2.9.2.58

configuration qadui

homeserver http://plli26:8080/qadhome

activeWorkspaceName QAD System Domain [USD] > 999 - SYSADM SYSTEM

activeWorkspaceKey QAD.999 - SYSADM

activeUser mfg

activeForm Supplier Aging Analysis Current

activeFormPlugin qad.plugin.financials

culture en-US

cultureName English (United States)

System

QAD	qad.plugin.reportserver	1.0.0	True	QAD.Plugin.Reports.ReportServer, Version
QAD	qad.plugin.services	1.1.0	True	QAD.Plugin.Services, Version=2.9.2.57, C

computerName DBB-ADL-LT

networkEnabled True

user dbb

connectionLimit 10

dnsRefreshTimeout 300000

osVersion Microsoft Windows NT 6.1.7600.0

processorCount 2

commandLine "C:\Program Files (x86)\QAD\QAD Enterprise Applications 2010 EE\container\QAD.Client

currentDirectory C:\Program Files (x86)\QAD\QAD Enterprise Applications 2010 EE

workingSetMemory 181563392

dotNetVersion 2.0.50727.4952

startupPath C:\Program Files (x86)\QAD\QAD Enterprise Applications 2010 EE\container

execPath C:\Program Files (x86)\QAD\QAD Enterprise Applications 2010 EE\container\QAD.Client

currentCulture English (United States)

Exceptions

Logs

level	message
Warn	2010-09-30 09:45:33, WARN, [0], QAD.Shell.Configuration.CustomSection_get_Value(1), The configur

Workspaces

key	name	enabled	active	forms
QAD.999 - SYSADM	QAD System Domain [USD] > 999 - SYSADM SYSTEM	True	True	3

Forms



Enhanced Client Logging

The Report is generated to your default browser. It shows information on AppShell, plug-ins, client OS, log levels, workspaces, open forms, registries, assemblies, and configuration.

Enhanced Client Logging 5

Controlling User Generated Error Reports

\$TOMCAT/webapps/qadhome/configurations/[instance]/client-session.xml

Name	Default value	Description
ErrorReport.Enabled	False	Enables/disables error reporting.
ErrorReport.MaxLogs	25	Maximum number of session logs to save for error reporting
ErrorReport.From	anonymous@qad.com	The default sender email address if the user does not supply one.
ErrorReport.To	None	Comma delimited list of email addresses.
Exceptions.Unhandled.Suppress	True	Enables suppression of unhandled exception notification. Suppressed exceptions are still logged.
Smtp.Host	None	SMTP server name.
Smtp.Port	25	SMTP port number.



Enhanced Client Logging

Important File Locations

Client Side Configuration Settings

- Logging level, plugins, proxies, other settings

[INSTALL]\container\QAD.Client.exe.config

- QAD server URL (host:port/qadhome)

[INSTALL]\container\homeserver.config

```
<?xml version="1.0" encoding="utf-8"?>
<appSettings>
  <!-- An HTTP URI to a server that provides backen the
  application. -->
  <add key="HomeServer" value="http://p11126:8080/qad
  <!-- An HTTP URI to a configuration server or a f... ..cing an XML
  configuration document. -->
  <add key="config.uri" value="${homeserver}/servlet/env" />
</appSettings>
```




Important File Locations

Where [INSTALL] is the chosen install directory.

For example:

```
C:\program files(x86)\QAD\QAD Enterprise Applications <version>EE
\container\homeserver.config
```

Important File Locations 2

Server Side Configuration Files

- Client Session Control

`$TOMCAT/webapps/qadhome/configurations/
[instance]/client-session.xml`

- QAD UI Configuration

`$MFG/[instance]/qaduiconfigs/[instance].xml`

For example

`/dr02/ee2012.1/erp/qadui/qaduiconfigs/
qadui.xml`

- Enhanced Log File Control (log4j)

`$TOMCAT/webapps/[instance]/WEB-INF/conf/
logging.xml`



Important File Locations

Where \$MFG is the QAD ERP install directory.

Important File Locations 3

Server Side Configuration Files

- QAD UI WebApp / Additional Tomcat Configuration

`$TOMCAT/webapps/[instance]/WEB-INF/conf/
config.xml`

- Process Maps

`$TOMCAT/webapps/[instance]/WEB-INF/conf/
process-config.xml`

- Connection Manager

`$TOMCAT/webapps/[instance]/WEB-INF/conf/
config.xml`



Important File Locations

Important File Locations 3

Server Side Configuration Files - Financials

- Principal Financials Control File
\$QDT/envs/[instance]/configs/server.xml
database connections, AppServer connections,
NameServer connections, caching, state management
- Business Layer Control File
\$QDT/envs/[instance]/configs/cbserver.xml
Financials AppServer Connection, when called from Core
ERP.



Important File Locations

Note `<statedirectory>` is blanked/nulled-out. Then state management occurs in the database via the `fcInstance` table instead of on disk. This arrangement could be an important performance consideration.

Troubleshooting

Can't Login to Character?

- Check screen error messages from Progress
Search Progress KB
<http://web.progress.com/en/support/index.html>
- Check database logs for error messages
Databases actually running?
- Might be failing to connect to Financials AppServer
 - Check
`$QDT/envs/[instance]/configs/cbserver.xml`
 - Check qadfin<env> appserver log
 - Trim appserver for financial appserver to 0 & try login again. If there are agents connectivity is working



Troubleshooting

.NET UI Login

Can't Login to QAD .NET UI?

- Check the various log files
- Verify the AppServers are running
- If it is used, verify the NameServer is running
- Are there proxy or firewalls rules that could be interfering?
- Check the homeserver.config file
- If using Tomcat compression, check that the AIA Servlet is running

`http://server:port/aia/Aia?GetServletStatus`



Troubleshooting

Connection Manager

Connection Manager not getting Idle Sessions / Cannot Launch QAD UI ERP Screens?

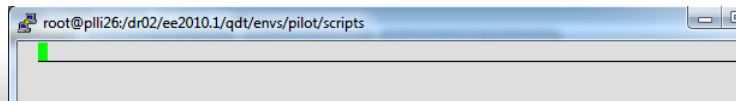
- Check the Startup Script in Configuration Parameters

Configuration Parameters

Host:	plli26.qad.com
Port:	23
Startup Script:	login:[mfg]Password:[mfg]#[cd /dr02/ee201
Server Startup Password:	*****
Minimum Connections:	5

- Run the connmgr.[instance] script in the QDT scripts directory for the instance. It should bring up a headless QAD session.

For example, `./connmgr.pilot`



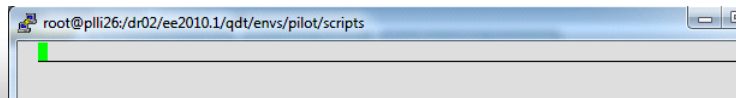
Troubleshooting

Embedded Telnet Screens

Can't Launch Embedded Telnet Screens?

- Check the parameters in User Option Telnet Maintenance
 - Incorrect login / password / script details?
 - Incorrectly configured min / max sessions?
- Incorrect SSH setup if using SSH?
- Run the telnet.[instance] script in the QDT scripts directory for the instance. It should bring up a headless QAD session.

For example, `./telnet.pilot`



Troubleshooting

New User / Sales Order

Can't Save a New User or Enter a Sales Order?

Might be failing to connect to Financials AppServer

- Check
`$QDT/envs/[instance]/configs/cb-server.xml`
- Check qadfin<env> appserver log
- Trim appserver for financial appserver to 0 and try login again. If there are agents, connectivity is working



Troubleshooting

Configuration Tips

Configuration Tips



Configuration Tips

Configuration Tips

Changing AppServer Agents

- AppServer Agents are defined in
\$DLC/properties/ubroker.properties
- To change the port range, logging level, or minimum / maximum / startup agents :
 - Edit this file directly (after making a backup)
 ./asbman -name [appserver] -stop
 ./asbman -name [appserver] -start
 - Use the OpenEdge Management or Explorer tools



Configuration Tips

Example definition:

```
[UBroker.AS.qadfinpilot]
  appserviceNameList=qadfinpilot
  brokerLogFile=/dr02/ee2010.1/qdt/logs/qadfinpilot.broker.log
  controllingNameServer=NS1
  description=Financials AppServer
  environment=
  initialSrvrInstance=2
  maxSrvrInstance=8
  minSrvrInstance=2
  operatingMode=Stateless
  portNumber=53810
  PROPATH=
/dr02/ee2010.1/qdt/envs/pilot/configs:/dr02/ee2010.1/erp/fin/qxtend:/
dr02/ee2010.1/erp/fin/patch:/dr02/ee2010.1/erp/gra:/dr02/ee2010.1/erp
/gra/gra.pl:/dr02/ee2010.1/erp/fin:/dr02/ee2010.1/erp/fin/qadfin.pl:/
dr02/ee2010.1/erp:/dr02/oe102b
  srvrActivateProc=program/activate.p
  srvrConnectProc=program/connect.p
  srvrDeactivateProc=program/deactivate.p
  srvrLogFile=/dr02/ee2010.1/qdt/logs/qadfinpilot.server.log
  srvrMaxPort=52020
  srvrMinPort=52011
  srvrShutdownProc=program/shutdown.p
  srvrStartupParam=-rereadnolock -s 512 -mmax 16000 -inp 32000 -tok
20000 -TB 31 -TM 32 -Bt 10000 -cpinternal utf-8 -cpstream utf-8 -cpcoll
```

```
basic
  srvrStartupProc=program/startup.p
  sslEnable=0
  uuid=23c88154b11c24d8:-63250668:12b569c785a:-7ffd
  workDir=/dr02/ee2010.1/erp/fin
```

Configuration Tips 2

Bypassing the NameServer for Financials

- For some customers, using the NameServer (UDP protocol) introduces a performance penalty
- You can bypass the NameServer by using Tomcat AIA Compression (covered in the installation section) or by using direct AppServer connections
- Use the AppServerDC method in the Financials server.xml and cbserver.xml

Remove the NameServer port number and specify the AppServer port number instead



Configuration Tips

Configuration Tips 3

Bypassing the NameServer for Financials

Example

\$QDT/envs/pilot/configs/server.xml

```
<appServiceURL>AppServer://p11i26.qad.com:5162/qadui_ASpilot</appServiceURL> becomes
```

```
<appServiceURL>AppServerDC://p11i26.qad.com:23500/qadui_ASpilot</appServiceURL>
```

```
<ENVAPPSERVERURL>AppServer://p11i26.qad.com:5162/qadfinpilot</ENVAPPSERVERURL> becomes
```

```
<ENVAPPSERVERURL>AppServerDC://p11i26.qad.com:23100/qadfinpilot</ENVAPPSERVERURL>
```



Configuration Tips

In this example, 23500 would be the qadui_Aspilot Appserver port and 23100 would be the qadfinpilot AppServer.

Configuration Tips 4

State Management

- Enterprise Financials manages context via a sophisticated state management mechanism
- By default, this is stored on disk, with the location specified in the Financials server.xml

```
<statedirectory>/dr02/qdt/envs/pilot/state</statedirectory>
```

```
[root@plli26 state]# ls
bbankaccountformat45768.lob  session45638.lob  session45955.lob
bbusinessrelation45761.lob  session45791.lob  session45961.lob
bcompany45769.lob          session45818.lob  session45966.lob
bcountry45746.lob          session45834.lob  session45972.lob
```

- However, on some systems, this places too much load on the specified file system, and performance can suffer.
- Blanking out the `<statedirectory></statedirectory>` entry forces state management into the database (fclInstance table) and state management becomes maintained by the OpenEdge database broker.



Configuration Tips

Configuration Tips 5

Changing QAD .NET UI menu security options

- Example: A customer wants to make the Process Editor accessible to users who are not in the qadadmin group, but continue to restrict other items under the Administration menu

- The menu item and security options are contained in

\$TOMCAT/webapps/qadhome/configurations/default/menus/plugin-menu.xml

- Default security constraints

```
<SecurityConstraint key="admin" constraint="allow">
  <Role>admin</Role>
  <Role>dtadmin</Role>
  <Role>qadadmin</Role>
  <Role>SuperUser</Role>
  <User>mfg</User>
</SecurityConstraint>
```

- See the slide notes for instructions



Configuration Tips

The Security constraint:

```
<SecurityConstraint key="admin" constraint="allow">
  <Role>admin</Role>
  <Role>dtadmin</Role>
  <Role>qadadmin</Role>
  <Role>SuperUser</Role>
  <User>mfg</User>
</SecurityConstraint>
```

Add an additional one call processadmin and link it to an MFG/PRO role:

```
<SecurityConstraint key="processadmin " constraint="allow">
  <Role>someroles</Role>
</SecurityConstraint>
```

This top-level menu folder is the current "Administration" folder:

```
<ShellMenu key="images" menuType="application" label=
"${Admin}" security="admin">
```

Add this one after the </ShellMenu> from the previous example:

```
<ShellMenu key="ProcessAdmin" menuType="application" label=
"ProcessAdmin" security="processadmin">
</ShellMenu>
```


Now add the desired Menu Item in the new folder. Copy the current ProcessAdmin reference into the code as follows:

```
<ShellMenu key="ProcessAdmin" menuType="application" label=
"ProcessAdmin" security="processadmin">
<ShellMenuItem key="menu.process.editor1" label="{ProcessEditor}"
image="ProcessMap">      <Command type=
"QAD.Commands.WebBrowserCommand">
<Parametervalue="{DesktopBaseUrl}/ProcessEditor.jsp?apisource=
AppShell" type="System.Uri, System"/>
<Property name="Title" value="{ProcessEditor}"/>
</Command></ShellMenu>
```

Note Label terms are specified using `{SOME_TERM}`. These label terms are translated if a label term is found in MFG/PRO at login. It is important that the "key= . . ." values be unique.

Controlling Browse Limits

Controlling Browse Limits

Browses can have a major impact on performance

- Especially using the browse as an Extract to Excel style tool
- Download limits are controlled in `client-session.xml`

```
<!-- Browse section -->
<!--
  The maximum number of records the browse server will be count during a query.
-->
<MaximumBrowseRecordsToCount>50000</MaximumBrowseRecordsToCount>
<!--
  The maximum number of records the browser server will send to the client.
-->
<MaximumBrowseRecordsToDownload>50000</MaximumBrowseRecordsToDownload>
<!--
  If this number of records is exceeded during a browse print operation
  a warning dialog box will be displayed.
-->
<BrowseRecordsForPrintWarning>10000</BrowseRecordsForPrintWarning>
<!--
  If this number of records is exceeded during a browse export to Excel operation
  a warning dialog box will be displayed.
-->
<BrowseRecordsForExcelWarning>10000</BrowseRecordsForExcelWarning>
```



Configuration Tips

Limiting User Connections

Limiting User Connections

You can limit concurrent user connections via User Option Telnet Maintenance

Telnet Connect
Maximum: 2 Min Telnet Connect: 0

Configuration Tips

The menu item and its security options are contained in the `plugin-menu.xml` file. The file contains three relevant sections.

The Security constraint:

```
<SecurityConstraint key="admin" constraint="allow">
  <Role>admin</Role>
  <Role>dtadmin</Role>
  <Role>qadadmin</Role>
  <Role>SuperUser</Role>
  <User>mfg</User>
</SecurityConstraint>
```

Add an additional one call `processadmin` and link it to an MFG/PRO role:

```
<SecurityConstraint key="processadmin " constraint="allow">
  <Role>someroles</Role>
</SecurityConstraint>
```

This top-level menu folder is the current "Administration" folder:

```
<ShellMenu key="images" menuType="application" label=
"${Admin}" security="admin">
```

Add this one after the `</ShellMenu>`:

```
<ShellMenu key="ProcessAdmin" menuType="application" label=
"ProcessAdmin" security="processadmin">
</ShellMenu>
```

Now add the desired Menu Item in the new folder. Copy the current ProcessAdmin reference into the code as follow:

```
<ShellMenu key="ProcessAdmin" menuType="application" label=
"ProcessAdmin" security="processadmin">
  <ShellMenuItem key="menu.process.editor1" label="${ProcessEditor}"
  image="ProcessMap">
    <Command type="QAD.Commands.WebBrowserCommand">
      <Parameter value="${DesktopBaseUrl}/ProcessEditor.jsp?apisource=
AppShell" type="System.Uri, System"/>
      <Property name="Title" value="${ProcessEditor}"/>
    </Command>
  </ShellMenuItem>
</ShellMenu>
```

Note Label terms are specified using `${SOME_TERM}`. These label terms are translated if a label term is found in MFG/PRO at login. It is important the "key=..." values be unique.

Visibility Tips

Session Monitoring

- Session Master Maintenance
 - No maintenance done in this screen
Can be used to delete defunct users
 - Specifies a system-generated session ID
- Connection Manager
 - Monitor which users are accessing system / programs
 - View status of connection pools
- Heartbeat Monitor
 - [http://\[host\]:\[port\]/\[webapp\]/heartbeat/status.jsp](http://[host]:[port]/[webapp]/heartbeat/status.jsp)
- User Count Log file
 - Logs user, program executed, and time of execution
 - `$TOMCAT/webapps/<instance>/WEB-INF/logs/usercount.log`



Visibility Tips

Visibility Tips 2

Session Master Maintenance

Session Master Maintenance x

Go To

Actions

Copy

Print

Preview

Session ID: 020020RyY1DA3L682Ep14w5LshH40WtwnNWpiumu0TN31pn0k0

User ID: mfg

User Name:

Session Master

Client IP Address: 167.3.22.11

Session Timeout: 0 Min

Active Web: 0

Number of Records: 0

Security Profile:

Idle Time: 1463.25 Min

Active Telnet: 0

Menu Substitution: ☐

Session Context Detail

Context ID: 1

GI Entity: 999 - SYSADM

Domain: QAD

Current Entity:

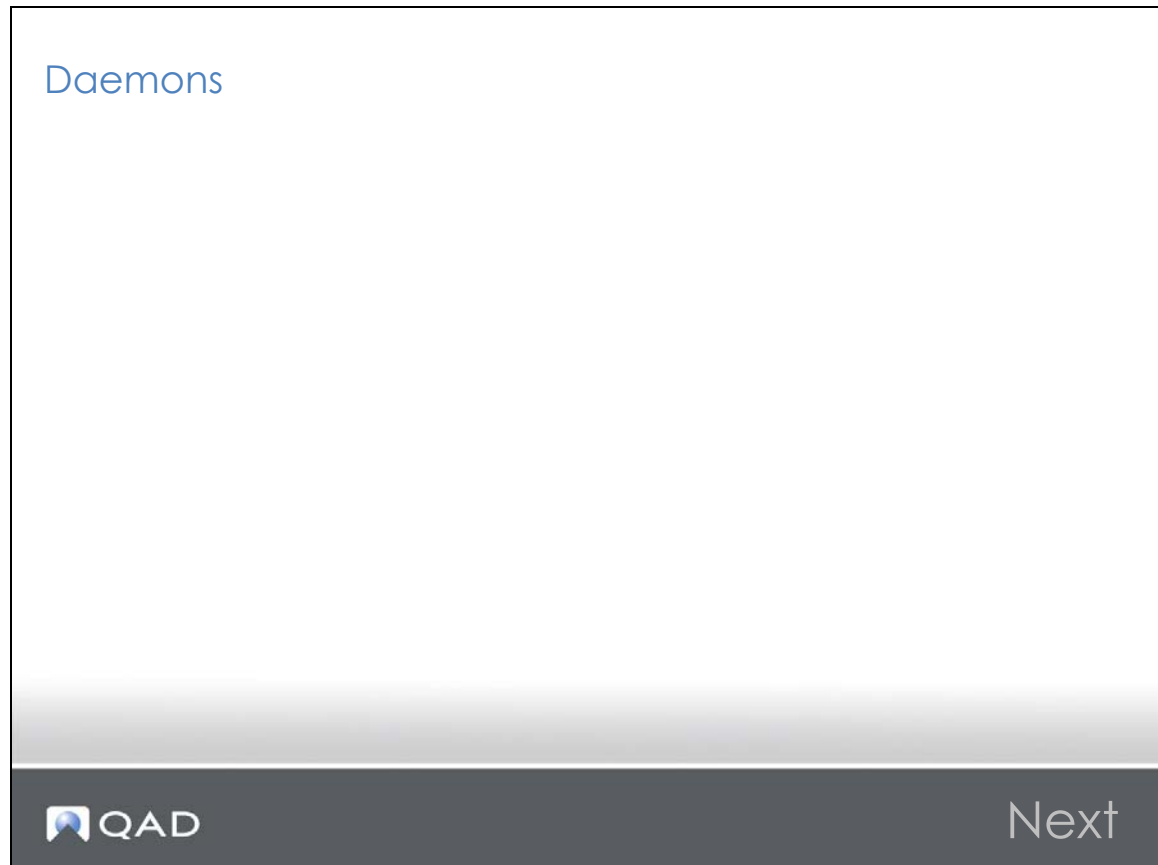
Base Currency: USD

Database: QADDB

 QAD

Visibility Tips

Daemons



Introduction to Daemons

Introduction to Daemons

Daemons are server-based processes that allow you to run tasks in the background.

- Users have no direct interaction with daemons.
- Some daemons must be running to ensure the health of QAD Enterprise Financials.
- Tasks are stored in a queue for each daemon.
- Daemons use a polling mechanism to detect, and process, new tasks.
- The behavior of each demon is controlled by maintenance program.



Daemons

Daemon Types

Types of Daemons

- History => historical data GL & SAF
- Balance => Customer/Supplier balances & movements and history data
- Budget => actuals vs budget data
- Event => QAD Events
- Cross Company => postings
- Replication => creation of new domain
- Report => reporting
- Time Out => terminate inactive user sessions
- XML => upload of data
- Scan => documents



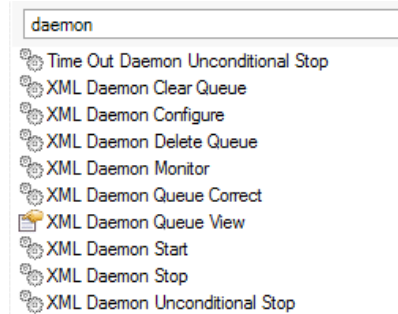
Daemons

Daemon Control

Daemons are usually controlled by the QAD UI

For each Daemon

- Clear Queue
- Configure
- Monitor
- Start
- Stop
- Unconditional Stop



Daemons

Daemon Configuration Screen

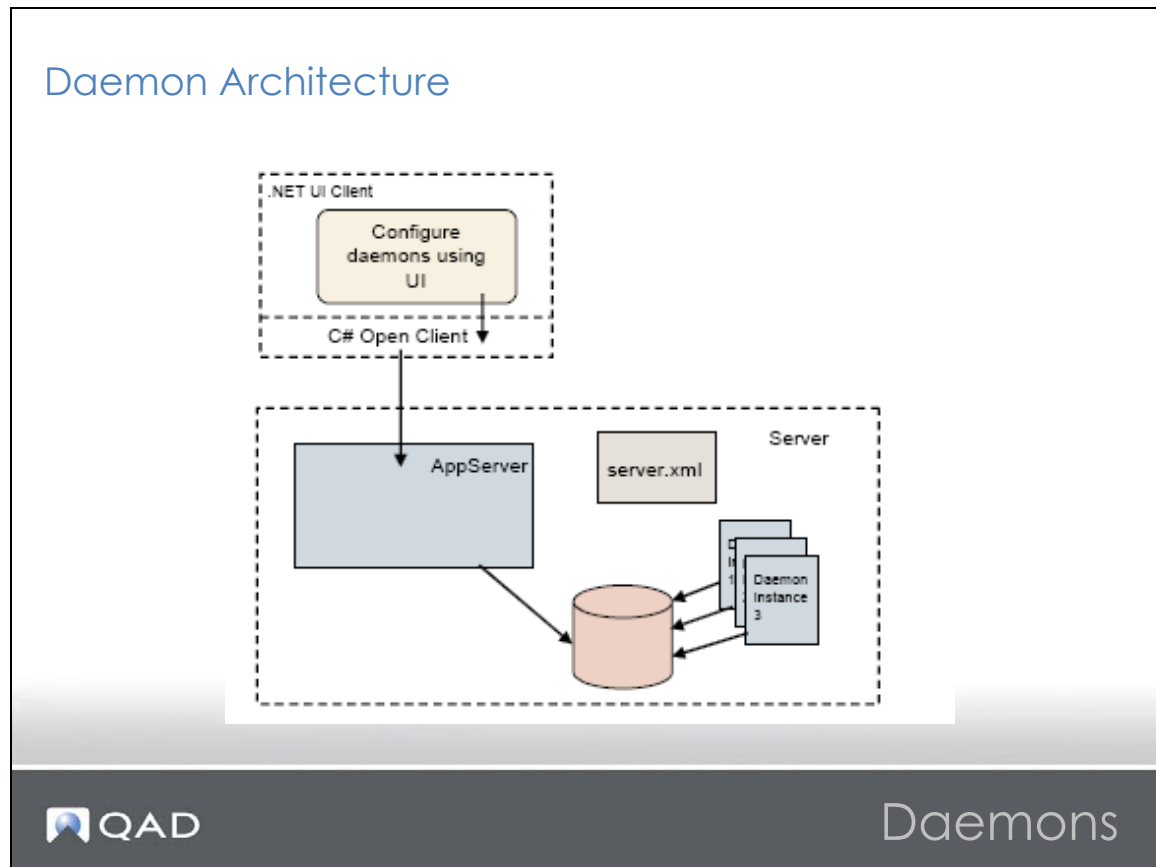
Example Daemon Configuration Screen

The screenshot displays the 'XML Daemon Configure' window. On the left, the 'Applications' pane shows a list of daemon-related actions, with 'daemon' selected. Below this is a 'Favorites' section with instructions. The main configuration area on the right contains the following fields and controls:

- Daemon Name:** XmlDaemon
- # Instances:** 10
- Interval (Sec):** 10
- Keep Processed Items:** ☒
- Number Treated in One Run:** 999,999
- Login ID for this Daemon:** <Unspecified>
- Password for this Daemon:** (empty field)
- Daemon Log File:** \$ENVROOT/logs/XmlDaemon.log
- Daemon Start Directory:** \$ENVROOT/daemons/XmlDaemon
- OS Command String:** <DaemonExecutable>
- Appserver URL:** \$ENVAPPSEVERURL
- Input Directory for XML Files:** (empty field)
- Action to be Performed:** (dropdown menu)
- Last Start Date:** (empty field)
- Last End Date:** (empty field)
- Daemon Status:** Inactive
- Running Processes:** (empty field)
- Overrule XML Action:** ☐
- Overrule Origin:** ☐

The QAD logo is visible in the bottom left corner, and the word 'Daemons' is displayed in the bottom right corner of the window.

Daemon Architecture



Controlling Daemons

Daemons can be Controlled from the Command Line

applicationcontrol.p

```
_progres -p program/applicationcontrol.p -b  
-param "-URL appserver://[host]:[port]/[financial  
appserver] -ACTION <action>" > [logfile]
```

Where <action> can be :

- StartApplication
- StartApplication_no_housekeeping
- StopApplication
- StopApplication_no_wait
- StartDaemon [<DaemonName>]
- StopDaemon [<DaemonName>]
- DaemonStatus [<DaemonName>]
- ResetDaemonConfiguration [<DaemonName>]
- Synchronize [Full | Limited | Topic<XX>]



Daemons

Daemon Status

Daemons Status

applicationcontrol.p -ACTION DaemonStatus <DaemonName>

Shows daemon status of named daemon

If no name is specified, then all daemons are shown

Shows :

- Name
- Running Status
- Running Instances
- Process IDs
- Start Date
- Log File
- Start Folder
- Login ID
- Other relevant information



Daemons

Reporting Framework

Reporting Framework

- Used to create and run reports against QAD Enterprise Applications
- Reports are customizable
- Supports data from multiple sources
- Deployed as part of the QAD .NET UI



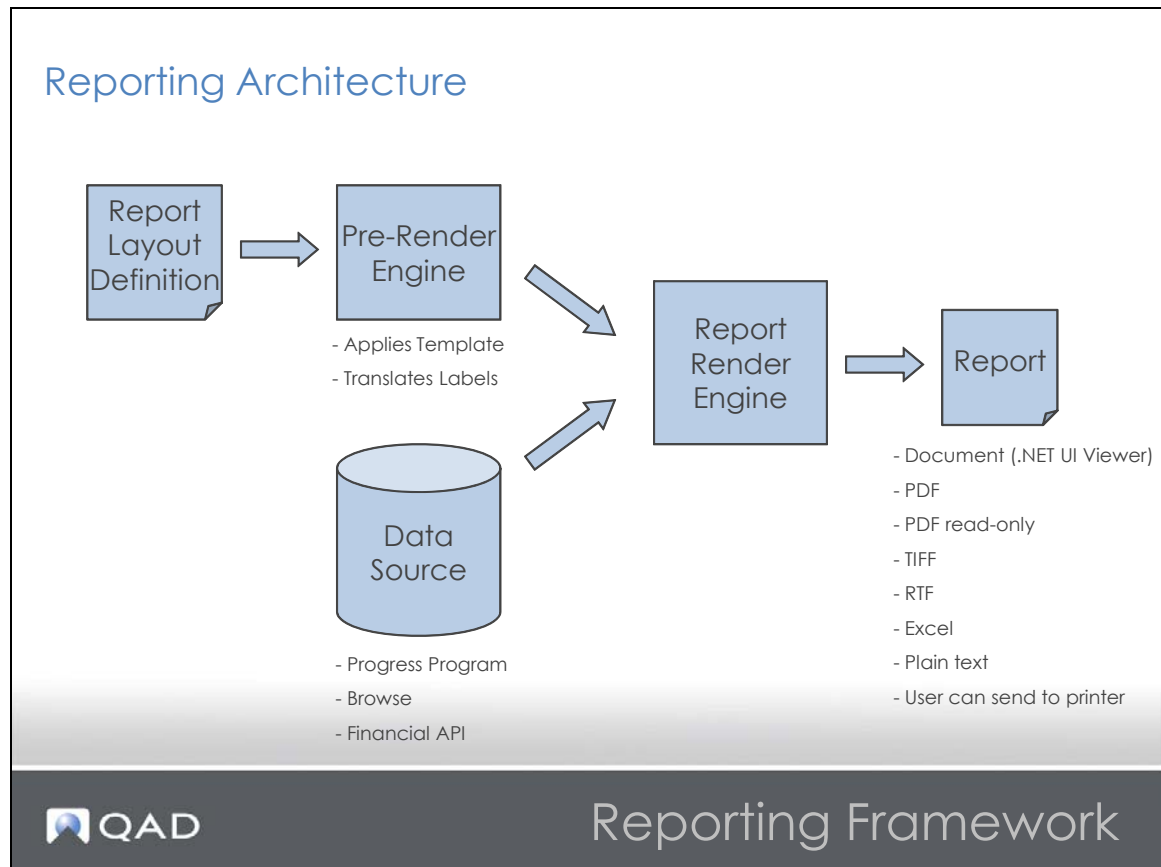
Reporting Framework

The QAD Reporting Framework is a reporting solution that delivers the infrastructure necessary to create and run reports against the QAD Enterprise Applications suite of products. It leverages a modern report rendering engine, complete with its own design layout program, that allows reports to contain formatted text, images, charts, and other rich content. It also provides a variety of data sources that allow access to various layers of the QAD product suite. This facilitates data integration with the page layouts. The report framework is deployed as part of the QAD .NET UI interface, and does not require separate installation or run-time licensing for customers. QAD developers, services consultants, partners, and customers can use the framework to create reports against the QAD product suite.

The QAD Reporting Framework is not the same as the .NET Report Service (also known as the QAD Reporting Service) or the related Report Daemon used for the batch processing of some financial reports in the Enterprise Edition (EE) product. Unlike the .NET Report Service, the QAD Reporting Framework does not require the use of Crystal Reports and it has a different batch reporting mechanism that does not use the Report Daemon. These financial reports will eventually be converted to use the newer QAD Reporting Framework. However, the Crystal-based solution will be supported for some time.

The QAD Reporting Framework should also not be confused with the QAD Business Intelligence (BI) product, which involves multi-dimensional data modeling and OLAP-style tooling. This reporting technology is not currently supported with the QAD Reporting Framework. You should view the latter as fitting more into the Forms and Operational Reporting space rather than the OLAP space.

Reporting Architecture



Installation and Configuration

Installation and Configuration

- General installation and configuration
- Server installation and configuration



Reporting Framework

General Installation and Configuration

General Installation and Configuration

- Everything an end user needs to design and run reports is bundled with .NET UI
- rptAdmin and rptDsgn Roles and Group



Reporting Framework

rptAdmin and rptDsgn Roles / Groups

rptAdmin and rptDsgn Roles / Groups

- These roles are used to grant access to report development and admin programs
- rptAdmin membership allows access to all of the reporting programs
- rptDsgn membership allows access to a subset of the programs
 - Appropriate for report developers
- EE Admin Programs for User Roles
 - Role View, Role Create, User Role View, Role Membership Maintain



Reporting Framework

You must create two roles — rptAdmin and rptDsgn — in Role Create for the report administrator and report designer/developer respectively, and then assign them to the particular user IDs you would like to perform the associated activities. These roles add another layer of security that controls access to some activities within the programs. Since the activity-level controls are hard-coded in the reporting programs, you will not be able to perform certain activities within these programs if you create roles with other names for the report administrator and report designer/developer.

Note Make sure you use the correct capitalization for the roles.

Reporting Modes

Reporting Modes

Two reporting modes are available:

- Scheduled Batch Mode
- Continuous Service Mode

 QAD

Reporting Framework

In scheduled batch mode, report server processes are typically set up for launch as Windows Tasks (using the Windows Task Scheduler). This type of process runs reports in the specified batch until they have all been run, at which point the process terminates. These are typically set up for periodic runs such as nightly or monthly batches.

In continuous service mode, report server processes are run as Windows Services (administered using the Windows Service Manager). This type of process runs reports in the special QADSVC batch and continuously keeps checking for more reports to run even after the batch has been fully processed. This is a long-running process that is intended to run scheduled reports immediately.

Server Installation and Configuration

Server Installation and Configuration

- Reporting Framework server must be a Windows machine. It can run report processes in two modes: Continuous (service) and Batch
- QAD Reporting Framework service is installed and configured as described in the Reporting Framework User Guide
- Batch Mode allows the customer to set up Windows tasks to run batches at specific times



Reporting Framework

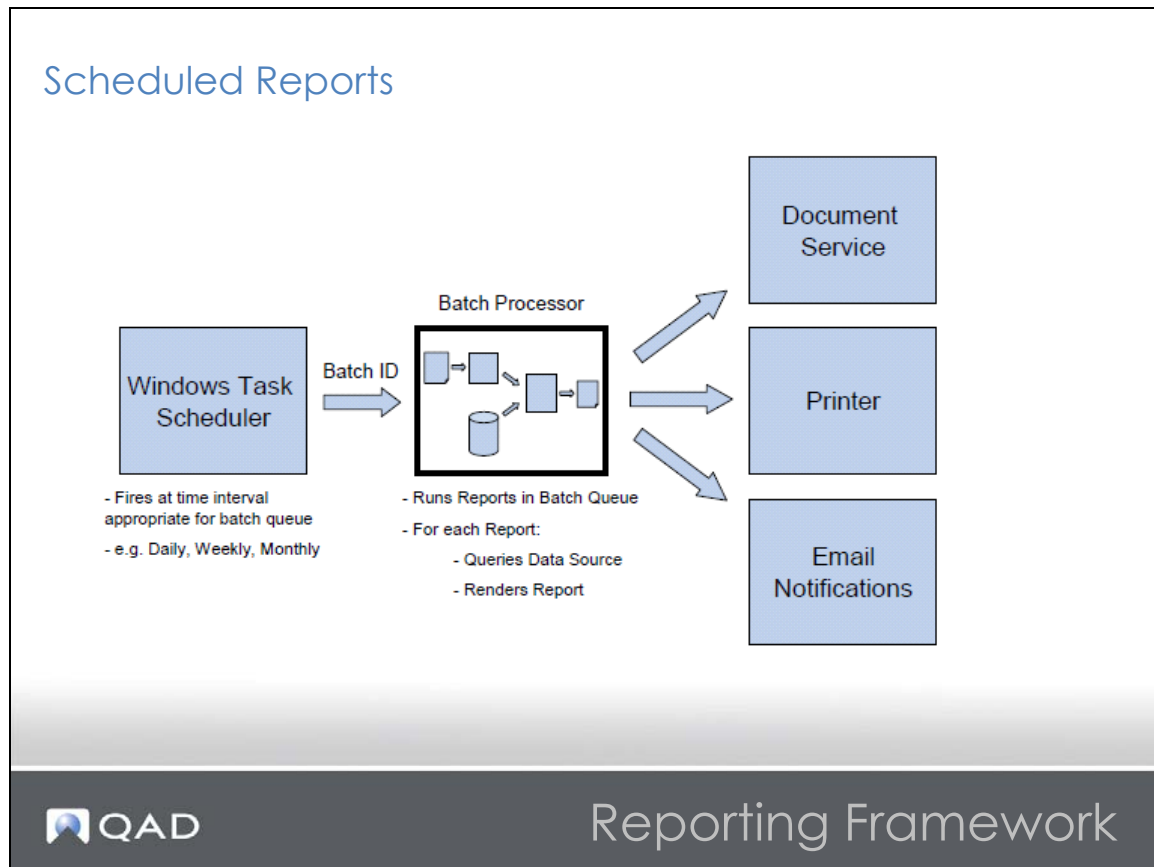
The Reporting Framework server must be a Windows machine. It can run report processes in two modes: Continuous (service) and Batch.

The QAD Reporting Framework Service must be configured and installed as described in the Reporting Framework User Guide. The installation involves customizing an XML configuration file, running a DOS batch script to install the Windows Service, and starting the service.

Note Do not confuse this with the QAD Reporting Service for EE, which is separate from QAD Reporting Framework and used only for Financial reports using Crystal Reports.

Batch Mode allows the customer to set up Windows tasks to run batches at specified times (for example, nightly, monthly, and so on). The details of this set up are in the Reporting Framework User Guide.

Scheduled Reports



When end users run reports from the QAD .NET UI, the reports are rendered on the user's computer inside of the .NET UI process. Alternatively, users can choose to schedule reports to run on a report server (this must be a Windows machine) using the Schedule button from the report viewer. Scheduled reports are assigned to a batch ID. Each report server process runs a specified batch at the desired time interval (for example, nightly, monthly, and so on). Windows Tasks are used to launch these server tasks at the desired interval.

As of QAD Applications version 2012EE (and 2013SE), there is also the capability to schedule reports to a special batch ID (QADSVCS) which is monitored continuously by the QAD Reporting Framework Service. This runs as a Windows Service on the report server and processes reports as soon as they are scheduled. Although the above batch mode configuration is optional for customers, the QAD Reporting Framework Service must be installed and running to support some newer QAD programs that auto-run reports.

Scheduled Reports

Scheduled Reports

- Report Server(s) run queues of reports (batches)
- Server processes
 - Non-GUI .NET UI processes
 - Standard installation of .NET UI
 - Launched from command line
- Windows Task Scheduler used to periodically launch batches (for example: daily, monthly)
- Output to printer and/or file on web server
- Optional notifications to e-mail, .NET UI Inbox with output as attachment or link to the output



Reporting Framework

Note Do not confuse QRF scheduled report servers with the financial report daemons in Enterprise Edition.

Further Information

For Further Information

- Refer to the Reporting Framework User Guide
- Take QAD's Reporting Framework training



Reporting Framework

End of Lesson

Next: Database Admin, Availability, Disaster Tolerance



End of Lesson

Exercise: Extend QAD EE

Exercise 2: Extend QAD Enterprise Edition



Chapter 4

Database Administration and High Availability

Introduction and Agenda

Introduction and Agenda



Introduction

QAD Enterprise Edition Database Admin and High Availability

After this section of the class, you should be able to:

- Undertake routine operational and preventative maintenance of the OpenEdge Database environment
- Understand concepts related to high availability and disaster recovery planning



Introduction

Topics Covered

What is in this lesson?

- Database Reorganization
- Database Preventative Maintenance
- Backup and Recovery Strategy
- After Imaging
- High Availability
- Disaster Tolerance



Agenda

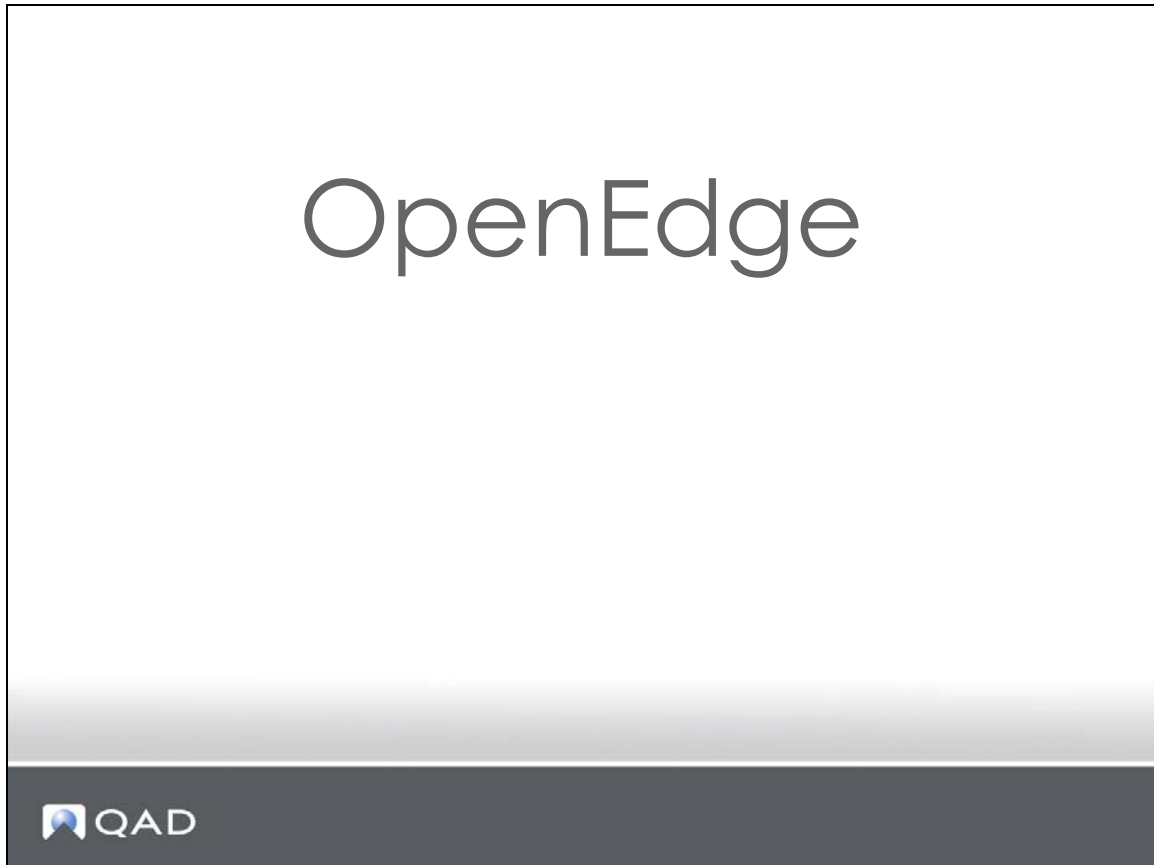
QAD Enterprise Edition DBA and High Availability

QAD Enterprise Edition DBA and High Availability



QAD Enterprise Edition

OpenEdge



OpenEdge New Features

What's New in OE 10.2B?

- Transparent Data Encryption (TDE)
 - Data encrypted on disk on the fly
 - 5% performance impact
 - No changes required to application code
 - Separate license required
- Improved Auditing
- Also supports encryption
- OpenEdge Management and Explorer come with the standard installation bundle
 - OE Management still has license costs



OpenEdge 10.2B

OpenEdge New Features 2

New to OpenEdge 10.2B

- Alternate Buffer Pool
Allows certain tables to exist in a separate shared memory space for performance reasons
- Various developer productivity improvements



OpenEdge 10.2B

OpenEdge New Features 3

Also includes new features from 10.2A and 10.1B

- 10.2A benefits are mainly related to development, not core database and deployment.
- 10.1B introduced many database enhancements:
 - New startup parameters
 - Modified startup parameters
 - 64-bit data type support (INT64). Includes sequence support for INT64
 - Larger database index keys



OpenEdge 10.2B

New Startup Parameters

The following new startup parameters were added:

- Maximum Area Number (`-maxAreas`): Lets you specify the highest area number available for use when the database is online.
- No INT64 (`-noint64`): Lets you execute Release 10.1B r-code with Release 10.1A executables, for applications that have INT64 data type incompatibilities.
- Screen Value Mode (`-scrvalmode`): Lets you specify the mode in which the SCREEN-VALUE attribute indicates that the selected item in a combo-box item list is empty.
- Shared Memory Segment Size (`-shmsegsize`): Lets you specify the size of the largest shared memory segment the server can allocate.

Modified Startup Parameters

The following existing startup parameters were modified:

- Input Characters (`-inp`): Lets you specify the number of characters allowed in a single ABL statement. The default number of characters increased from 4096 to 15000.
- Log Entry Types (`-logentrytypes`): Lets you specify one or more types of log entries to write to the log file. In addition to existing log entry types, ABL clients can now log the processing of transactions and subtransactions in ABL procedures.

- Maximum JTA Transactions (-maxxids): Lets you specify the number of simultaneous JTA transactions allowed. The multi-user default is now only 100.
- Temporary Table Block Size (-tmpbsize): Lets you specify the temp-table block size. The default increased from 1KB to 4KB.
- Token (-tok): Lets you specify the maximum number of tokens allowed in a single ABL statement. The default number of tokens allowed increased from 1024 to 3000.

OpenEdge Additional Features

Additional 10.B Features

- VST to monitor table and indexes, by user
_UserIndexStat
- Compile with XREF-XML to output Index Cross reference information in XML format
- After Imaging can be enabled online
- New storage areas can be added online
- Many developer and code enhancements



OpenEdge 10.2B

Starting and Stopping Database

Starting and Stopping Databases



QAD Databases

QAD Databases

- When the QDT builds a new Enterprise Edition System, it places the database startup and shutdown scripts under the QDT directory structure
 - \$QDT/envs/[systemname]/scripts/start.[systemname]
 - \$QDT/envs/[systemname]/scripts/start.[systemname]
- These scripts can be moved anywhere you want

However, QAD Support might find it easier if you left them in the original location *or* supplied a README file pointing to the new location
- The scripts are “out of the box” settings, and typically need to be tuned or changed to support a production system.



Starting and Stopping Databases

QAD Databases 2

QAD Databases

- Scripts in the default location are overwritten when QDT regenerates scripts
Rename or backup any custom scripts to ensure they are not lost the next time QDT is used to maintain the system
- Beginning with QAD 2014 EE, databases are managed by the conmgr.properties file and DBMAN utility or the proserv and proshut utilities
- You can add custom databases to the compile by including them in the extradbs.pf file



Starting and Stopping Databases

Startup Script

Example Startup Script

```
/progress/dlc/bin/dbman -port 20931 -database live-qaddb -start
/progress/dlc/bin/dbman -port 20931 -database live-qadadm -start
/progress/dlc/bin/dbman -port 20931 -database live-qadhelp -start

dbExists=`grep live-qxevents < /progress/dlc/properties/conmgr.properties`
if [ "$dbExists" != "" ]; then
    /progress/dlc/bin/dbman -port 20931 -database live-qxevents -start
fi
/dr01/qadapps/qdt/envs/live/scripts/startqxtendlive
```



Starting and Stopping Databases

The default startup options/parameters are probably fine for pilot systems. Change them for production systems. See the Performance section of this course for details.

Shutdown Script

Example Shutdown Script

```
/progress/dlc/bin/dbman -port 20931 -database live-qaddb -stop  
/progress/dlc/bin/dbman -port 20931 -database live-qadadm -stop  
/progress/dlc/bin/dbman -port 20931 -database live-qadhelp -stop  
  
dbExists=`grep live-qxevents < /progress/dlc/properties/commgr.properties`  
if [ "$dbExists" != "" ]; then  
    /progress/dlc/bin/dbman -port 20931 -database live-qxevents -stop  
fi  
/dr01/qadapps/qdt/envs/live/scripts/stopqxtendlive
```



Starting and Stopping Databases

OE Database Reorganization

OE Database Reorganization



Introduction to prostrct

Introduction to prostrct

- The OpenEdge Structure Maintenance Utility
 - The standard Progress tool for DB reorganization
 - Essential for running a high availability system
- Syntax

```
prostrct dbname options
```

Where *options* are:

add	addonline
bulddb	create
list	remove
reorder AI	repair
statistics	unlock



prostrct

Introduction to prostrct 2

Introduction to prostrct

- prostrct is one of the first tools a QAD database administrator might use when deploying a production instance of QAD Enterprise Edition.
- To create a database structure capable of supporting the deployment's short to medium term data growth and performance needs.

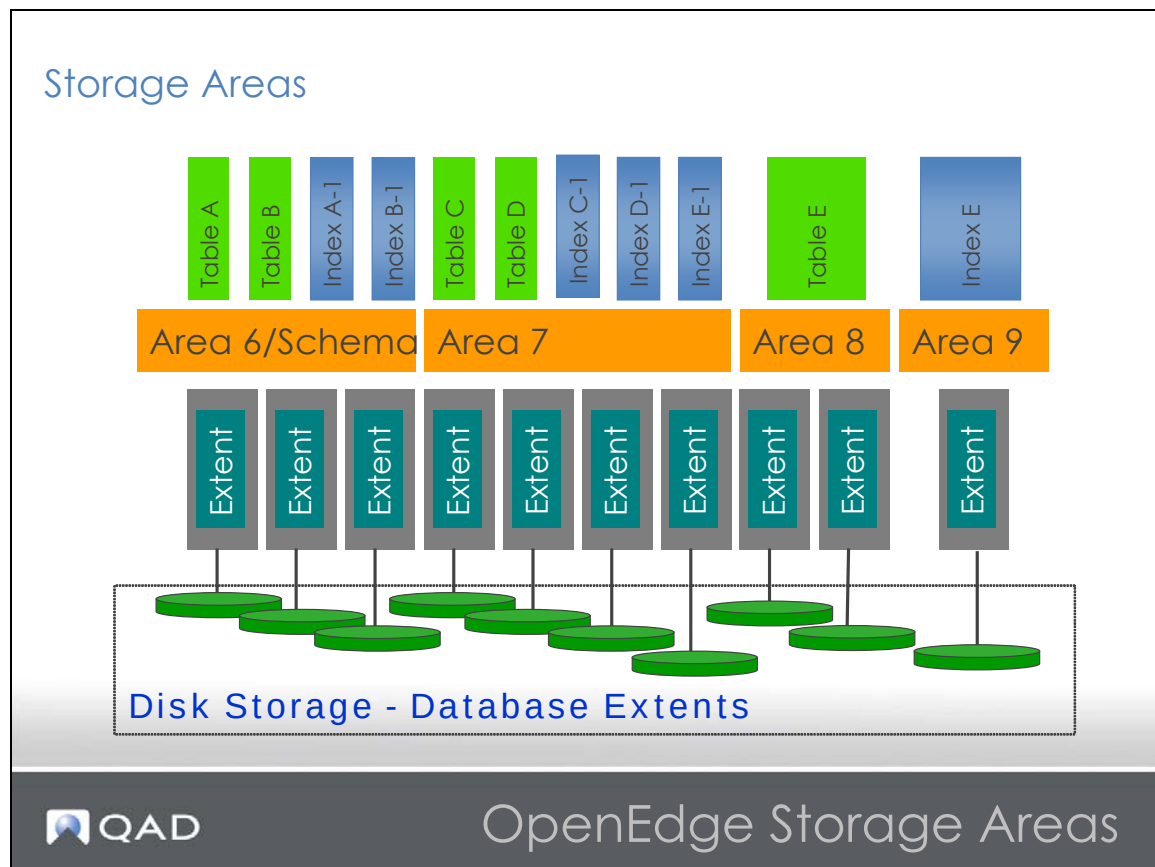
The DBA might typically:

1. Create a new Production Database Structure
2. Build the Structure with the appropriate block sizes
3. Copy an empty QAD EE database to the new structure
4. Point the QAD EE deployment to the new database
5. Create associated backup and availability infrastructure



prostrct

OpenEdge Storage Areas



- A Table, Index, or LOB can be placed in any data area.
- Data Areas can contain a mixture of indexes, tables, and LOBs.
- An Area can be dedicated to one object.
- Objects cannot span areas.

OpenEdge Structure File

The OpenEdge Database Structure File

The diagram shows a text file representing the OpenEdge database structure. Annotations with arrows point to specific parts of the file:

- Extent Type:** Points to the 'b' (block) and 'd' (data) characters at the start of each line.
- Fixed Extent of 128000 blocks:** Points to the 'f 128000' part of the first line.
- Variable Extent:** Points to the 'f 128000' part of the line for 'Schema Area'.
- Extent #:** Points to the first number in the data cluster size (e.g., 6 in '6,64;1').
- Records Per Block:** Points to the second number in the data cluster size (e.g., 64 in '6,64;1').
- Data Cluster Size*:** Points to the entire data cluster size string (e.g., '6,64;1').

```

b /dr02/adm_qa.b1 f 128000
b /dr02/adm_qa.b2
d "Schema Area":6,64;1 /dr01/adm_qa.d1 f 128000
d "Schema Area":6,64;1 /dr01/adm_qa.d2
d "GUI":7,64;1 /dr01/adm_qa_7.d1 f 128000
d "GUI":7,64;1 /dr01/adm_qa_7.d2
d "GUI_IDX":8,32;1 /dr01/adm_qa_8.d1 f 128000
d "GUI_IDX":8,32;1 /dr01/adm_qa_8.d2
d "T2":9,32;64 /dr01/adm_qa_9.d1 f 128000
d "T2":9,32;64 /dr02/adm_qa_9.d2
  
```

It is best to keep RPB and DC size the same as supplied by QAD.



OpenEdge Structure File

When the data cluster (DC) size is greater than 1, the storage area is a Type II storage area. A DC:

- Is a set of contiguous Index (IX) or Data (RM) database blocks.
- Is 8, 64, or 512 blocks.
- Can only contain a specific Object (table, index, or LOB), so Scatter Factors should be lower.

QAD does not support changing the storage areas to a type different from the default (Type I). Type II storage area only shown for informational purposes.

Building a New Database

Using prostrct create to build a new database

```
#prostrct create <dbname> [-blocksize size]
```

```
proenv>prostrct create adm_qa -blocksize 8192

Formatting extents:
  size      area name      path name
16000      Primary Recovery Area /dr02/adm_qa.b1 00:00:00
   4        Primary Recovery Area /dr02/adm_qa.b2 00:00:00
16000      Schema Area     /dr01/adm_qa.d1 00:00:00
   16      Schema Area     /dr01/adm_qa.d2 00:00:00
16000      GUI            /dr01/adm_qa_7.d1 00:00:00
   16      GUI            /dr01/adm_qa_7.d2 00:00:00
16000      GUI_IDX        /dr01/adm_qa_8.d1 00:00:00
   16      GUI_IDX        /dr01/adm_qa_8.d2 00:00:00
16000      T2             /dr01/adm_qa_9.d1 00:00:01
   64      T2             /dr02/adm_qa_9.d2 00:00:00
```



Building a New Database

Make the blocksize 4 kB on Windows, 4 or 8 kB on Linux, and 8 kB on UNIX (based on historical performance benchmarks).

Copying the QAD Databases

Using procopy to populate the database with default QAD data

```
#procopy <QAD default DB> <target>
```

Note that the source database must have the same number of storage areas and block sizes.

- And these must have the same RPB and DC settings.
- If you wish to change these, a dump and reload is needed.

```
proenv>procopy admempty adm_qa
WARNING: Before-image file of database admempty is not truncated. (1552)
Procopy session begin for root on /dev/pts/3. (451)
A database named adm_qa already exists, do you want to replace it? (y/n) y

Copying admempty to adm_qa... (6715)

Start writing data blocks. (6718)
18:04:48 10 Percent complete.
18:04:48 20 Percent complete.
```



Copying the QAD Databases

The default empty databases to copy need:

- The QAD schema and base data loaded
- The relevant field-level help data loaded
- The QAD licenses entered

Viewing Structure Data

Using prostrct list and statistics to See Structure Data

- #prostrct list <dbname>
 - Creates <dbname>.st file in same directory
 - Essential you do this, for database emergency repair and maintenance reasons
- #prostrct statistics <dbname>
 - Shows Database Statistics
 - DB, BI, and AI block sizes
 - Storage Areas (active, empty, and total blocks)
 - The last database backup date and time



Building a New Database

```
proenv>prostrct statistics admempty
```

WARNING: Before-image file of database admempty is not truncated. (1552)

Storage Utilization Statistics

Database: admempty

Primary data block size: 8192

BI block size: 8192

AI block size: 8192

Database Physical structure information

Statistics for Area: Control Area

Files in Area: Control Area

/dr01/admempty.db 655360

Database Block Usage for Area: Control Area

Active blocks: 5

Data blocks: 5

Free blocks: 0

Empty blocks: 75

Total blocks: 80

Extent blocks: 1

Records/Block: 64

Cluster size: 1

Statistics for Area: Primary Recovery Area

Files in Area: Primary Recovery Area

/dr01/admempty.b1 21102592

Statistics for Area: Schema Area

Files in Area: Schema Area

/dr01/admempty.d1 2752512

Database Block Usage for Area: Schema Area

Active blocks: 320

Data blocks: 320

Free blocks: 0

Empty blocks: 16

Total blocks: 336

Extent blocks: 1

Records/Block: 64

Cluster size: 1

Statistics for Area: GUI

Files in Area: GUI

/dr01/admempty_7.d1 38404096

Database Block Usage for Area: GUI

Active blocks: 4684

Data blocks: 4684

Free blocks: 0

Empty blocks: 4

Total blocks: 4688

Extent blocks: 1

Records/Block: 64

Cluster size: 1

Statistics for Area: GUI_IDX

Files in Area: GUI_IDX

/dr01/admempty_8.d1 12451840

Database Block Usage for Area: GUI_IDX

Active blocks: 1508

Data blocks: 1077

Free blocks: 431

Empty blocks: 12

Total blocks: 1520

Extent blocks: 1

Records/Block: 32

Cluster size: 1

Statistics for Area: COMPCONF

Files in Area: COMPCONF

/dr01/admempty_9.d1 1310720

Database Block Usage for Area: COMPCONF

Active blocks: 159

Data blocks: 159

Free blocks: 0

Empty blocks: 1

Total blocks: 160

Extent blocks: 1

Records/Block: 64

Cluster size: 1

Statistics for Area: COMPCONF_IDX

Files in Area: COMPCONF_IDX

/dr01/admempty_10.d1 262144

Database Block Usage for Area: COMPCONF_IDX

Active blocks: 21

Data blocks: 21

Free blocks: 0

Empty blocks: 11

Total blocks: 32

Extent blocks: 1

Records/Block: 32

Cluster size: 1

Statistics for Area: ADM_LOB

Files in Area: ADM_LOB

/dr01/admempty_11.d1 3014656

Database Block Usage for Area: ADM_LOB

Active blocks: 360

Data blocks: 360

Free blocks: 0

Empty blocks: 8

Total blocks: 368

Extent blocks: 1

Records/Block: 32

Cluster size: 1

Database Block Usage Summary

Active blocks: 7057

Data blocks: 6626

Free blocks: 431

Empty blocks: 127

Extent blocks: 7

Total blocks: 7184

NO FULL BACKUP HAS BEEN DONE. (6943)

Changing Scripts to Use the New Database

Changing Scripts to use the New Database

Once the Production databases have been sized, created and populated, you need to change the QDT created scripts to access them

- \$QDT/envs/[env]/scripts
- Start / Stop / Client / Check / Connmgr / Telnet
base-live-set.pf

```
proenv>ls *pilot*
checkqadfinpilot.ksh  start.pilot          stop.pilot
checkqadsi_ASpilot.ksh startqadfinpilot.ksh stopqadfinpilot.ksh
checkqadui_ASpilot.ksh startqadsi_ASpilot.ksh stopqadsi_ASpilot.ksh
checkqadui_WSpilot.ksh startqadui_ASpilot.ksh stopqadui_ASpilot.ksh
checkqxosi_ASpilot.ksh startqadui_WSpilot.ksh stopqadui_WSpilot.ksh
checkqxoui_ASpilot.ksh startqxosi_ASpilot.ksh stopqxosi_ASpilot.ksh
client.pilot          startqxoui_ASpilot.ksh stopqxoui_ASpilot.ksh
connmgr.pilot         startqxtendpilot     stopqxtendpilot
startenv.pilot        stopenv.pilot        telnet.pilot
```



Using the New Database

Changing Scripts to Use the New Database 2

Changing Scripts to use the New Database

You must also change the following files

- \$QDT/envs/[env]/configs/server.xml
 <database><./database>
- Start / Stop / Client / Check / Connmgr / Telnet
 base-live-set.pf
- Any backup, batch, daemon or other scripts
 that will be used to access the databases



Using the New Database

Advanced: prostrct add

Advanced: prostrct add [online]

- Adds extents to an existing database
- Backup your database before adding extents
 - Create a new structure file

```
# add.st
#
d "new",128 . f 2048
d "new" .
```

- #prostrct add *db-name* add.st

```
Formatting extents :
Size      area name
2048      New      /dr01/eb3/db/new_9.d1 0:03
32        New      /dr01/eb3/db/new_9.d1 0:01
```

- The new extents are added

Remember to use prostrct list to update the structure file

```
# add.st
#
d "new",128 . f 2048
d "new" .
```



Advanced prostrct

Online version of prostrct add:

- Only one instance at a time
- Checks users have privilege to access new extents
- Creates extents
- Rechecks user privileges
- Locks admin area
- Adds extents
- Unlocks admin area

Advanced: prostrct repair

Advanced: prostrct repair

- #prostrct repair <dbname> <structure file>
- Used to fix a corrupted database master block
- But also very useful in moving the database files to new locations
 - Ensure the structure file is up to date (prostrct list)
 - Shut down the database
 - Backup!!
- Move the physical database file extents using the operating system
- Update the structure file to reflect the changes
- Restart Database



Advanced prostrct

Always have a valid structure listing file.

Backups and After Imaging

Backups and After Imaging



Backup Strategy

Create a Backup Strategy

- Simply deciding to back up the database onto some tapes every night *is not* a strategy
- Your data is an extremely important asset
Failing to protect it creates a significant risk to your company
- You should create a strategy that adequately minimizes the risks to your company data



If in doubt, back it up

Backup and Recovery Strategy

Backup and Recovery Strategy

- The backup and recovery strategy should be directed by the business unit
 - The data belongs to the business
 - They decide how important it is. And how much should be spent on backups
- Speed, flexibility and Integrity influence the cost
 - A portable drive might be cheap, but would you risk a corporate database using one?
 - An offsite Enterprise SAN solution might be effective and reliable, but can the company afford it?
 - Traditional Tape Drive method a good compromise?
- **TEST EVERYTHING**



Backup and Recovery Strategy

probkup or Operating System Backup?

probkup versus Operating System Backup

- probkup is the OpenEdge backup tool
- Use It!
 - probkup knows how an OpenEdge database works
 - Location of all extents
 - Before Image data
 - After Image data
 - Online backups
 - If you must use the operating system to back up a database, ensure the database is offline. It is still not recommended
 - The operating system can then be used to back up the resulting probkup file



probkup or Operating System?

probkup Syntax

probkup Syntax

```

probkup [ online ] db-name [ incremental ] device-name
        [ enableai ] [ enableaiarchiver -aiarcdir dirlist
        [-aiarcinterval n] [-aiarcdircrcreate]]
        [ -estimate | -vs n | -bf n | -verbose | -scan
        | -io i | -com | -red i | -norecover
        ]

```

- Offline or online abilities
- Use “-com” to compress the backup if you want to save space
- The database is backed up from the high water mark downward.
 - Free blocks are compressed to save space
 - Use “-red 1” (redundancy) if your backup media is unreliable



probkup

probkup with Quiet Points

probkup with Quiet Points

- If disk mirroring or volume snapshot utilities are used to provide data redundancy, then quiet points can be incorporated to manage the backups.
- When a quiet point is issued, all file write activity to the database is suspended until the quiet point is lifted.
- Used for availability / low downtime database backups
- `#proquiet <dbname> -C enable`
Split mirror or take snapshot
- `#proquiet <dbname> -C disable`
 - On Mirror or Snapshot, update the structure file to reflect the new location using `prostrct repair`
 - Backup the split copy
- Resync Mirror (if using mirroring)



probkup

Restoring a Database with prorest

Restoring a Database

- #prorest <target db> <probkup db>
- prorest restores a backup created with probkup
- prorest grows the database to the required size

There should be a valid structure file in place to support the expected database size

- prorest will overwrite an existing database!

... But it does warn you first and give you the chance to avoid making a mistake



prorest

Online Backups

Tip: Using online Backups to create new environments

Backup online and restore is a good way to create a test environment without kicking the users off a production system

1. probkup online
2. Restore the backed up copy into the test database
3. The test database is refreshed with current data
4. The production database does not need to be stopped



prorest

After Imaging and Replication

After Imaging and Replication



Live Databases and After Imaging

Live databases **should always** run with after imaging

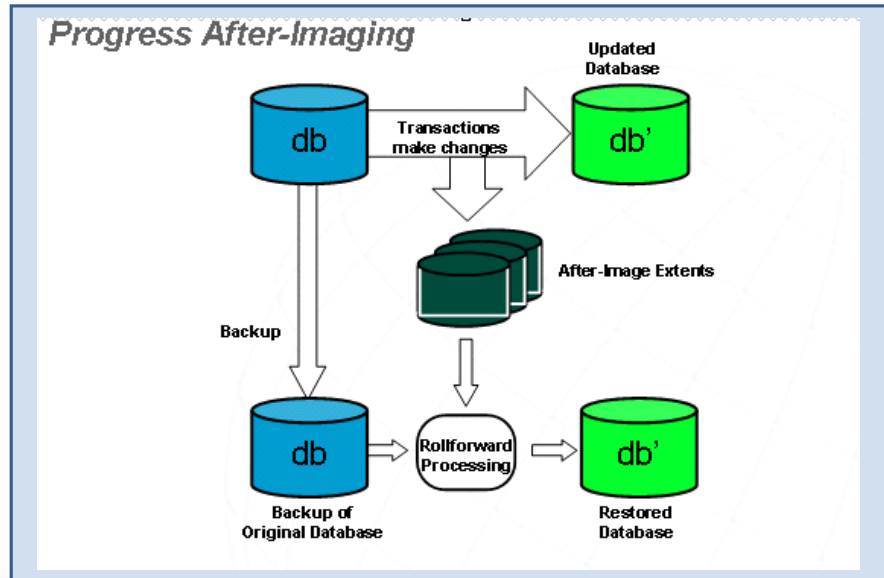
- After Imaging (AI) is an “optional” recovery system that helps guard against hardware failure
Provides restoration of transactions that occurred after most recent backup
- Most people have realized they should have been running AI *AFTER* they failed to recover from a disaster
 - If losing data between scheduled backups would hurt your business, you must use after imaging
 - It should not be “optional” in your business
 - If you want to protect your data, make it mandatory



After Imaging

After Imaging Architecture

Architectural Overview



After Imaging Set Up

Set Up

- Estimate After Image (AI) volumes and determine structure size
You can do this by using the VSTs or Promon to examine the bytes written to the before image log
- Add AI structure to the database (prostrct)
- Manage AI Extents
Use the AI File Management Daemon (OE 10.1)
- Use AI writers (proaiw)
For performance reasons



After Imaging

Adding the AI Structure to the Database

Adding the AI Structure to the Database (prostrct)

```
proenv>cat aiadd.st  
a /dr01/adm_qa.a1 f 50000  
a /dr01/adm_qa.a2 f 50000  
a /dr01/adm_qa.a3
```

```
proenv>vi aiadd.st  
proenv>prostrct add adm_qa aiadd.st
```

Formatting extents:

size	area name	path name
6256	After Image Area 1	/dr01/adm_qa.a1 00:00:00
6256	After Image Area 2	/dr01/adm_qa.a2 00:00:00
16	After Image Area 3	/dr01/adm_qa.a3 00:00:00



After Imaging

Enabling After Imaging

Enabling After Imaging

Run `rfutil <dbname> -C aimage begin`

- Automatically truncates BI file
- Must do a backup first

```
proenv>probkup adm_qa adm_qa.bkup

7052 active blocks out of 7098 blocks in adm_qa will be dumped. (6686)
0 BI blocks will be dumped. (6688)
The blocksize is 8192. (6994)
Backup requires an estimated 55.2 MBytes of media. (9285)
Restore would require an estimated 7052 db blocks using 55.1 MBytes of media. (9286)
Backed up 7052 db blocks in 00:00:01
Wrote a total of 195 backup blocks using 51.8 MBytes of media. (13625)

Backup complete. (3740)
proenv>rfutil adm_qa -C aimage begin
OpenEdge Release 10.2B0107 as of Fri Jul 2 10:40:57 EDT 2010

The BI file is being automatically truncated. (1526)
```



After Imaging

Examining Status

Examining Status

- AI files have three states
 - Full: Extent is ready to archive
 - Busy: Extent is currently being written to
 - Empty: Extent is empty and ready to use
- Use

```
# rfutil <dbname> -C aimage extent list
```

to see the status of AI extents



After Imaging

Examining Status 2

Examining Status

```
proenv>rfutil adm_qa -C aimage extent list
OpenEdge Release 10.2B0107 as of Fri Jul 2 10:40:57 EDT 2010

Extent: 1
Status: Busy
Type: Fixed Length
Path: /dr01/adm_qa.a1
Size: 50040
Used: 1
Start: Mon Oct 4 21:22:57 2010
Seqno: 1

Extent: 2
Status: Empty
Type: Fixed Length
Path: /dr01/adm_qa.a2
Size: 50040
Used: 0
Start: N/A
Seqno: 0
```



After Imaging

AI File Management

AI Management Daemon

- The AI File Management utility provides a best-practice approach to managing after-image extents. 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
- AI File Management has two modes:
 - Automatic mode allows users with little or no experience with after imaging to quickly get started. In this mode, the utility handles AI extent archival for you.
 - In the manual mode, the user has greater control over the process of archiving AI extents



After Imaging

AI Management Daemon

AI Management Daemon

- After Imaging must already be enabled
- Enable the AI File Management

```
proenv>rfutil adm_qa -C aiarchiver enable  
OpenEdge Release 10.2B0107 as of Fri Jul 2 10:40:57 EDT 2010  
  
Archiver has been enabled.
```

- Start the Database Broker with AI File Management parameters

```
#proserve [dbname] [port number]  
-aiarcdir [archive directory]  
-aiarcinterval [archive interval]
```



After Imaging

AI Management Daemon Modes

AI Management Daemon Operating Modes

- The AI File Management utility operates in “Timed” or “On Demand” mode
- Timed

AI Extent switches at a specific interval *or* when an extent becomes full
- On Demand
 - Extents are only switched when they become full.
 - FULL extents are auto archived every 5 seconds by default



After Imaging

Switching Extents

Switching Extents

As an AI file fills, it will switch to the next extent (if empty).

- Use the AI File Management Daemon (10.1A)
- You can manually force a switch

- Old way

```
rfutil <dbname> -C aimage new
```

- Using the AI File Management Daemon

```
rfutil <dbname> -C aiarchiver nextextent
```

```
proenv>rfutil adm_ga -C aiarchive nextextent  
OpenEdge Release 10.2B0107 as of Fri Jul 2 10:40:57 EDT 2010
```



After Imaging

Full AI Extent Handling

What happens if all AI Extents fill up?

- By default, the broker will shut down the database.
- Start the broker with -aistall
 - All update activity is suspended
 - Message is written to database log file
 - Resumes when the AI file is marked empty



After Imaging

Database Recovery

Recovering a Crashed Database

- Restore the last backup
- Apply AI files in the same order as created

```
rfutil <dbname> -C roll forward -a <aifile>
```
- After the last AI file is applied, the database is considered crashed.
 - Schedule a dump and reload
- Open the database (Start Broker or Single user session)
 - It is Normal to get crash recovery messages
- User community should test the environment
 - DBA should ask for a pay rise



After Imaging

Best Practices

Best Practices

- Use After Image Writers
- Use the AI File Management Daemon
- Set -aibuffs (to 1.5 * -bibuffs (30-50))
- AI blocksize should be equal to the BI blocksize

```
rfutil <db> -C truncate ai -aiblocksize 16
```
- To estimate size of AI files for a day

```
# of checkpoints per day * BI cluster size
*or* BI bytes written
```



After Imaging

Best Practices 2

Best Practices

- AI files should be stored on their own disks
Not part of the general RAID set
- Do not make extents too large
They should be able to hold about an hour's worth of data before switching
- Copy the archived AI files off to secure storage as soon as possible
- Consider using OpenEdge or Disk Based Replication



After Imaging

Dump and Reload Concepts

Dump and Reload Concepts



Dump and Reload Introduction

Introduction to Dump and Reload

Sometimes a QAD database should have its data dumped to disk, and reloaded into a new empty database structure

- Usually because of severe internal data fragmentation
- Possibly due to required maintenance
 - Changing the Block Size
 - Moving to Type II storage areas
 - Changing the internal structure of the database



Database Dump and Reload

Determining Fragmentation

Determining Fragmentation

```
#proutil dbname -C dbanalys > analysis.txt
```

dbanalys creates a detailed analysis file useful for determining fragmentation.

- If the number of records for a table in a given storage area is large *and*
- The scatter factor is over 4.5 *then*
- Consider a dump and reload for
 - The entire database (if time allows)
 - Just the storage area in question (for high availability)



Database Dump and Reload

Determining Fragmentation 2

Determining Fragmentation

Number of Records

RECORD BLOCK SUMMARY FOR AREA "Schema Area" : 6

Table	Records	Size	-Record Size (B)-			---Fragments---		Scatter Factor
			Min	Max	Mean	Count	Factor	
PUB.AAA_qadfinance_20090630	0	0.0B	0	0	0	0	0.0	0.0
PUB.ClientCache	91	12.5K	72	176	140	91	1.0	4.0
PUB.COAMaskCC	456	20.2K	41	66	45	456	1.0	3.3
PUB.COAMaskCCDiv	1555	74.4K	42	60	48	1555	1.0	1.7
PUB.COAMaskCCGL	4010	197.1K	42	71	50	4010	1.0	2.4
PUB.COAMaskDiv	194	8.9K	41	65	46	194	1.0	3.1

Scatter Factor



Database Dump and Reload

By a “high” number of records, we usually mean in the millions.

The Scatter factor is a logarithmic scale. Think earthquakes. A magnitude 3 might be noticeable, but it is no cause for alarm. A magnitude 7 knocks down houses.

Dump and Reload via Data Dictionary

Using the Data Dictionary

- Dump and Reload via the data dictionary is the simplest method
 - Dump data as ASCII files to disk
 - [optional] Dump data definitions (.df) file
 - Dump table contents (.d) files
 - Don't forget to dump sequence current values
 - Reload
 - [optional] Load data definitions
 - Load table contents (.d) files
 - Don't forget to load sequence current values
 - Indexes are updated after each record load (SLOW)
- Multi-threading this process will yield significant speed increases



Database Dump and Reload

Dump and Bulk Reload

Dump and Bulk Reload

- Much Faster. More Complicated.
 - Create Bulk Loader description file via dictionary
 - Dump Data (as with normal dump and reload) via dictionary
 - Dump Data definitions file via dictionary
 - Create Empty Database (with correct structure)
 - Load Schema (data definitions file)
 - Run Bulk Load command via command line
`#proutil <dbname> -C bulkload bulk-loader-description-file`
 - Index Rebuild
- To improve performance , you can run the bulk load with no integrity (-i)
However, any errors will require you to start the entire process again



Database Dump and Reload

Dump and Bulk Reload 2

Other Dump and Bulk Reload Methods

- Binary Dump and Load
 - Faster than data dictionary*
 - Should be faster than bulkload
 - Binary load writes to the BI file, Bulkload doesn't
 - With multiple CPUs you can have multiple streams
 - `proutil <db> -C dump <table> . -index 0`
 - Dump performance vs Read performance
 - Choose an index based on read order
 - `proutil <db> -C load <table>.bd build`
 - Rebuild Indexes
- Buffer Copy to a new database
 - Use No Integrity for performance (-i)
 - Use one thread per (virtual) processor



Database Dump and Reload

If done carefully, multi-threaded data dictionary operations can be very fast.

High Availability

High Availability



High Availability Introduction

Introduction

QAD customers often have requirements for highly available systems. Designing and deploying a highly available system requires more planning and effort than simply relying on a modern server and a tape backup regime. Some of the concepts and considerations are documented in this section.

High Availability (HA) systems provide service during defined periods, at acceptable or agreed upon levels, and masks unplanned outages from end users.

HA systems employ fault tolerance, automated failure detection, recovery, testing, problem and change management.



High Availability

Redundancy

Redundancy

- Duplicate everything. No single points of failure.
- All of the following components should be duplicated/redundant in the architectural design:
 - Operating Systems
 - Logical Partitions
 - Servers
 - Storage
 - Ports and Cards
 - Fiber Channel Switches
 - Network Routers
 - QAD Application setup and data



High Availability Guidelines

Failover

Failover

- Automatic Switch to Redundant Systems on a detected Failure
- Operates via a heartbeat sampling mechanism
- QAD supports Failover Software such as HP Service Guard and IBM HACMP
- Linux failover software is not supported, but can be configured via Technical Services



High Availability Guidelines

Failover is the ability to automatically switch over to a redundant or standby computer server, system, or network upon the failure or abnormal termination of the previously active server, system, or network. Failover happens without human intervention and generally without warning.

The automation is done using a heartbeat cable that is connected to the two servers. As long as there is a pulse or heartbeat from the main server to the second server, the second server does not initiate its systems. There can also be a third spare parts server that has running spare components for hot switching to prevent down time.

QAD systems may not be able to failover all components, especially relational databases because QAD databases tend to have large amounts of recent data in RAM (buffer memory). Because it is technically very difficult to failover buffer memory contents, the actual failover of the relational database component probably requires manual intervention.

High Availability Design

Typical Technical Design Principles

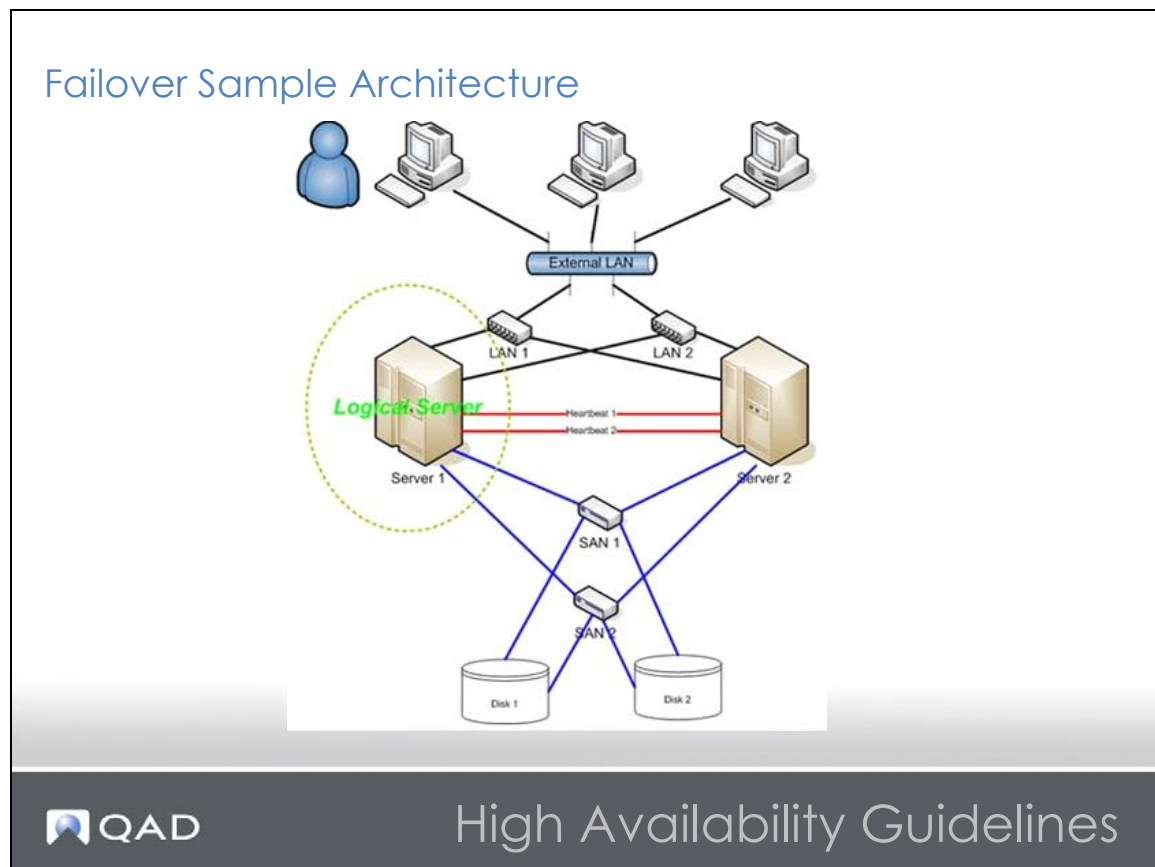
High Availability Systems have the following technical design requirements:

- Scripts or tools to start / stop / failover and failback the QAD application
- Shared Storage (SAN)
- Non-corruption of data when the failover occurs. Due to the nature of the buffered database data (in system memory), this may force the inclusion of replication or after-imaging functionality into the failover process



High Availability Guidelines

Failover Architecture



QAD and Progress OpenEdge support the following commercial HA implementations with QAD Enterprise Edition and other QAD software products using the OpenEdge database server:

- HP Service Guard 11i (HP-UX)
- IBM HACMP 5.3 (32-bit and 64-bit, AIX 5.3)
- Microsoft Cluster Server MSCS v1.2 (Windows Server 2003, 32-bit)
- Sun Solaris Sun Cluster 3.0 and 3.1+

For information on HA software support for Oracle and SQL-Server databases, contact QAD Support.

Disaster Recovery

Disaster Recovery



Disaster Recovery Planning

Introduction

- Disaster recovery planning (DRP) is essential for any company running QAD Enterprise Software.
- Of companies that had a major loss of computer data, 43% did not reopen, 51% closed within 2 years, and only about 6% survived long term

(Source: Cummings, Haag & McCubbrey, 2005)



Disaster Recovery Planning

Disaster Recovery Planning Definition

Definition (DRP)

- A disaster applies to major events that deny access to the normal IT infrastructure for an extended period. A disaster recovery plan (DRP) refers to an IT focused plan designed to restore operability of the company's IT infrastructure and QAD Applications at an alternate site after an emergency.
- A disaster recovery plan, in business terms, refers to a coordinated strategy involving plans, procedures and technical operations that enable the recovery of IT systems and QAD applications after a disastrous disruption to services.



Disaster Recovery Planning

Disaster Recovery Planning Tiers

The Seven Tiers of DRP

- Tier 0: No offsite Data
- Tier 1: Offsite backup but no “hot” site
- Tier 2: Offsite backup and “hot” site
- Tier 3: Electronic Vaulting
- **Tier 4: Point in Time Copies**
For example, After Imaging, Disk Flash Copy
- **Tier 5: Transaction Integrity**
For example, OE Replication, Disk Replication
- Tier 6: Zero Data Loss
- Tier 7: Completely Automated



Disaster Recovery Planning

Tier 0 - No Off-site Data

Businesses with a Tier 0 Disaster Recovery solution have no Disaster Recovery Plan. There is no saved information, no documentation, no backup hardware, and no contingency plan.

Typical recovery time: The length of recovery time in this instance is unpredictable. In fact, recovery may be impossible.

Tier 1 – Offsite Backup with no Hot Site

Businesses that use Tier 1 Disaster Recovery solutions back up their data at an off-site facility. Depending on how often backups are made, they are prepared to accept several days to weeks of data loss, but their backups are secure off-site. However, this Tier lacks the systems on which to restore data.

Tier 2 – Offsite Backup with a Hot Site

Businesses using Tier 2 Disaster Recovery solutions make regular backups on tape. The backups are combined with an off-site facility and infrastructure (known as a hot site) to restore systems from tapes in the event of a disaster. This tier solution still results in the need to recreate several hours to days of data, but the recovery time is more predictable.

Tier 3 - Electronic Vaulting

Tier 3 solutions utilize components of Tier 2. Additionally, some mission-critical data is electronically vaulted. This electronically vaulted data is typically more current than that data which is initially installed. As a result, there is less data recreation or loss after a disaster occurs.

Tier 4 - Point-in-Time Copies

Businesses that require greater data currency and faster recovery than users of lower tiers use Tier 4 solutions. Rather than relying largely on shipping tape, as is common in the lower tiers, Tier 4 solutions begin to incorporate more disk-based solutions. Several hours of data loss is still possible, but it is easier to make such point-in-time (PIT) copies with greater frequency than data that can be replicated through tape-based solutions.

Tier 5 - Transaction Integrity

Businesses with a requirement for consistency of data between production and recovery data centers use Tier 5 solutions. There is little to no data loss in such solutions. However, the presence of this functionality is entirely dependent on the application in use.

Tier 6 – Zero Data Loss

Tier 6 Disaster Recovery solutions maintain the highest levels of data currency. Businesses with little or no tolerance for data loss that require the rapid restoration of data to applications use this tier. These solutions have no dependence on the applications to provide data consistency.

Tier 7 – Completely Automated

Tier 7 solutions include all the major components being used for a Tier 6 solution with the additional integration of automation. This approach allows a Tier 7 solution to ensure a higher consistency of data. Additionally, recovery of the applications is automated, allowing for restoration of systems and applications much faster and more reliably than would be possible through manual disaster recovery procedures.

DRP Solution Selection

Selecting the Optimum DRP Solution

Working with the business, decide upon the following objectives:

- **Recovery Time Objective (RTO):** How long can you afford to be without your systems?
- **Recovery Point Objective (RPO):** When it is recovered, how much data can you afford to recreate?
- **Degraded Operations Objective (DOO):** What will be the impact on operations with fewer data centers?
- **Network Recovery Objective (NRO):** How long to switch over the network?



Disaster Recovery Planning

It is important to understand that the cost of a solution must be in reasonable proportion to the business value of IT. You do not want to spend more money on a disaster recovery solution than the financial loss you would suffer from a disaster.

Using the following objectives, it becomes relatively simple to decide which solution to select according to how much you can afford to spend and the speed at which you need your data recovered. The quicker the recovery, the higher the cost.

A DRP is a comprehensive statement of actions to take before, during, and after a disaster. Document and test the planning to ensure the continuity of operations and availability of critical resources in the event of a disaster.

The DRP involves more than just specifying off-site storage locations or backup procedures.

Form a planning/management team, with senior management support, to oversee the development and implementation of the plan. Expenses can be very high, so senior management should be involved at all times.

The major functions of the planning team might be:

- Defining what constitutes a disaster
- Conducting a risk analysis
- Conducting a business impact analysis
- Identifying critical resources

- Identifying disruption impact and allowable outage times and data loss
- Developing recovery priorities
- Defining the architectural solution
- Defining the personnel and sub-teams, their roles, and responsibilities
- Defining the recovery plan phase
- Selecting the disaster recovery site
- Managing costs

Managing Costs

Managing Costs

Cost/Time Window

- Cost of solution and time to recover
- Cost of outage
- Time



Disaster Recovery Planning

Disaster Recovery Planning Summary

Summary

- DRP should be a requirement, not an option
- Plan
- Practice
- Refine
- Know the limitations of the plan
- Test
- Document
- Define Roles and Responsibilities



Disaster Recovery Planning

End of Lesson

Next: Performance



End of Lesson

Exercise: Maintain QAD EE

Exercise 3: Maintain QAD Enterprise Edition



Chapter 5

QAD Enterprise Edition Performance

Introduction and Agenda

Introduction and Agenda



Introduction

QAD Enterprise Edition Performance

After this section of the class, you should:

- Understand a Performance Engineering methodology you can use with QAD Enterprise Applications
- Understand the most common tuning parameters and their effectiveness



Introduction

Topics Covered

What is in this lesson?

- Introduction to Performance Engineering Concepts
- A Problem Solving Methodology
- Case Studies
- Tuning and Tools



Agenda

QAD Enterprise Edition Performance

QAD Enterprise Edition Performance



QAD Enterprise Edition

Impact of Poor Performance



What is Performance?

Responsiveness?



Low System Requirements?



High Capacity?



What is "Performance"?

What is Performance? 2

Based on Role and Responsibility

- Users and IT Support: Normally concerned with application responsiveness
- Database Administrators: Might focus on database efficiency and potential bottlenecks.
- Systems Administrators and Engineers: Look at server capacity and utilization
- IT Managers: Might be concerned with user productivity, system availability, budgets, and risk aversion



What is Performance?

Application Performance Degradation

Forrester Research has reported that among companies with revenue > \$100 billion, nearly 85% reported **significant application performance degradation**

Best Practices in Problem Management



Impact of Poor Performance

Application Performance

Nearly 85% of applications are **failing to meet and sustain their performance requirements** over time and under increasing load



Impact of Poor Performance

QAD Customers and Users Affected

How It Affects QAD Customers and Users

- Lost Productivity
- Lost Confidence and Credibility
 - Customers
 - End Users
- Lost Revenue
- Low Morale
- Financial Penalties



Impact of Poor Performance

Typical Performance Problems

Typical Performance Problems

- Generally slow user interface
- Applications get slower over time.
 - Memory leaks
 - If caused by additional users, this means a lack of *scalability*
- Applications crash
- Applications freeze
- Business functions fail to complete within a reasonable time



Definition

Defining Good Performance

How Do We Define Good Performance?

- Establish objective response time
- Define throughput criteria for key QAD application functions
- Scale to thousands of concurrent users
- Provide consistent and predictable response times



Definition

Metrics

Objective and Measurable Metrics

- Response time
 - Queue time
 - Service time
 - Transmission delay
- Transaction throughput
- User counts and scalability



Metrics

- Response Time: $\text{Service Time} + \text{Queue Time} + \text{Network} / \text{Transmission delay}$
- Queue Time: Any delay processing a service request because the request is queued.
- Service Time: How long it takes to process a work request.
- Throughput: The rate at which work requests are completed.
- Scalability: How does Response Time and Throughput vary as extra users/load is added?
- Utilization: The percentage of time the device is busy doing work.
- Capacity: How much work can be processed at maximum utilization.
- Bandwidth: The capacity of a device or interface to transfer data.
- Bottleneck: The component slowing everything else down because it is at the capacity limit.

Performance Definitions

Response Times

- Response time
 - The time from when a user initiates an action to the time the response is produced on the screen
 - Queue time + Application service time + Transmission delay
- QAD Enterprise Edition response time limits
 - General navigation ≤ 1 second
 - Complex validations & saving documents ≤ 3 seconds
- Consistent response times are important!



Definitions

Studies have shown that user productivity increases significantly when system response times are consistent, even if the average response times are slow.

Performance Definitions 2

Response Time Standards

- Average response times for field-to-field navigation
 - 0.2 seconds is good
 - 0.5 seconds is acceptable
 - 1.0 second starts to impact the user
- Complex Enterprise Financials documents
Validated and saved < 2.0 seconds
- **Response times must be predictable and consistent**



Definitions

Performance Definitions 3

Throughput, Scalability, and Bottlenecks

- Throughput measures the amount of work that can be completed in a given timeframe
 - How many Sales Orders per day?
 - How long does MRP take?
- Scalability measures the ability to increase the user workload without causing a *non-linear* decrease in system performance
- A Bottleneck is a point in the system that throttles the performance of other areas
 - It causes other components to *wait* for a response



Definitions

Performance Definitions 4

What Is A “Concurrent User”?

- A concurrent user is a user actively using the QAD Enterprise Edition Software

Working from a base of "100 users", some assumptions based on real world data on the effective hourly work rate of users were made to generate the load testing scenarios

- Typically the “Named User” count is much higher than the concurrent user count



Definitions

Performance Expectations

It all comes down to expectations

- Regardless of the technical measurements, the performance of a QAD system ultimately depends on human expectations
- Many perceptions of poor performance can be solved by managing customer expectations
- Adequately defining the performance problems and setting objective targets can be critical



Expectations

Regardless of the technical measurements, the performance of an application depends on human expectations. Many perceptions of poor performance can be solved by managing the customer relationship, instead of embarking on a time consuming and costly exercise to tune the QAD software environment.

Often the customer has overly optimistic expectations as a result of the sales process; resetting their expectations can change their perception of the software performance from unacceptable to acceptable.

Defining current performance issues, setting performance objectives, determining key performance indicators (KPIs), and using a performance engineering methodology can be critical in managing customer perceptions and expectations.

Performance Perception

If you can't fix response times, improve consistency.

Manage Expectations



Perception is the Key to Happiness

Performance Engineering

Performance Engineering



Methodology

A Performance Engineering Methodology

- Establish Performance Objectives
- Identify Critical Requirements
- Define Abnormal and Normal Conditions
 - Service Level Agreements
- Create a Baseline
- Continuous Monitoring and Alerting
 - QAD Monitoring Framework
- Performance Tuning
- Capacity Planning and Resizing



Overview

An effective methodology for defining, identifying, and solving performance issues is important for managing customer perceptions and expectations.

Performance Objectives

Establish Performance Objectives

Unless performance is actively managed and benchmarked, user performance expectations are hard to quantify:

- “The system is running slow.”
- “It takes too long to log in.”

What do these mean?



Methodology

When users access the QAD application software, they place additional demand on the system (usually requiring both good response time and high throughput). When the user demand is high, system resources can come under load and fall out of balance. Performance suffers with the user noticing:

- Decreased system throughput (reports and complex processing functions take longer)
- Increased response time (moving from field to field on a screen takes longer)

Unless performance is actively managed and benchmarked, user performance expectations are hard to quantify. “The system is running slow” or “my report is taking forever” are not good measures or descriptions of system performance.

It is far better to have quantitative information such as “My report is running 65% slower than baseline.”

Identify Critical Requirements

Identify Critical Requirements

- Maximum Satisfactory Response times for key processing
 - Define “key processing”
- Throughput Requirements
 - MRP, Backup, Batch Processing Windows
- The mix of processing expected
 - How this varies with time
 - Concurrent User Counts
 - Averages and Peaks, Expected Growth



Methodology

At a minimum, a set of performance requirements documents the following:

- The maximum satisfactory response time usually experienced for key types of processing, along with a definition of “usually.”
- The typical throughput required and the times it occurs. For example, a program (such as MRP) runs daily at 10:00 a.m. and 3:15 p.m.

The mix of processing expected and how the mix varies with time. For example, in the morning the user base is mainly processing sales orders and dispatching goods. In the afternoon, the users are mainly entering sales orders, work orders, and processing Financials information. At night, the system is generally running MRP, DRP, Invoice Prints, and generating EDI transactions.

Try to determine:

- The expected number of users at various times of the day, including peak.
- Any hard requirements, such as the maximum time for backup, or “EDI transaction must be processed within 5 minutes or there is a financial penalty.”

Establish a Baseline

Establish a Baseline

- Using KPIs and Performance Requirements
 - Create a set of baseline measurements as a reference point
 - Useful for Capacity Requirements Planning, Trending
- Load Testing tools may help with creating a baseline
 - Apache Jmeter
 - HP LoadRunner



Methodology

A common way of determining application performance is to benchmark key applications. Choose a subset of QAD Enterprise Applications programs to serve as key performance indicators (KPIs). When benchmarking the KPIs, there are a few common rules to follow:

- Test Iteratively: Have each test script run the benchmark program multiple times in succession. The first iteration often takes longer than subsequent iterations. This method also smoothes out statistical variations and identifies progressive slowdown issues.
- Always Repeat Tests: Run each test script multiple times.
- Use real data.
- Understand the difference between a benchmark and a stress test.
 - Benchmarking can be done with a single client to identify best case performance.
 - Benchmarking can be done with expected concurrent user counts to identify average performance.
 - Stress testing is conducted to see how many users / processes can be loaded onto the system before something breaks.

For further information on how to benchmark QAD Enterprise Applications, contact the QAD Performance Team.

There are many techniques and software packages that you can use for benchmarking.

After creating the benchmark baselines, test the KPI applications on a regular basis, at set times, with set selection criteria, and time how long they take to execute. If data is gathered and tracked for these KPI programs over time, you can determine:

- What are normal execution times?
- What are abnormal execution times?
- When do the abnormal execution times occur?
- Is the system, as a whole, getting slower over time?
- At what rate is the system getting slower?
- Was the original benchmark accurate?

This continuous benchmarking enables you to track system performance over time. You can use spot checking, in addition to planned benchmarks, to show system performance trends in the medium term (for example, what will the system behave like two months from now?) and the short term (why is the system performing poorly right now?).

Continuous Monitoring

Continuous Monitoring

Ad Hoc Monitoring lacks transparency and can lead to emergency performance escalations.

Continuous Monitoring allows:

- Advance notice of developing problems
- Trending against the baseline
- Extra information to aid in problem solving
- The ability to deliver KPI information to management on demand



Methodology

Problem Solving

Problem Solving



Approach

A Problem Solving Approach

You have an urgent performance problem.

How do you solve it?

1. Has the problem been properly defined?
2. Start with the hardware / OS, and work your way up the stack to the database, and finally to the QAD Application
3. Don't discount user behavior and custom code implementations



Problem Solving

Hardware Performance

How well is the hardware performing?



Hardware and Operating System

CPU Load

Are the CPUs under load?

Use vmstat

```
[monitor@coli43 ~]$ vmstat 20 20
procs -----memory----- --swap--  ---io---  --system--  ---cpu---
r  b   swpd   free   buff   cache   si   so    bi    bo    in    cs  us  sy  id  wa
0  0     84 8932088 393616 2753340    0    0    22    26     6     2   3   0 96   1
0  0     84 8932568 393664 2753292    0    0     0    64 1061 1576   0   0 99   0
```

Id(le) should average at least 20 or more

Sy(tem) should be under 10

Wa (wait IO) should be under 10



Hardware and OS

Wait IO is really a measure of the I/O subsystem, not the CPU.

CPU Load 2

Are the CPUs Under Load?

- On Linux / any system with "top":
 - Run top interactively, and note the "Load Average"
 - If, at peak times, the 1 or 5 minute Load Average is > the number of cores on the server, then the system is under heavy CPU load
- On AIX, use "lparstat 20 20"
 - Check %user %sys %wait (as above)
 - Check "physc" & "%entc" to see how many processors in use - compare to total processors on system and judge if server is under CPU load
- Alternatively:
 - Run `sar -q 20 20` to get sampled load averages
 - Run `sar -u 20 20` to get CPU percentages



Hardware and OS

Storage Subsystem

Storage Subsystem a Problem?

Use iostat

```
[monitor@coli43 ~]$ iostat -x 20 20
Linux 2.6.9-89.0.29.ELmp (coli43)      10/05/2010

avg-cpu:  %user   %nice    %sys %iowait    %idle
           2.75    0.00    0.29    0.63   96.32

Device:            rrqm/s  wrqm/s     r/s     w/s  rsec/s  wsec/s   rkB/s   wkB/s  avgrq-sz  avgqu-sz   await  svctm   %util
sda                0.09  15.51   3.22  10.41  177.24  208.04   88.62  104.02   28.25    0.78   57.22   2.43   3.31
sda1               0.00   0.00   0.00   0.00    0.26    0.00    0.13    0.00  109.45    0.00    3.98   3.13   0.00
sda2               0.03   9.35   1.02   7.09   25.72  132.21   12.86   66.11   19.46    0.64   79.31   1.69   1.37
sda3               0.00   1.42   0.15   1.77    4.17   25.49    2.09   12.74   15.49    0.03   16.92   6.51   1.25
sda4               0.00   0.00   0.00   0.00    0.00    0.00    0.00    0.00    2.00    0.00    6.18   6.18   0.00
sda5               0.00   0.00   0.00   0.00    0.00    0.00    0.00    0.00   50.75    0.00    3.02   2.56   0.00
sda6               0.06   4.74   2.05   1.55  147.09   50.35   73.54   25.17   54.77    0.10   28.91   2.99   1.08
```



Hardware and OS

Storage Subsystem 2

Storage Subsystem a Problem?

- If %wio is high (> 5 or 10%), then look at the individual disks
- Are the disks unbalanced?
 - Is one disk busier than the rest?
 - Are any disks overutilized (%util)?
 - Are the service times higher than about 3ms? (svctm)
 - Is the run queue > 2 on any disk (avgqu-sz)?
- Can you move things about to balance the disks?
 - Database extents / before image files?
 - Home directories
 - Temporary Files

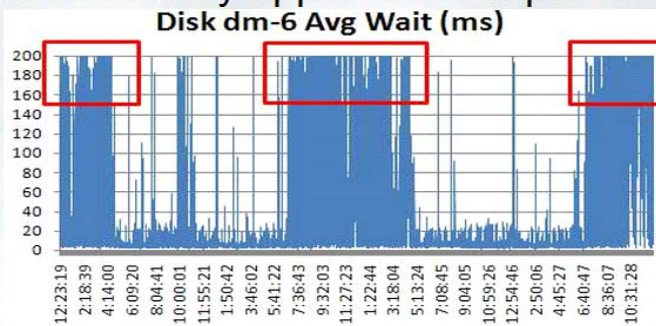


Hardware and OS

Storage I/O Case Study

Storage I/O Case Study

- When looking at "iostat" one device (disk) stood out
- It had huge average wait times (await) of 100 - 200 ms
- It turns out this was the slowest disk on the io subsystem
- It was where the key appserver's tmp files were being written



- The tmp files were redirected to fastest disk
- Problem resolved.



Hardware and OS

Storage I/O Study 2

Storage I/O Case Study

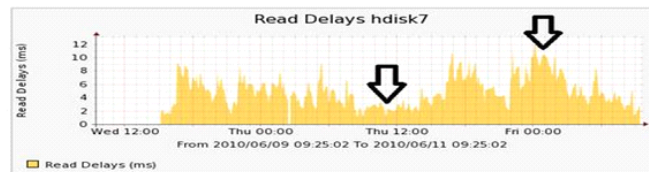
A customer was advised to run with RAID 10, but went ahead and deployed with RAID 5 instead. A couple of years later, they were complaining of poor application performance. The disk subsystem (high %wio) was soon identified as a bottleneck.

An analysis of the service times :

Disk Writes delayed up to 800% over Optimal



Disk Reads delayed up to 500% over Optimal



Hardware and OS

Memory and Paging

What About Memory and Paging?

Use vmstat

```
[monitor@coli43 ~]$ vmstat 20 20
procs -----memory----- --swap-- -----io----- --system-- -----cpu-----
 r  b   swpd   free   buff  cache   si   so    bi    bo    in    cs  us  sy  id  wa
 0   0     84 8932088 393616 2753340    0    0    22    26     6     2   3   0  96   1
 0   0     84 8932568 393664 2753292    0    0     0    64  1061   1576   0   0  99   0
```

- Look at "free", "si", "so". If si and so are non-zero, the system is paging. The system usually pages due to lack of memory. The "free" value should confirm a low memory level
- You can use "ps" and "top" to determine which processes are using the most memory



Hardware and OS

Network

Is it a Network Issue?

Use netstat

```
[monitor@coli43 ~]$ netstat -sa
Ip:
  299888000 total packets received
  380515 with invalid addresses
  0 forwarded
  227 with unknown protocol
  0 incoming packets discarded
  299507238 incoming packets delivered
  323828989 requests sent out
  53763 fragments received ok
Icmp:
  172977 ICMP messages received
  44 input ICMP message failed.
```

- Look for dropped packets
- Network Errors

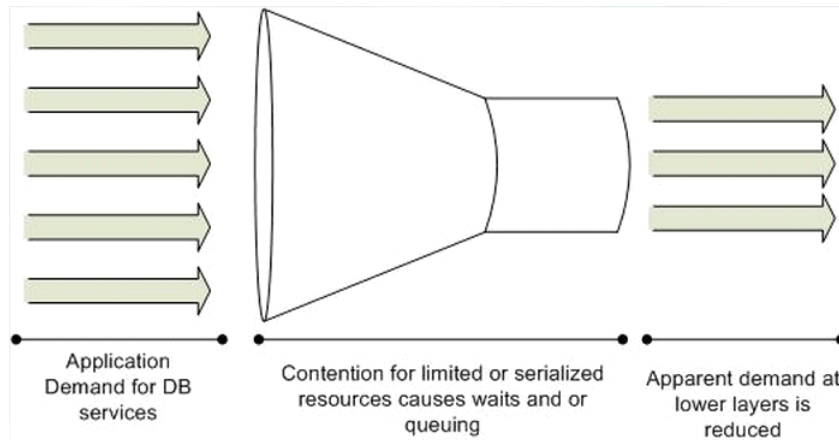


Hardware and OS

The simplest way to tell if the network is a significant contributor to application performance issues is to take measurement while running the client application on the local host and over the network. Then compare the results.

Database a Bottleneck?

Is the database a bottleneck?



OpenEdge Database

Database Manager

Database Memory

Use promon to look at the buffer hits

- Take 60-second samples
- Should be 98% or higher (99% or 100% is better)
- Increase with -B startup parameter

Dynamic / online increase with OE 10.2



Database

Database Memory 2

Database Memory

Event	Total	Per Sec	Event	Total	Per Sec
Commits	28788	0.0	Undos	55	0.0
Record Updates	67510	0.1	Record Reads	3918792	5.7
Record Creates	66478	0.1	Record Deletes	151	0.0
DB Writes	4460	0.0	DB Reads	1228723	1.8
BI Writes	6035	0.0	BI Reads	347	0.0
AI Writes	0	0.0			
Record Locks	399294	0.6	Record Waits	0	0.0
Checkpoints	83	0.0	Bufs Flushed	452	0.0
Rec Lock Waits	0 %		BI Buf Waits	0 %	
Writes by APW	60 %		Writes by AIW	77 %	
Buffer Hits			Alternate Hits	0 %	
DB Size			AI Size	0 K	
FR chain			M chain	2 blocks	
Shared Memory	32				
0 Servers, 9 Users					



Buffer Hits



Database

Checkpoints

Checkpoints

- Progress must eventually flush updated blocks to disk
- A checkpoint is a periodic verifications that disk writes are keeping up
- OpenEdge uses asynchronous checkpoints based on BI clusters
- APWs will reduce the number of buffers flushed at checkpoint
- You definitely want them to occur less often than every 60 seconds. 120 seconds is an even better goal
Try increasing the BI block size and the BI cluster size



Database

BI File Utilization

Before Image File Utilization

10/05/10	Activity: BI Log			
19:49:47	09/27/10 21:32 to 10/05/10 19:49 (190 hrs 17 min)			
	Total	Per Min	Per Sec	Per Tx
Total BI writes	6035	1	0.01	0.21
BIW BI writes	4668	0	0.01	0.16
Records written	468414	41	0.68	16.27
Bytes written	43519860	3812	63.53	1511.74
Total BI Reads	347	0	0.00	0.01
Records read	397	0	0.00	0.01
Bytes read	41346	4	0.06	1.44
Clusters closed	83	0	0.00	0.00
Busy buffer waits	91	0	0.00	0.00
Empty buffer waits	0	0	0.00	0.00
Log force waits	0	0	0.00	0.00
Log force writes	0	0	0.00	0.00
Partial writes	313	0	0.00	0.01
Input buffer hits	0	0	0.00	0.00
Output buffer hits	692	0	0.00	0.02
Mod buffer hits	106	0	0.00	0.00
BO buffer hits	0	0	0.00	0.00

Promon → R&D → Activity Displays → BI Log



Database

Keep:

- Busy buffer waits low by using a before image writer
- Empty buffer waits low by providing more BI buffers
- The BIW BI writes low by increasing BI buffer size

Further Information

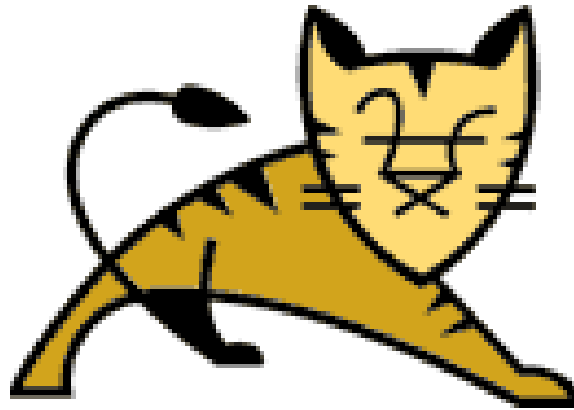
Further Information

- Tuning the OpenEdge database can be very involved and difficult
- There are many options and approaches to take
- Contact the QAD Performance Team for more information



Database

Tomcat and Java



Tomcat and Java

Java Introduction

Tomcat and Java

- Java is a critical component of both the Tomcat and OpenEdge technologies.
- Optimizing Java can (and will) provide performance and stability gains.
 - Better memory usage
 - Faster Response Times
 - Higher overall throughput
 - Lower CPU Utilization
- *The default settings are tradeoffs that ensure that no applications run particularly well, but they do not run particular badly either.*



Tomcat and Java

Startup Parameters

Startup Parameters

- [Tomcat Install Directory]/conf/server.xml
Specify Max/Min Threads and Timeouts
- [Tomcat Install Directory]/bin/setenv.sh
Specify JVM Performance parameters

```
#!/bin/sh

# Set these variables for use during Tomcat statup / shutdown

# CATALINA_OPTS="-Djava.awt.headless=true -server -Xms256m -Xmx256m"
JAVA_HOME=/usr/java/jdk1.6.0_05

# the "headless" option is required for QAD Desktop 2.2.0 and above
CATALINA_OPTS="-Djava.awt.headless=true -Xms1024m -Xmx1024m -Xss128k -XX:MaxPerm
Size=512m -server -XX:+UseParallelGC"
```



Tomcat Java Startup Parameters

The default number of threads is 150. If you want more than 200 threads, consider using multiple Tomcat servers.

Startup Parameters 2

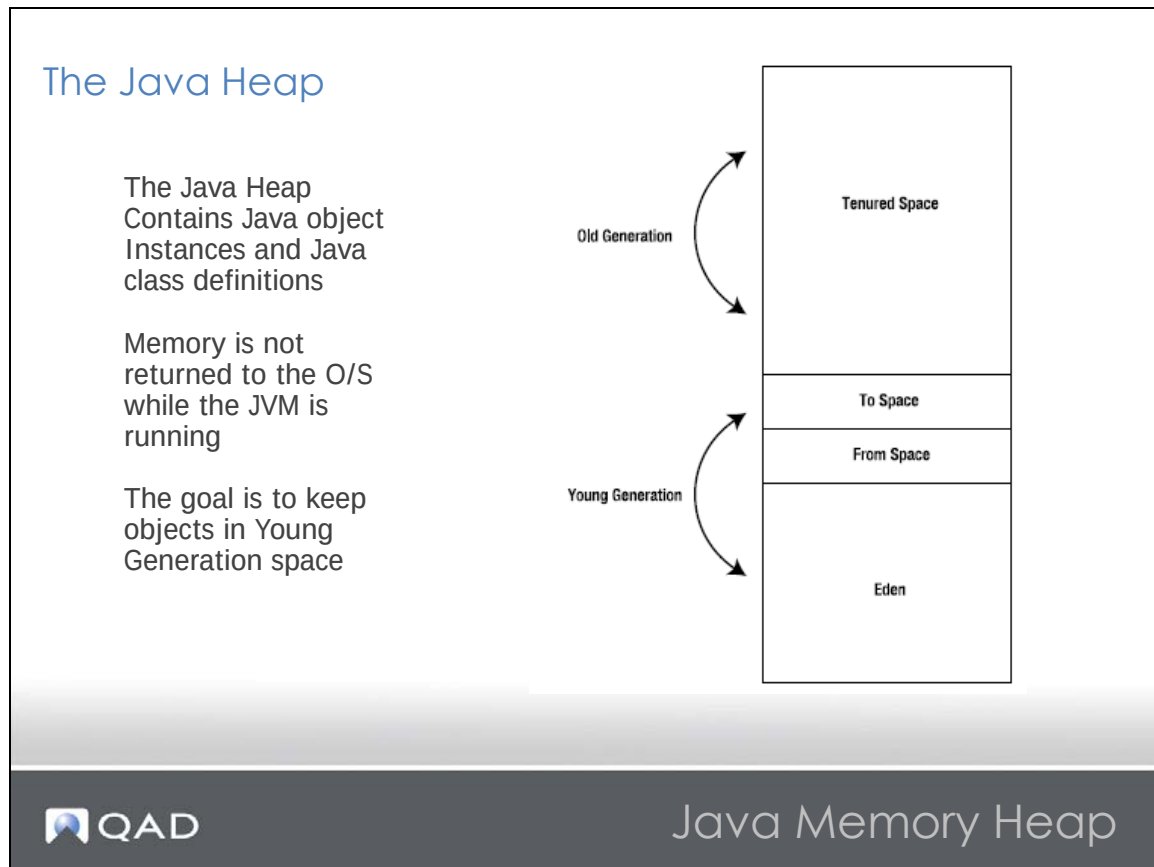
Startup Parameters

- Standard options
 - Supported on all platforms
- Beginning with -X
 - Nonstandard. Not guaranteed to be on all platforms
 - Subject to change without notice
- Beginning with -XX
 - Nonstandard
 - May have specific system requirements
 - May not work with IBM AIX JVM



Categories of JVM Params

Java Memory Heap



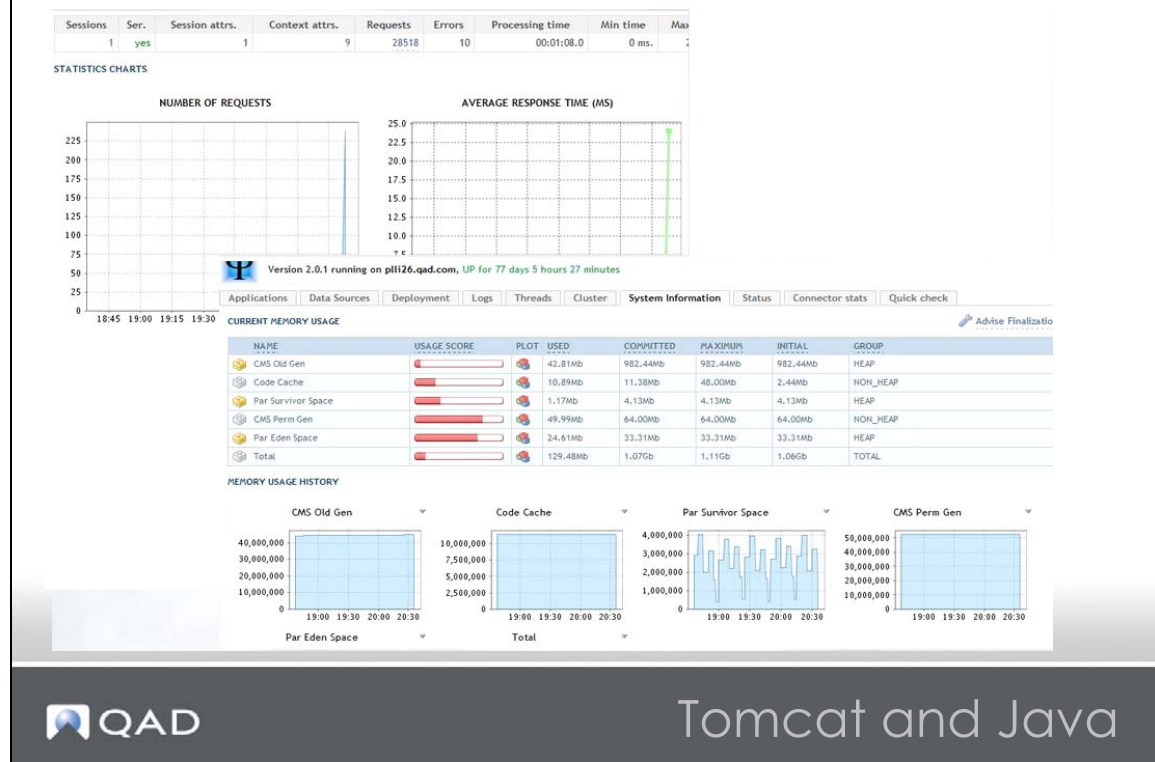
The Sun JVM heap is divided into two parts:

- The Old Generation, sometimes called the “Tenured Space.”
- The Young Generation, sometimes called the “New Space.”

The Young Generation is further subdivided into three partitions: Eden and two survivor spaces, called the “From Space” and the “To Space.” Objects are created in Eden. When Eden is full, live objects are copied to the From Space. When Eden is full again, objects in the From Space are copied to the To Space. Finally, if the object survives when Eden is full, the object is moved to the Old Generation.

Psi-Probe

Psi-Probe can show response times and memory use



Install PSI-Probe from the Google Code repository:

<http://code.google.com/p/psi-probe/>

QAD .NET UI

The screenshot shows the QAD .NET UI interface with the 'Customer Maintenance' window open. The window is divided into several sections:

- Applications:** A sidebar on the left containing various application categories like Distribution, Manufacturing, Financials, Customer Services, Customer, Supply Chain, and Processes.
- Process:** A section below Applications showing a flowchart for the 'Order Process'.
- Customer Maintenance:** The main window displaying a list of customers and a detailed view of a selected customer's address and data.

The 'Customer Maintenance' window shows a list of customers with columns for Customer ID, Sort Name, Telephone, Address, City, State, Postal Code, Region, and Country. The selected customer is 'University of Cal - Ship To'.

The detailed view for the selected customer shows the following information:

- Customer Address:**
 - Customer: 00010000
 - Name: University of Cal - Ship To
 - Address: 1 Briar Lane
 - City: Santa Barbara
 - State: CA
 - Post: 90026
 - Country: United States of America
 - Attention: Mr. Huang
 - Telephone: (212) 123-4567
 - Ext: (212) 123-4567
 - Address: 09/13/2005
- Customer Data:**
 - Sort Name: University of Cal - Ship To
 - Multiple: ☐
 - Type: ☐
 - Ship Via: US
 - Region: ☐
 - AR Acct: 1200
 - Currency: USD
 - Resale: ☐
 - Dual Pricing: ☐
 - Rate: 10000
 - Remarks:
 - Lang: ☐

The bottom of the window shows 'Program Links' and 'Actions' buttons.

.NET UI the Problem?

Is the .NET UI the problem?

- Compare the same program against the character UI version.
Won't work with Enterprise Financials
- Check AppServer Connections and Memory
 - AIA, Name Server, Direct Connect?
 - -Bt startup parameter
- Check swaplimit in server.xml (too low?)
- Are databases connecting in shared memory?
- Do the client PCs have enough capacity?



QAD .NET UI

Customized Programs

Customized Programs



Customizations a Usual Suspect

A Usual Suspect

Customizations are a common cause of performance issues on customer sites

Code is often developed quickly against deadlines, and does not go through a rigorous QA process

Also, coders may not understand transaction scope, record scope, and locking issues

The effect of customizations cannot be underestimated

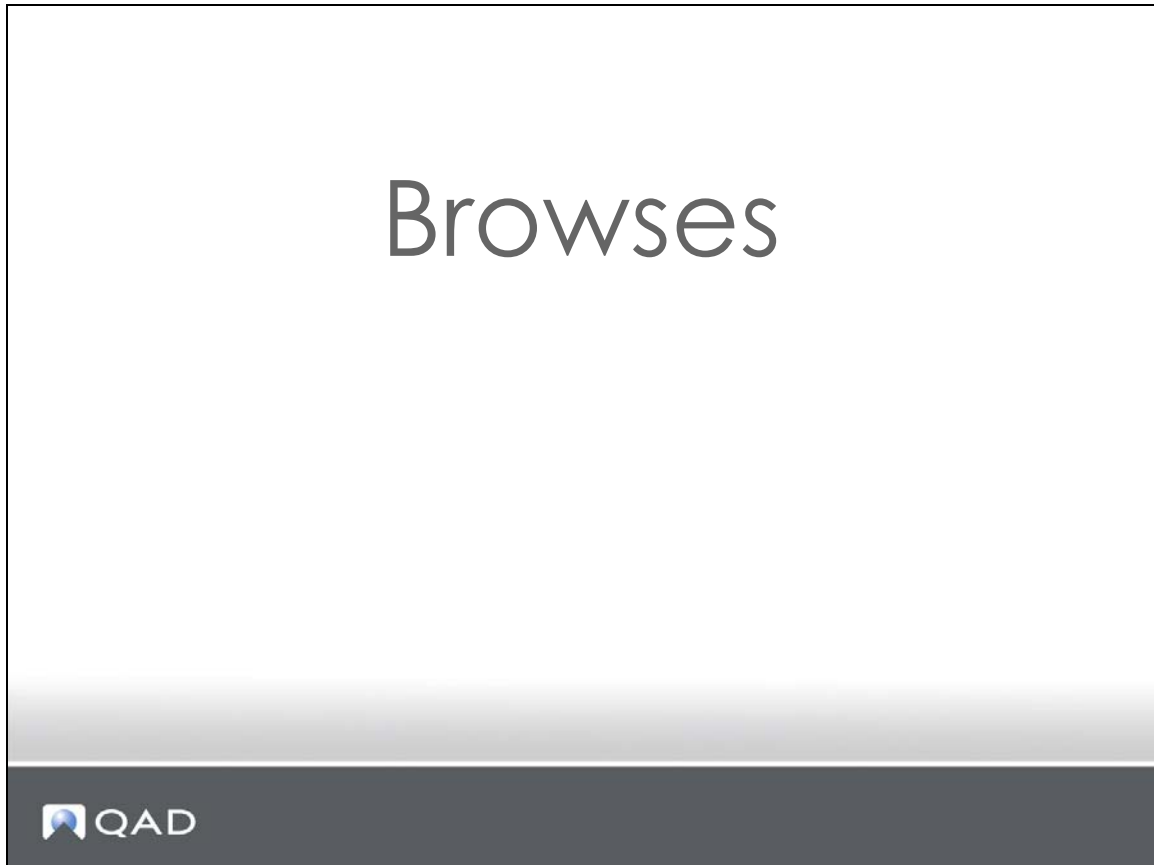
Simple programming errors in a commonly used program can turn a responsive and well performing site into a performance catastrophe overnight

All code should be analyzed using XREF to ensure good index selection, are a bare minimum, before being allowed into production



Customizations

Browses



Impact of Browsers

Great Functionality, However ...

- Users have the power to create them
 - This is a very simple way of allowing un-indexed queries to be run against large tables
 - Which has a huge negative impact on system performance
- Even well designed browses can run in un-indexed mode if the users do not effectively use the selection criteria, or try to sort on non-indexed fields
 - Avoid using "contains", "begins", or similar. Use simple criteria where possible (greater than, less than, equals)
 - The indexed fields tend to be at the drop of the drop down boxes with selection fields. Try to use them
 - Avoid sorting on anything but the default sort order, unless absolutely necessary
 - Limit the number of browses which go into a browse collection

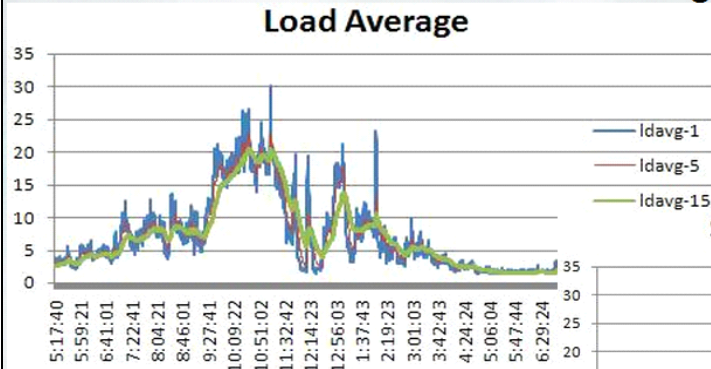


Browses

Browises Case Study

Case Study

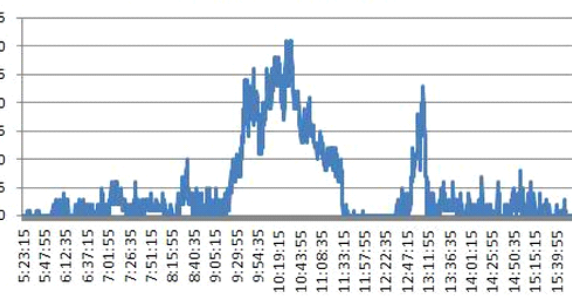
- A customer running on a 16-core server experiences CPU "overload" - sustained Load Averages 20



- It turns out most of the load is due to long-running Browises.

- Check the UI appserver
- Check top for activity
- Address Browse Behavior

Simultaneous Browises



Browises

End of Course

Further Assistance

- QAD Performance Team

If you cannot solve a performance issue, contact the team at PDL_RaD_Performance@qad.com

- Q-Scans

QAD offers consulting engagements that assess your current QAD configuration and identify improvements



End of Course

Product Information Resources

QAD offers a number of online resources to help you get more information about using QAD products.

[QAD Forums \(community.qad.com\)](https://community.qad.com)

Ask questions and share information with other members of the user community, including QAD experts.

[QAD Knowledgebase \(knowledgebase.qad.com\)*](https://knowledgebase.qad.com)

Search for answers, tips, or solutions related to any QAD product or topic.

[QAD Document Library \(www.qad.com/documentlibrary\)](https://www.qad.com/documentlibrary)

Get browser-based access to user guides, release notes, training guides, and so on; use powerful search features to find the document you want, then read online, or download and print PDF.

[QAD Learning Center \(learning.qad.com\)*](https://learning.qad.com)

Visit QAD's one-stop destination for all courses and training materials.

*Log-in required

