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Building a Global BusinessObjects Shared Services Environment on VMware

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Credit Suisse

SESSION CODE: 0706

Learning Points

- Learn how to architect BO XI 3 clusters for performance, high availability and disaster recovery.
- Learn how to build a BO XI 3 security model to support a shared services deployment of a large number of silo'ed projects on shared BO XI 3 clusters.
- Learn how to take full advantage of VMware to meet performance and availability SLAs while maximizing hardware utilization.

Topics

- BO XI Shared Services Program Overview
- BO XI Cluster Technical Architecture
- BO XI Shared Services Security Model
- BO XI VMware Deployment Model

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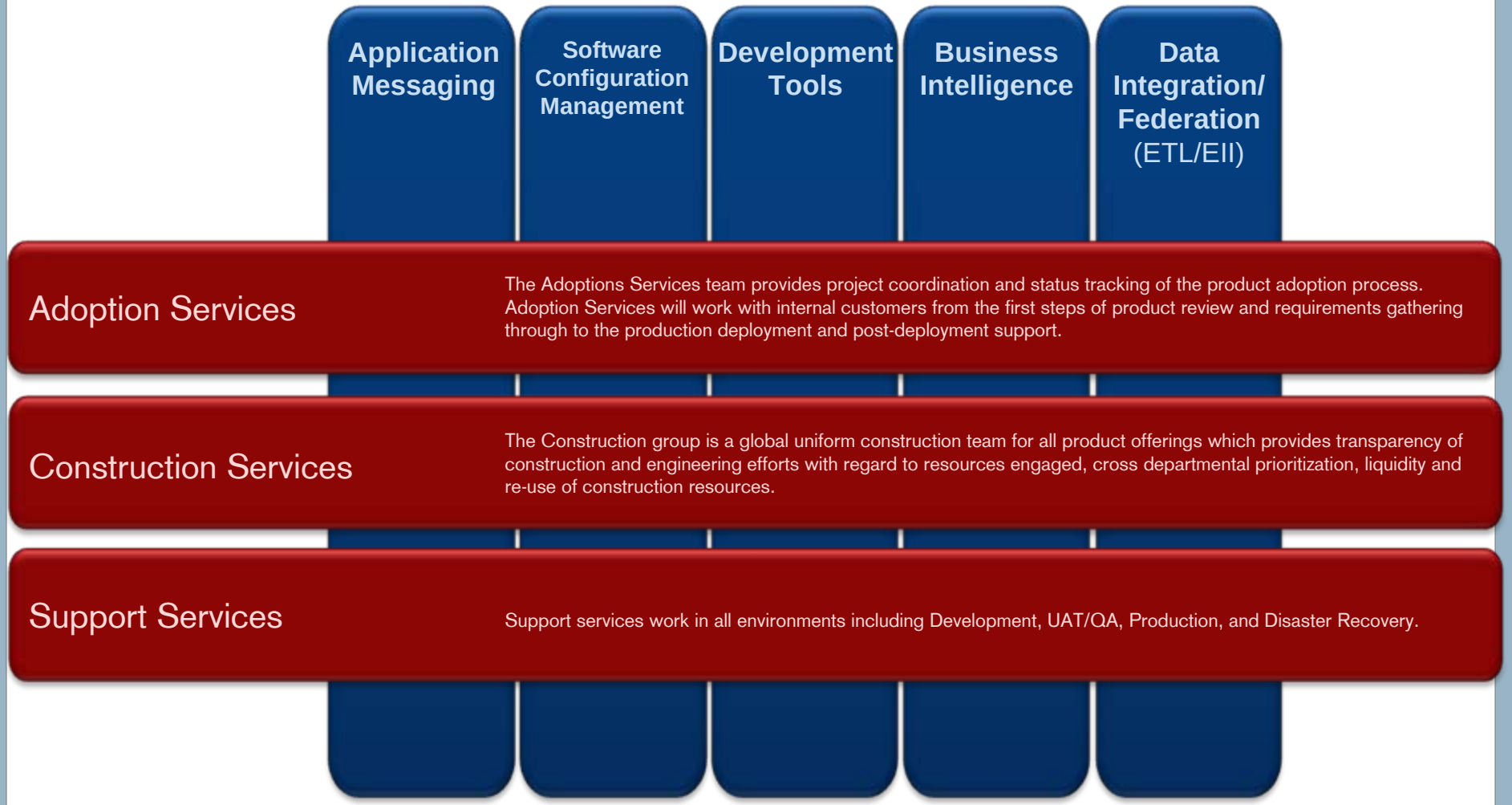
Credit Suisse Company Overview

- Our Businesses
  - Private Banking
  - Investment Banking
  - Asset Management

- Investment Banking Profile
  - Investment Banking provides a broad range of financial products and services, including global securities sales, trading and execution, prime brokerage and capital raising services, corporate advisory and comprehensive investment research.
  - Clients include corporations, governments and institutional investors around the world.

- Key Metrics
  - Total number of employees: 46,700 (21,000 in Switzerland)
  - Net income 6M09: $3.48 billion
  - Assets under management as of June 30, 2009: $1,135.49 billion
  - Offices in 123 locations across 46 countries on five continents

Shared Services Org Functional Overview



Shared-Services IT Teams

- Business Intelligence Product Team
  - Overall program management
  - Vendor relationship management
  - As Subject Matter Experts (SMEs), provide global Business Objects integration services and product consulting expertise
  - Develop architectural roadmap
  - Design global shared infrastructure
- Global Support Services
  - Server support including deployment, configuration and monitoring
  - Security administration and change management
  - Day to day developer support
- Global Construction Services
  - Build value-added shared service integration components
  - Engineer all workstation and server components

BI Program Structure

- Provide a global state-of-the-art BusinessObjects business intelligence standard toolset
  - Centralized product team
  - Centralized support services
  - Centralized construction/engineering services
- Divisional IT departments to retain full ownership of data and reporting applications
  - BusinessObjects to be centrally owned and hosted on shared development, user test, and production environments
  - Each Divisional reporting application to be deployed in a virtual silo that isolates it from other applications running on the same shared server instance
- SOX Compliant
  - Controls to limit access to UAT and Production environments

Tiered Shared Service Model

Owned by Shared Services — Shared Services

Owned by Individual Projects — Standalone

CS SAP BO Deployment Summary

- Products Supported
  - BO XI 3.1 Business Objects Enterprise
    - InfoView, Web Intelligence, Webi Rich Client, DeskIntelligence, Crystal Reports, Xcelsius

- Deployment Size (Project initiated in 2003)
  - Projects: 100 Business Applications
  - Users: 19,500 (5,000 external)
  - Reports: Over 6,000
  - DB Connections: Over 150

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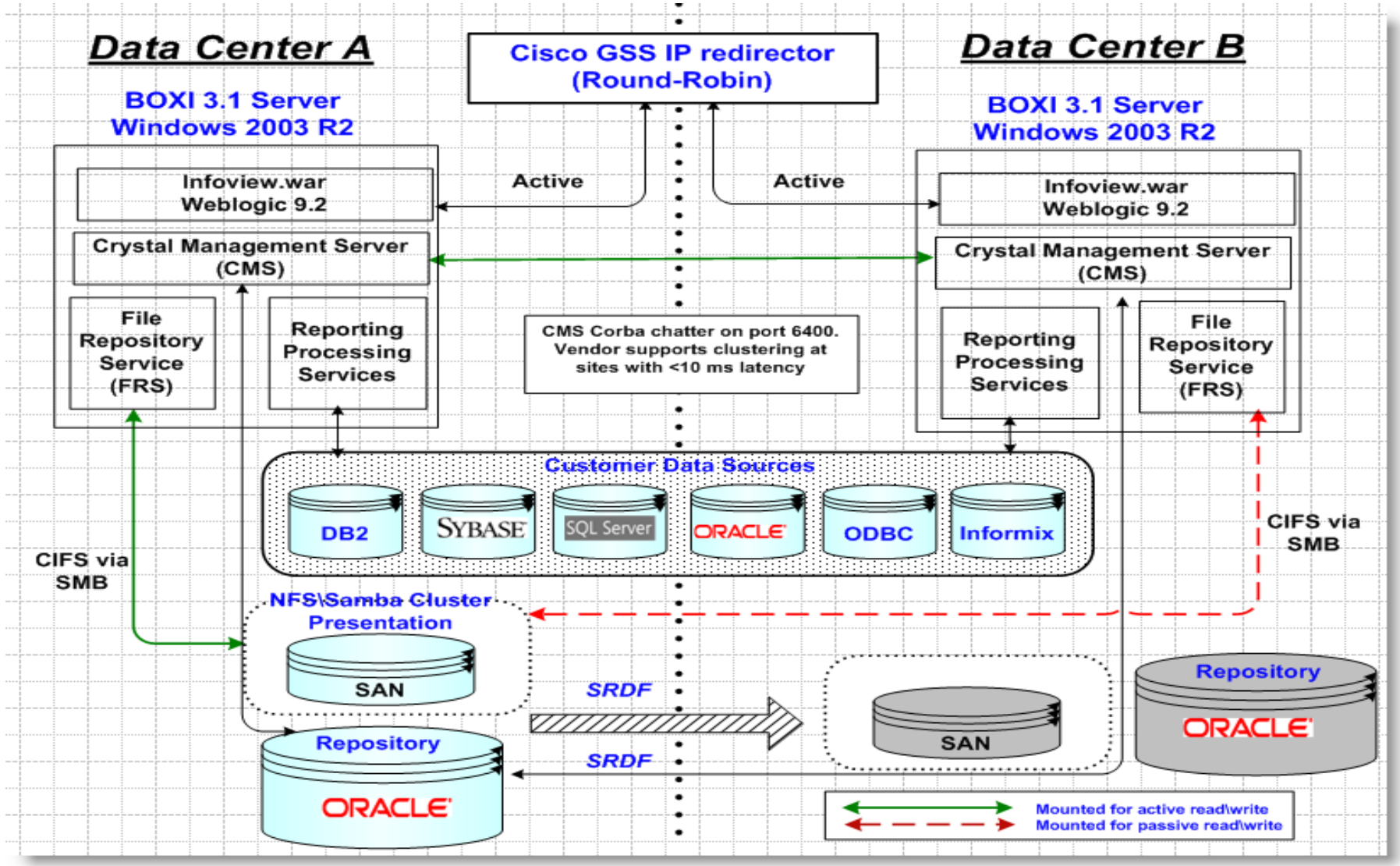
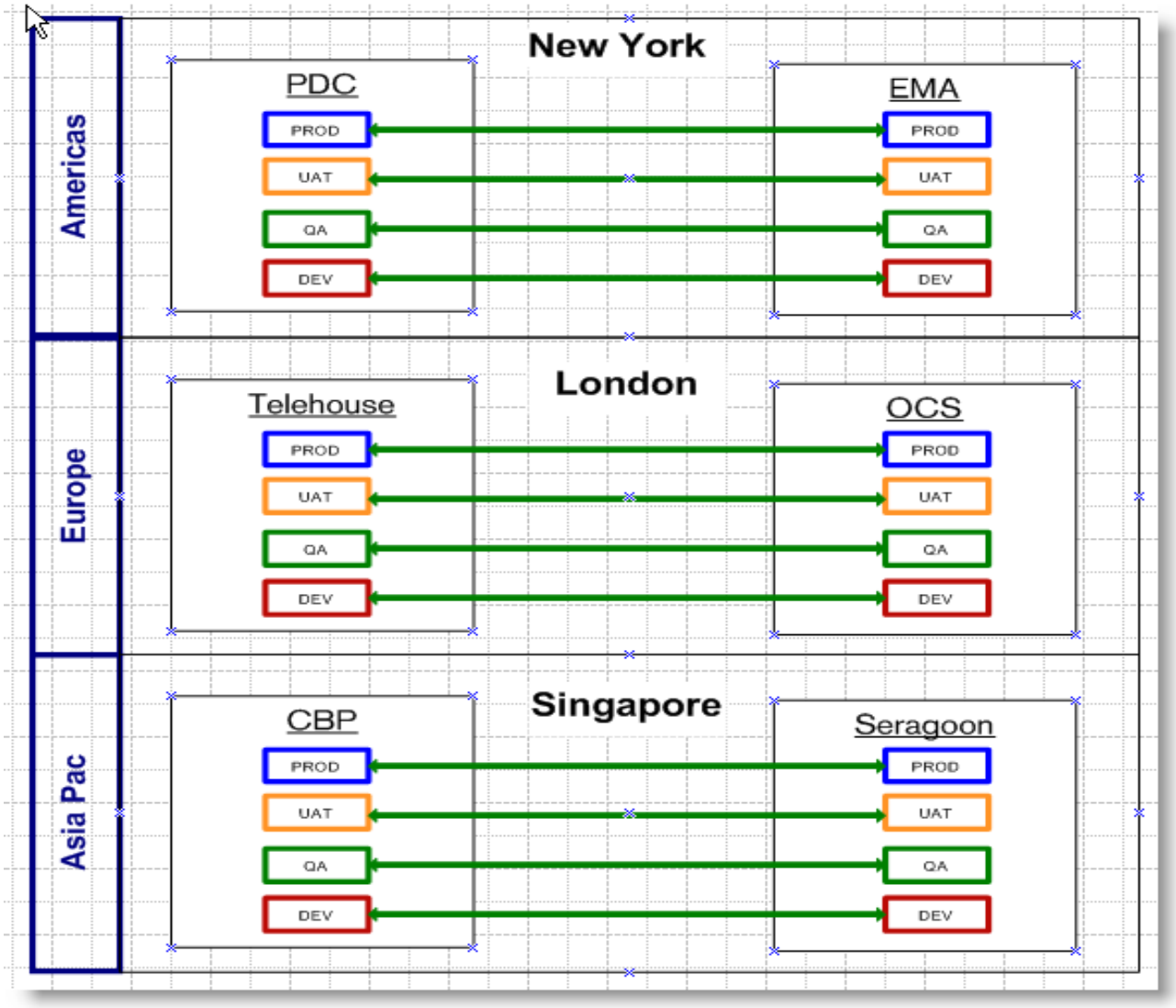
General Cluster Architecture



Cluster Deployment - Environments and Regions



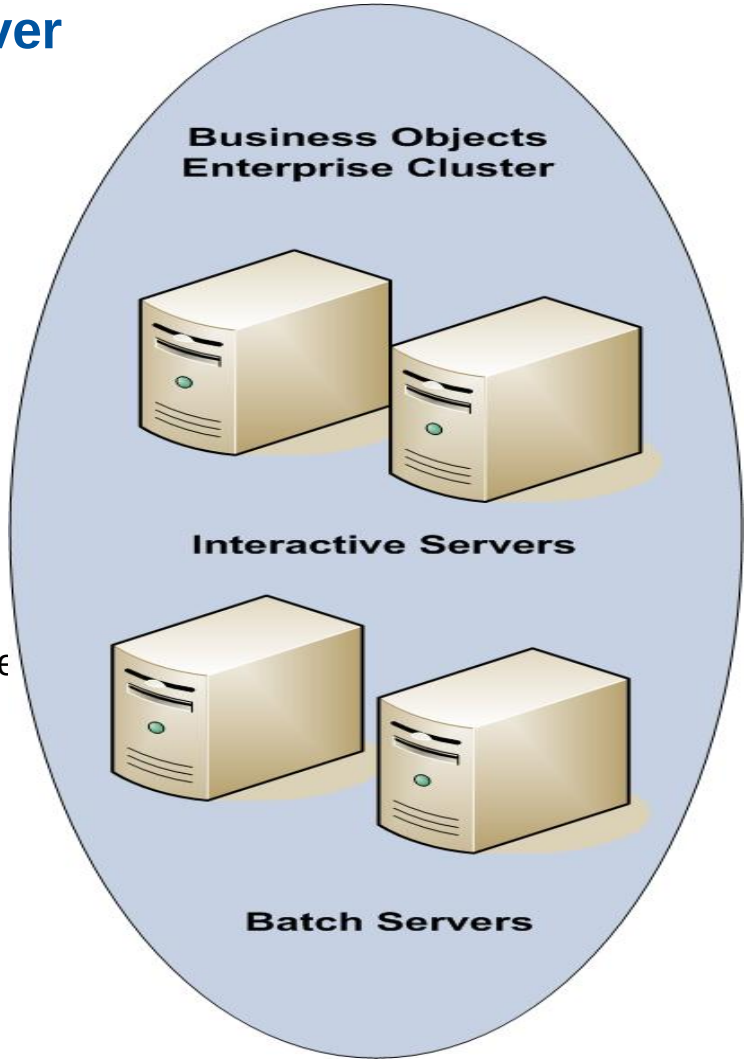
Cluster Architecture Key Concepts

- Business Objects Enterprise Clustering
  - Latency requirement of < 10ms between CMS
- High Availability
  - Business Objects Enterprise services required running actively at both data centers
  - Oracle two-node cluster in primary location
  - NFS \Samba clusters in primary location
  - Storage Area Network (SAN) provides highly fault tolerant, distributed network
- Disaster Recovery
  - Business Objects Enterprise running actively in both data centers
  - DNS push for Oracle and NFS server fail-over via use of alias naming standard
  - Synchronous copy technology, by EMC, of SAN to remote location

Production Cluster – Services

Interactive Server

No.	Service Name
1	CMS
1	Input and Output File Repository Service
4	WebIntelligence Processing Servers
4	Report Application Servers
1	Crystal Reports Cache Server
1	Crystal Reports Processing Server
1	Desktop Intelligence Cache Server
1	Desktop Intelligence Processing Server



Batch Server

No.	Service Name
1	List Of Values Job Server
1	Program Job Server
1	Publication Job Server
1	Event Server
1	Destination Job Server
1	Adaptive job Server
1	Crystal Reports Job Server
2	WebIntelligence Processing Servers
1	Desktop Intelligence Job Server

Cluster Deployment – Key Issues Resolved

- Separating WebIntelligence Batch Processing From Interactive
  - Adaptive Job Server forwards process request
  - WebIntelligence Processing Server pool
  - Use of server groups

Solution: Scheduled daily SDK application sets preferred processing and interactive server groups

- Traditional multi-pass report bursting impact on CMS
  - Uses the Schedule-For feature with multiple executions
  - High CMS load due to rights assignment
  - Interactive vs. batch

Solution: Reduction of batch load through use of custom SDK solution to allow sharing of report instances

Cluster Deployment – Key Issues Resolved

- Inability To Load Cache with Native Crystal\WebIntelligence Objects
  - Requirement for interactive viewing and edit
  - Crystal and WebIntelligence native objects are not pre-loaded in cache
  - Crystal Encapsulated Page Format (EPF) also not pre-loaded

Solution: SDK application to act as a “cache warmer” to pre-load caching

Cluster Deployment – Key Issues Outstanding

- Inconsistent error response from Infoview when timeout occurs
  - Identified 6 unique user workflows within Infoview which cause different error and redirection to the end-user
    - Timeout examples:
      - Within WebIntelligence applet
      - Within Crystal Report viewer
      - When viewing Crystal Reports Instance History
      - When viewing WebIntelligence Instance History
    - Resultant error and redirect examples:
      - Invalid Session error with direction to close browser
      - Crystal Reports Explorer login page
      - HTTP 500 error message
      - Error has occurred: Timeout has occurred with no direction, back button sends you back to users login page entry

Solution (Tactical): Expand session timeout

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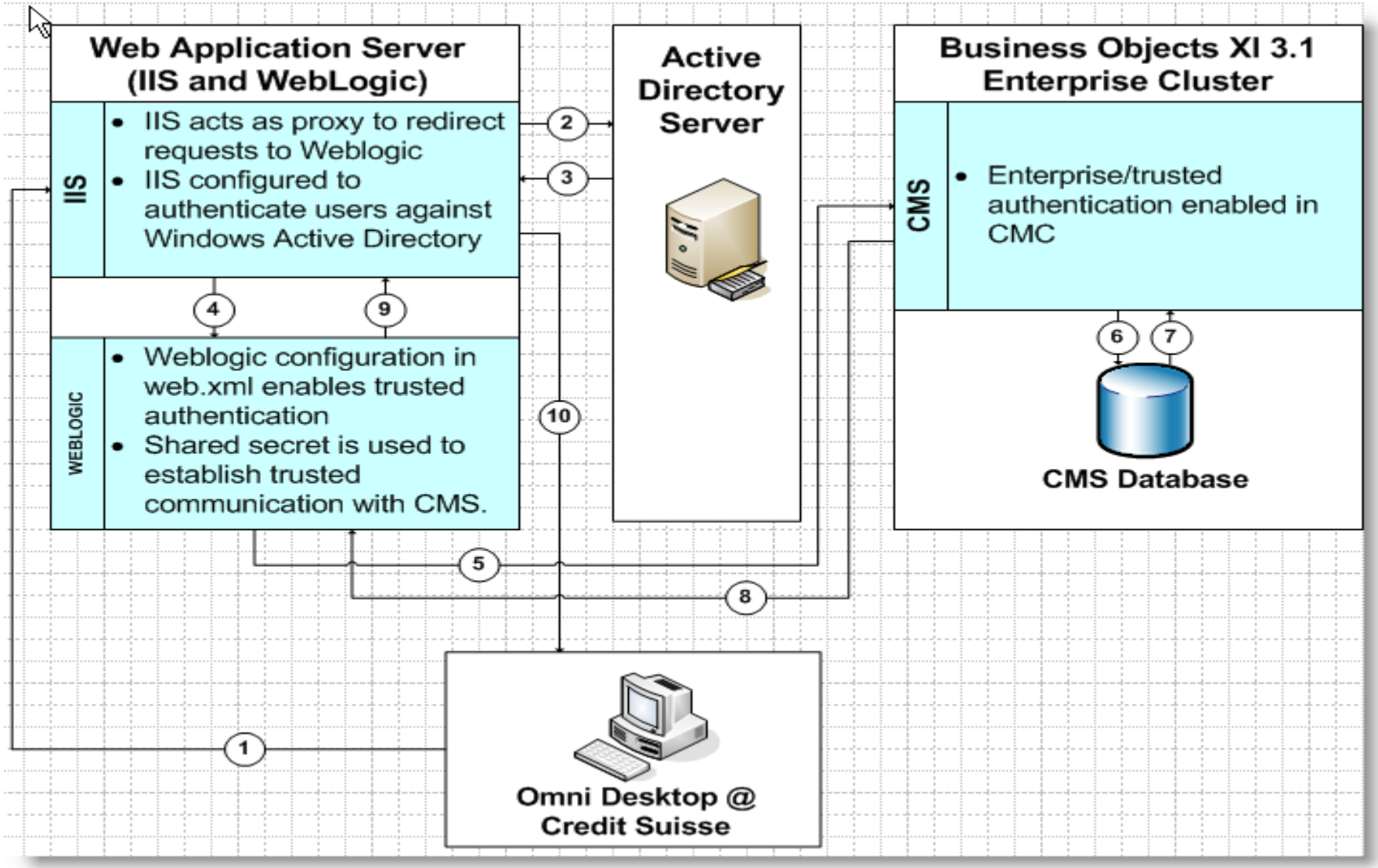
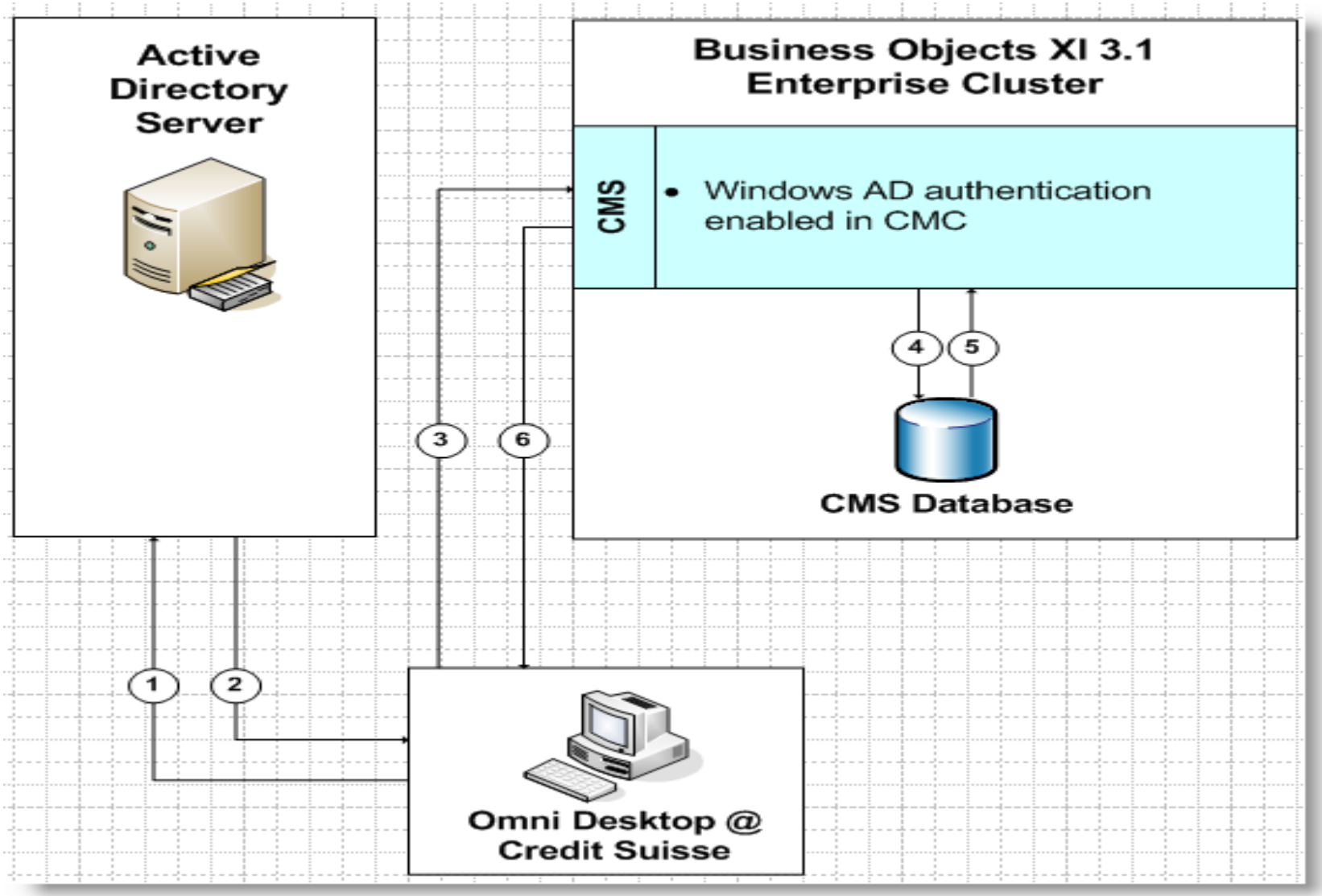
Security –Authentication for Web



Security –Authentication for Desktop

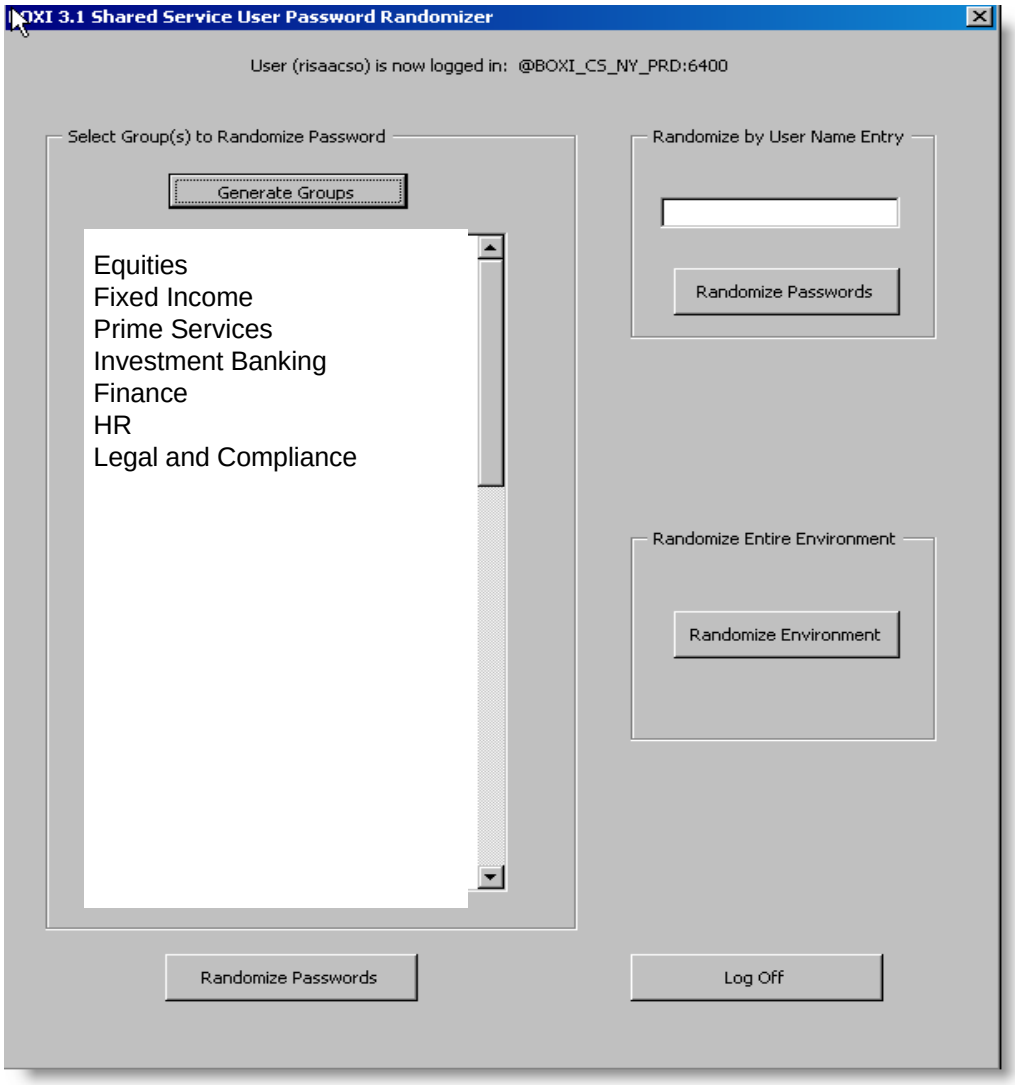


Security -Authentication Key Issues Resolved

- Trusted Authentication forces Enterprise Authentication to be Enabled and Forces Maintenance Passwords
  - Control of logins from client tools and SDK deployments
  - Requirement to randomize enterprise passwords for
    - Existing user base
    - New user creation
    - Support team needs “become” access

Solution: Created custom user interface to allow for randomizing passwords for both environmental security and support requirements

Security -Authentication Key Issues Resolved



- Delivered via Excel with included VBA
- By application
  - New application setup
- By user
  - Support “become” access
- Entire environment
- Exception list
  - Break-glass admin
  - System SDK
  - Batch user

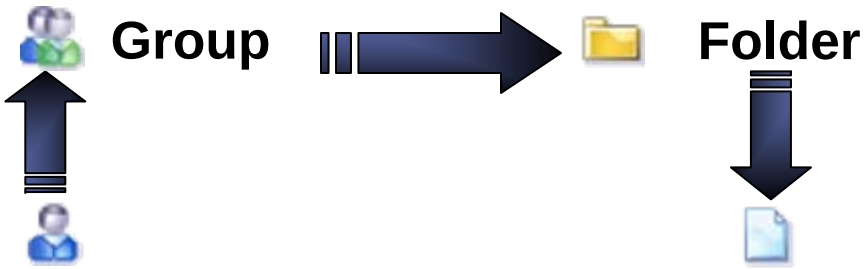
Security – Defining An Application

- Publish and manage own BI content
  - Through development lifecycle (DEV -> TEST -> PROD)
- All levels of security
  - Resource (report, universe, connection) and data security
  - Functional role definition
    - Product level features (e.g. Import\Export from Designer)
- Leverage BI services
  - Inclusion in client-server and web application deployments
  - Complete separation between application and processing tiers
- Enterprise job control
  - Integration with Control-M, an enterprise job scheduling product, and Broadcast Agent.

Security – Functional Roles

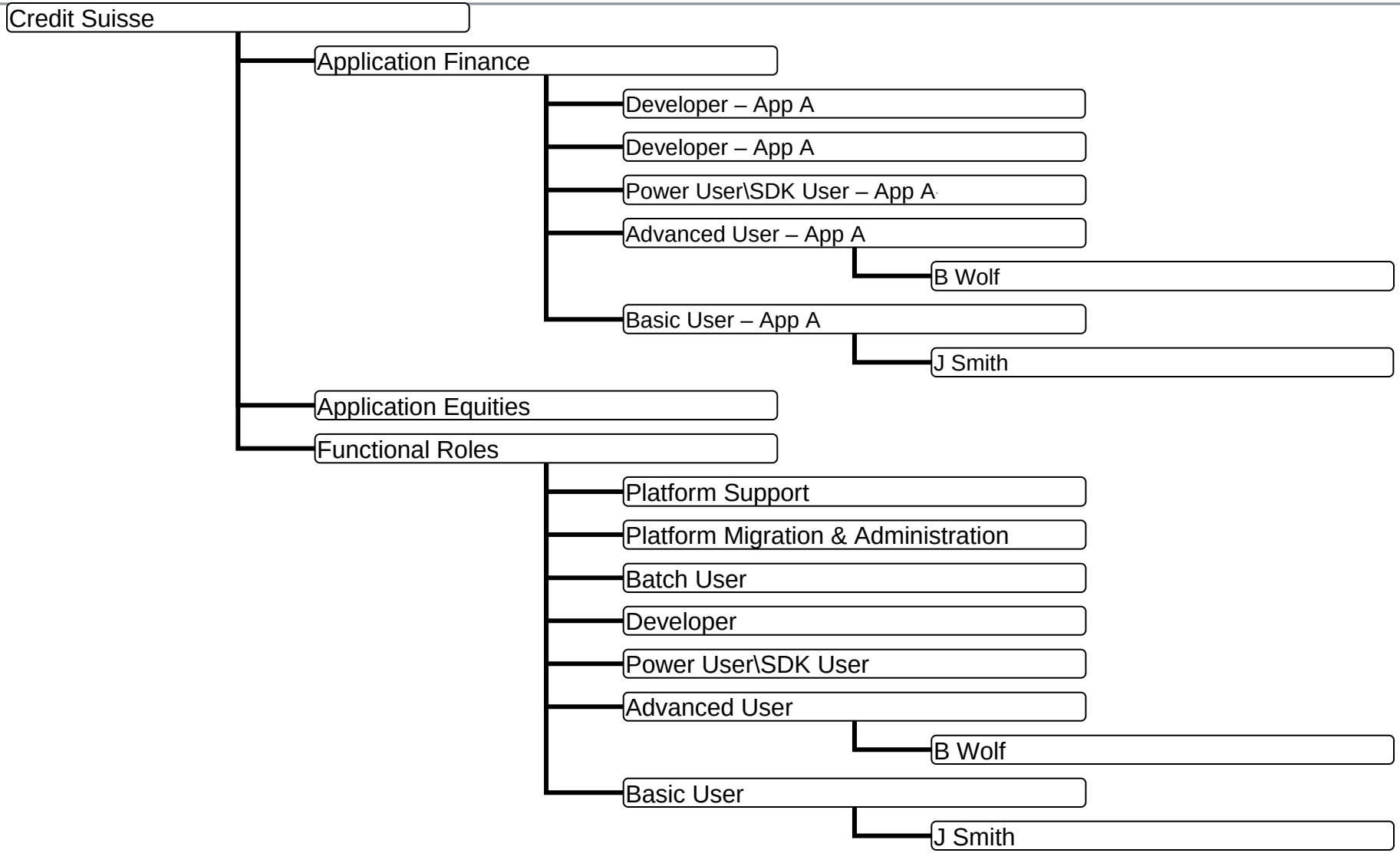
- Define functional roles
  - Roles within a OLAP deployment for use of product functions
    - Application admin role who will perform user and group administration
    - Migration role who will perform code migrations through lifecycle
    - Power user role who can promote code to group folders
    - User role for refresh and basic OLAP functions
    - Environmental specific permissions
      - Locked-down production
      - Open sandbox and development
- Points of control
  - SOX control objective requiring development lifecycle enforcement
    - Development personnel prohibited from moving development software or data to production

Security – Application to Content



- Folder for an applications content
- Create set of profile groups at the application level
  - For example: App XYZ developer, App XYZ power user, App XYZ basic user
  - Add users to a enterprise function role and application-level role
  - Apply folder permissions based on documented standard

Security – Functional Role Matrix



Security – Functional Role Matrix Snapshot

BOXI Environments ▶	Development		QA				UAT/Production				ALL
User roles ▶	App Developer	Power User / SDK User	App Developer	Power User / SDK User	Advance User	Basic User	App Developer	Power User / SDK User	Advance User	Basic User	Batch User (Custom BCA API or BO Scheduler)
Permission											
Can refresh reports	√	√	√	√	√	√	√	√	√	√	√
Edit reports (report header, footer, body)	√	√	√	√	√	X	√	√	√	X	√
Can extend scope of analysis	√	√	√	√	X	X	√	√	X	X	√
Create new reports	√	√	√	√	X	X	√	√	X	X	√
Edit Universe connection***	√	X	X	X	X	X	X	X	X	X	X
Tools											
CMC	√*	X	√*	X	X	X	X	X	X	X	√**

* Only to edit Crystal report's DB credentials

** Access to create new schedule jobs and to monitor jobs using 'Instance Manager'

Application Security - Key Issues Resolved

- My Favorites security
  - Users have full rights
  - Content objects copied from application folders to not retain security
  - Secured content objects now can be edited\modified

Solution (Tactical): Remove My Favorites from basic users

- Edit Object rights on WebIntelligence Reports
  - Required for anyone who wishes to perform interactive analysis
    - Slice-n-dice
    - Filter
    - Modify query
  - Edit Object rights also allows user to “overwrite” corporate version of the report

Solution: Remove edit object right and educate users to copy to My Favorites to perform analysis

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VMware BO XI 3 VM Requirements

- **BO XI VM Environment Requirements**
  - Dedicated CPU/Memory Resources
  - Dedicated I/O bandwidth
  - Segregation of Production Service from other environments
  - ESX Read-only console access for performance troubleshooting transparency
- **Dedicated VMware Platform Required**
  - Based upon above requirements it was determined that this requirement could not be met by a shared corporate VM farm and that a dedicated “Platinum” environment was required for BO XI VMs

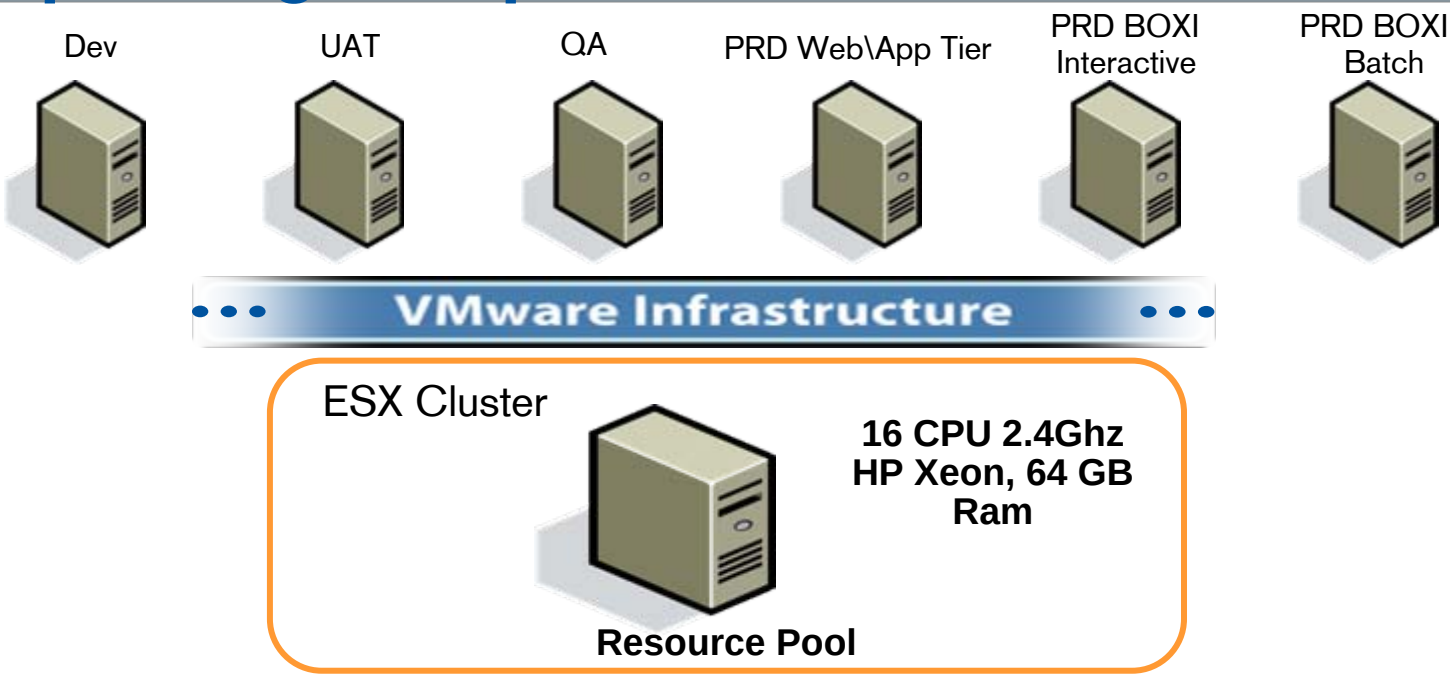
VMware BO XI 3 VM Benefits

- **Benefits of going Virtual for a global shared service BO XI deployment**
  - Provisioning using standard corporate VMware platform
  - Ability to do immediate deployment on shared Gold VM platform and migrate VMs to Platinum when available
  - Ability to create additional VMs on existing platform as needed (e.g. swing kit, QA, …)
  - Ability for hardware resource sharing across non-production environments
  - Use of VM cloning for global build outs
  - On-demand scaling as peak usage grows
  - Able to support HA/DR for non-production clusters w/o additional dedicated hardware

VMware BO XI 3 Hardware Configuration

- Hardware segregation of Prod/Dev for Network & Disk I/O
  - 2 App Dedicated (teamed) Gigabit Ethernet NICs
    - Prod Virtual Port group for production dedicated to 1 NIC w/failover to Dev NIC
    - Dev Virtual Port group for Dev, QA, UAT dedicated to 1 NIC w/failover to Prod NIC
  - 2 separate production 3-PAR data-stores to segregate disk I/O traffic
    - One for the Production VM VMDK files
    - One for all Dev VM VMDK files
- Initial Global Deployment
  - 6 HP BL680 blades (16-way 64GB) * 6 VMs/blade = 36 VMs

VMware ESX Cluster Deployment: Two per Region Split Across Data Centers



Server type	CPU	RAM	Priority	Reservations?
Development	4 x 2.4Ghz Xeon	16 GB	Low	No
QA	4 x 2.4Ghz Xeon	16 GB	Low	No
UAT	4 x 2.4Ghz Xeon	16 GB	Normal	No
PRD Web\App Tier	2 x 2.4Ghz Xeon	8 GB	High	CPU & Memory
PRD BOXI Interactive	4 x 2.4Ghz Xeon	16 GB	High	CPU & Memory
PRD BOXI Batch	2 x 2.4Ghz Xeon	8 GB	High	CPU & Memory

Virtual Machine Allocation Worksheet

VM	Usage	VM Server	Site	ESX Blade	ESX Host	VM Name	vCPUs Allocated	vCPU Reservations	vCPU Reservations (GHz)	RAM Allocated (GB)	RAM Reservations (GB)	VM Shares	Virtual Switch Port Group	Notes
1	PROD	BOXI_CS_NY_PRD	NY	A	nye15i-0003a	gnyc11p12015	2	2	4.8	8	8	High	PROD	IIS/Weblogic
2	PROD	BOXI_CS_NY_PRD	NY	A	nye15i-0003a	gnyc11p12042	2	2	4.8	8	8	High	PROD	BOXI Batch
3	PROD	BOXI_CS_NY_PRD	NY	A	nye15i-0003a	gnyc11p12016	4	4	9.6	16	16	High	PROD	BOXI Interactive
4	UAT	BOXI_CS_NY_UAT	NY	A	nye15i-0003a	gnyc11p12011	4	0.5	1.2	16	NA	Normal	DEV	
5	QA	BOXI_CS_NY_QA	NY	A	nye15i-0003a	gnyc11p12020	4	0.5	1.2	16	NA	Low	DEV	
6	DEV	BOXI_CS_NY_DEV	NY	A	nye15i-0003a	gnyc11p12010	4	0.5	1.2	16	NA	Low	DEV	
					Total VM Allocations:		**20**	**9.5**		**80**	**32**			
					Total Physical:			**16**			**64**			
7	PROD	BOXI_CS_PDC_PRD	PDC	A	pne15i-0008a	gpri11p12013	2	2	4.8	8	8	High	PROD	IIS/Weblogic
8	PROD	BOXI_CS_PDC_PRD	PDC	A	pne15i-0008a	gpri11p12056	2	2	4.8	8	8	High	PROD	BOXI Batch
9	PROD	BOXI_CS_PDC_PRD	PDC	A	pne15i-0008a	gpri11p12014	4	4	9.6	16	16	High	PROD	BOXI Interactive
10	UAT	BOXI_CS_PDC_UAT	PDC	A	pne15i-0008a	gpri11p12011	4	0.5	1.2	16	NA	Normal	DEV	
11	QA	BOXI_CS_PDC_QA	PDC	A	pne15i-0008a	gpri11p12040	4	0.5	1.2	16	NA	Low	DEV	
12	DEV	BOXI_CS_PDC_DEV	PDC	A	pne15i-0008a	gpri11p12010	4	0.5	1.2	16	NA	Low	DEV	
					Total VM Allocations:		**20**	**9.5**		**80**	**32**			
					Total Physical:			**16**			**64**			

BOXI 3.1 User Capacity

- Capacity based upon two 4 cpu/16GB BO XI Cluster Nodes for interactive usage using vendor sizing guide
- User Load Types
  - Simultaneous Requests = Users executing requests for service using CPU (e.g. report refresh, next page, filter)
  - Concurrent = A user who has a session on the system, but is not requesting service, therefore only using RAM (e.g. viewing a report) [Concurrent = 10% Total Users]
  - Total = Number of authorized users in the cluster

Object Type Processing	# Simultaneous Requests	# Concurrent Users	# Total Users
Users Sessions	1200	1200	12000
Web Intelligence Service	400	800	8000
Desktop Intelligence Service	120	600*	6000
Crystal Reports RAS (Advanced Viewer)	400	800	8000
Crystal Report Page(Basic Viewer)	200	600	6000

* Desk Intelligence Two-Tier limits are higher as there are no server processor resources required.

User Capacity: 5,000 – 8,000 depending upon Object Type Mix

Questions?

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