

Visteon Case Study: Ensuring Business Continuity with QAD Applications

MWUG Fall 2010

Visteon DALO CONSULTING INC.

Visteon Case Study: Ensuring Business Continuity with QAD Applications

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Before We Start...

- This presentation is just an overview on business continuity with QAD products at Visteon
 - Not a complete *how-to* guide, but meant to provide you with some useful information to help with your business continuity planning
- Questions? Feel free to interrupt!
 - However, please leave long questions for the end

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Before We Start...

- **Your Mileage May Vary**
 - Information in this presentation may not necessarily apply to your environment
 - Don't hesitate to contact your favorite Technical Consultant for an evaluation


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Main Objective

- Show you how we monitor some critical QAD components
- Show how we are prepared to recover in the event of a failure



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Agenda

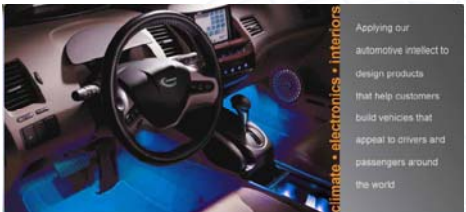
- Introduction
- Business Continuity
- Databases: OE Replication
- .NET UI
- Qxtend Inbound/Outbound
- Questions

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Visteon Corporation



Applying our automotive intellect to design products that help customers build vehicles that appeal to drivers and passengers around the world

eliminate electronics interiors

Visteon Overview

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Visteon Corporation

- Leading global automotive supplier
- Approximately 26,000 employees in 25 countries
- Strong Product portfolio in:
 - Climate
 - Interiors
 - Electronics
 - Powertrain Controls
 - Engine Induction
 - Lighting

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Product Portfolio



Climate

- Engine Induction
- HVAC Systems
- Powertrain Cooling
- Compressors
- Fluid Transport



Interiors

- Cockpit Modules
- Instrument Panels
- Consoles
- Door Trim



Electronics

- Audio and Infotainment
- Instrumentation and Displays
- Powertrain and Feature Controls
- Control Panels
- Front/Rear Lighting

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Visteon Worldwide



Broad Global Resources, Regionally Balanced

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Customers Are Key



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Global Manufacturing Capabilities

- 68 global facilities*
 - Asia Pacific 21
 - Europe 27
 - North America 14
 - South America 6
- Our Focus
 - Lean, flexible production
 - Continuous quality improvement
 - World-class safety levels
 - Lowest delivered cost to customer

Balanced by Region and Product Group

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QAD Implementation

- Multiple ERP Solutions, including Ford Legacy System
- Reduce TCO, promote global financial reporting
- Hundreds of Integration Points
- Heavily customized financials

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IT Challenges

- Large user base (1,000+ users and growing)
- Many critical interdependent components
- Need for business continuity
 - Avoid costly downtime
 - Quick response to issues
 - Disaster recovery site

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Dalco Consulting Inc.

- Member of QAD implementation team at Visteon
- Offers specialized services with Progress and QAD software:
 - Progress Database Administration
 - Install/Upgrades of QAD Applications
 - Technical Audits
 - Business Continuity Strategies
- Can provide 10+ year experienced technical resources specialized in Progress & QAD.

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- **Business Continuity**
- Databases: OE Replication
- .NET UI
- Qxtend Inbound/Outbound
- Questions

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Business Continuity

- Question: In the last five years, how many times has a company declared a disaster and had to recover?

A. 5%
B. 7%
C. 12%
D. 27%

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Disasters are not rare occurrences

How many times have you had to declare a disaster and recover operations at your recovery site in the past five years?

Frequency	Percentage
None	73%
Once	14%
Twice	6%
Three	3%
Five	2%
More than Five	2%

Source: Forrester/Disaster Recovery Journal October 2007

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Commonplace Failures are the typical cause

“What was the cause(s) of your most significant disaster declaration(s) or major business disruption?”

Cause	Percentage
Power Failure	42%
IT Hardware Failure	31%
Network Failure	21%
IT Software Failure	16%
Human Error	16%
Flood	12%
Hurricane	10%
Fire	7%
Winter Storm	6%
Terrorism	4%
Earthquake	3%
Tornado	2%
Chemical Spill	1%
Not declared disaster/business disruption	24%

Source: Forrester/Disaster Recovery Journal October 2007

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Example: Power Failure

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Source: Forrester/Disaster Recovery Journal October 2007

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Example: IT Hardware Failure

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Business Continuity

High Availability vs. Disaster Recovery

Business Continuity

High Availability
-More Localized Failure

Disaster Recovery
-Natural or human induced disaster
-More serious

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Business Continuity: Myths

- Disasters are rare occurrences
- A business continuity plan is only made to prepare for a natural catastrophe
- Disaster recovery sites are rare
- The disaster recovery site must be situated thousands of miles away
- Replication is limited

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Databases Are Critical

- Nearly all QAD applications are dependant on their databases
- If the databases go down, these applications are unusable:
 - MFG/PRO (QAD 2007.1)
 - .NET UI
 - Qxtend Inbound/Outbound
 - QAD Production Scheduler
 - ...and more

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Database Monitoring

- **Methods used at Visteon:**
 - OpenEdge Management
 - Centralized approach to monitoring databases
 - Sends an alert/page when database goes down
 - Scripts
 - Monitoring scripts to monitor for various points of failures
 - Sends an alert/page when database goes down

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Database Monitoring

- **Database points of failure:**
 - Online status
 - After-image full
 - OpenEdge Replication Status
 - System Errors in database logs
 - DB Extents filling up
 - User count approaching limit
 - File system filling up
 - Locked records
 - BI File threshold

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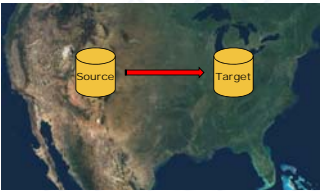
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Business Continuity with OpenEdge Databases

- OpenEdge Replication helps in recovering from a disaster by replicating the Progress databases to another server or site.



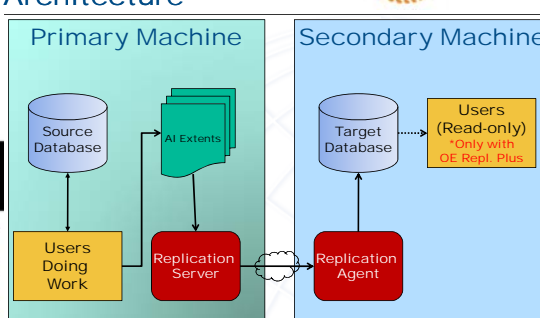
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OpenEdge Replication Architecture



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Network Performance

- **Make sure the link is fast enough!**
 - By Calculation: Suppose we have five databases that fill up 360 MB of AI files during a peak hour
 - Replication Overhead = 1.5 * AI Size
 - 1.5 * 360 MB = 554 MB
 - Bandwidth per second:
 - 554 MB/60/60=0.154 MB/second
 - In kB/s:
 - 0.154 MB/s * 1024 = 157.7 KB/s required for data transfer
 - Or 1,261.57 kb/s (1 kilobyte = 8 kilobits)

Source: Progress OpenEdge Replication Guide

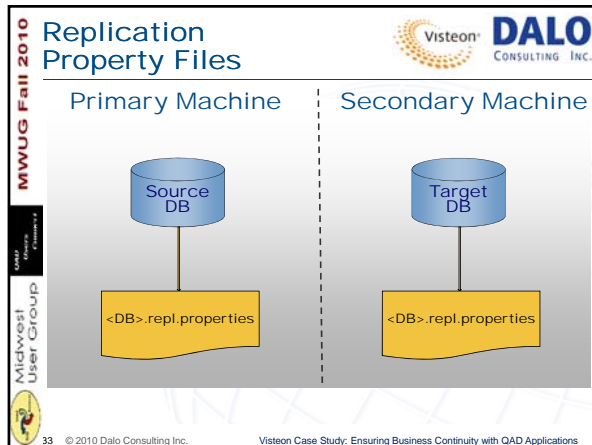
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Network Performance

- **Adjust cache parameter for message replication queue: -pica:**
 - Example:


```
$DLC/bin/_mprosvr prod1 -L 20000 -c 350 -B 50000 -DBService replserv -pica 8192
```
 - Calculation for -pica:
 - TAIW: Total AI Writes
 - TAIW / BlockCount
 - OpenEdge 10 – blockcount is 9.16
 - Progress® 9.1x – blockcount is 18.2

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Parameter Examples

- Manual or automatic transition
- Transition to source or to normal DB
- TCP/IP Port
- Timeouts
- Secondary site definition

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Sample Property File

```
[server]
control-agents=agent1
database=source
transition=manual
transition-timeout=600
defer-agent-startup=10080
agent-shutdown-action=recovery

[control-agent.agent1]
name=agent1
database=qadprd01
host=lov9100
port=7990
connect-timeout=120
replication-method=async
critical=0

[transition]
database-role=normal

[agent]
name=agent1
database=target
listener-minport=4000
listener-maxport=4500

[transition]
database-role=normal
```

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Most Common Issue: AI Files LOCKED

- All AI files are in a "Locked" state
 - #1 Cause: The Primary Machine is unable to reach the Secondary Machine
 - Parameter in OE Property File:


```
defer-agent-startup=10080
```

 : Minutes before the primary server stops checking for the secondary server (10080 minutes = 7 days)

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Monitoring Replication

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- Verify the status of the ReplServer and ReplAgent via DSRUTIL
 - DSRUTIL is a utility which helps us verify the status of the processes, the connection and the latency between servers
 - Syntax: `dsrutil <DB> -C monitor`

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DSRUTIL On ReplServer (Source)

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Normal Processing Sample:

OpenEdge Replication Monitor Page 1

Database: /db/prod/prod1
Database is enabled as OpenEdge Replication: Source

Server is: **In Normal Processing**

Number of configured agents: 1

Delay Interval (current / min / max): 345 / 5 / 500

Recovery information:

State: No recovery being performed

Agents needing recovery: 0

Agents connected: 0

Agents in synchronization: 0

Transition information:

Type: Manual

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DSRUTIL On ReplAgent (Target)

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OpenEdge Replication Monitor Page 1

Database: /db/prod/prod1
Database is enabled as OpenEdge Replication: Target

Agent:

Name: agent1

ID: 1

Host name: 204.19.29.11

State: **Normal Processing**

Ready: Yes

Critical: No

Method: Asynchronous

Agent is waiting for: Nothing

Maximum bytes in TCP/IP message: 16696

Server/Agent connection time: Wed May 6 03:01:15 2009

Delay Interval (current / min / max): 40 / 5 / 500

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DSRUTIL Sur ReplAgent (Target) con't

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Transition information:

Type: Manual

The last block received at: Fri May 8 21:06:35 2009

Activity information:

Blocks received: 100390

Blocks processed: 100390

Blocks acknowledged: 0

Notes processed: 5710736

Transactions started: 77946

Transactions ended: 77935

Synchronization points: 322

AI Block Information:

Source RDBMS Block (Seq / Block): 7 / 7801

Last Processed Block (Seq / Block): 7 / 7800

Latency Information:

Repl Server behind Source DB by: **14 second(s)**

Current Source Database Transaction: 309904965

Last Transaction Applied to Target: 309904960

Target Current as of (Target, Source): Fri May 8 22:07:44 2009

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Other Monitoring Methods: OE Mgmt.

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- OpenEdge Management is an excellent tool for monitoring the databases with OE Replication
 - Comes with predefined rules
 - Sends an alert when issues occur
 - Examples:
 - Alert when a connection issue occurs between the servers
 - Alert when the AI files are full or approaching their limit

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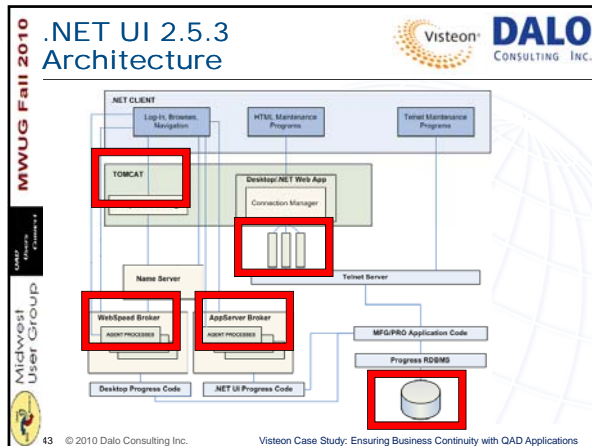
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.NET UI Monitoring

- Databases: Scripts / OE Management
- Name Server, AppServer & Webspeed Brokers:
 - 1) Use "nsman" command:
`nsman -i NS1 -q |grep <broker>`
 - 2) OE Management
- Tomcat:
 - 1) Check if process is running:
`PID=cat $TOMCAT/logs/tomcat.pid`
`PID_STATUS=ps -ef|grep $PID|grep $TOMCAT[|/] |wc -l`
 - 2) Use port monitor: (OE Management or other tool)

.NET UI Monitoring (con't)

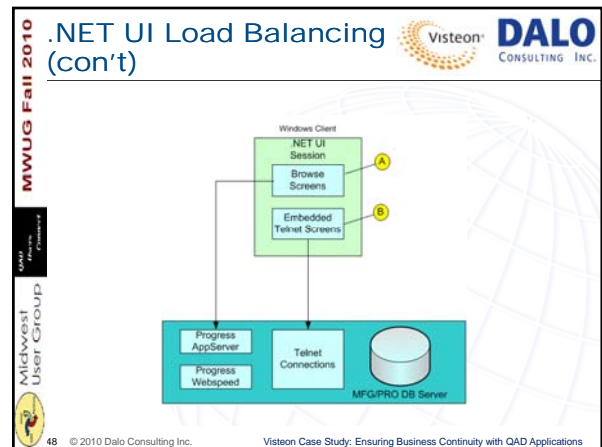
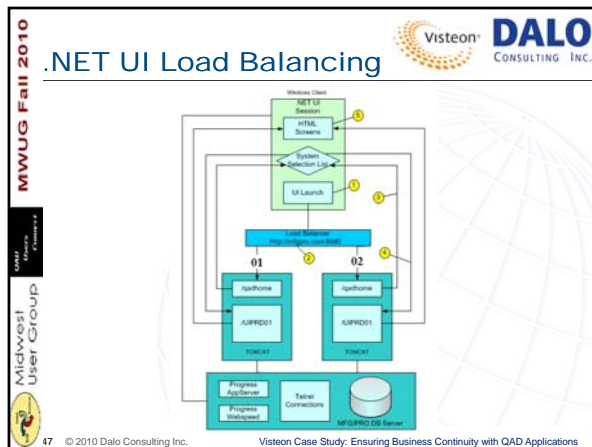
- Connection Manager Pool:

Heartbeat URLs: `idle.jsp`, `status.jsp`, `busy.jsp` and `init.jsp`

 - Can be accessed via web browser:
`http://<Tomcat Host>:<Port>/webapps/<UI-name>/heartbeat/idle.jsp`
 - Can also be accessed by using a command line browser such as "lynx": <http://lynx.isc.org/>
 - With "lynx", we can incorporate web commands into scripts for monitoring, starting and stopping the connection pool

.NET UI Business Continuity

- .NET UI Challenges:
 - Large user base (1,000+ Users)
 - Limited number of connections per Tomcat instance
 - High Availability and redundancy required
- Solution: Load Balancing



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.NET UI Load Balancing

- **Load balancing device features:**
 - Can determine if a Tomcat instance is unavailable and will stop redirecting to unavailable instance until it becomes available
 - Can track least busiest server via heartbeat URLs
 - Can temporarily stop redirecting to a Tomcat instance if the maximum number of busy connections has been reached

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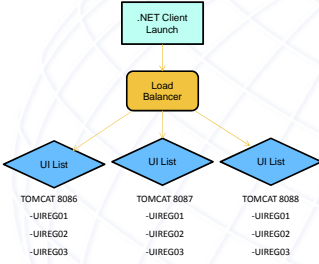
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.NET UI Load Balancing

- **As user base increased, so did the need for more nodes:**



```

graph TD
    Client[.NET Client Launch] --> LB[Load Balancer]
    LB --> UI1[UI List]
    LB --> UI2[UI List]
    LB --> UI3[UI List]
    UI1 --> T8086[TOMCAT 8086]
    UI1 --> U1[UIREG01]
    UI1 --> U2[UIREG02]
    UI1 --> U3[UIREG03]
    UI2 --> T8087[TOMCAT 8087]
    UI2 --> U1[UIREG01]
    UI2 --> U2[UIREG02]
    UI2 --> U3[UIREG03]
    UI3 --> T8088[TOMCAT 8088]
    UI3 --> U1[UIREG01]
    UI3 --> U2[UIREG02]
    UI3 --> U3[UIREG03]
    
```

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.NET UI Load Balancing

- **Configuration Guidelines for this Load Balancing Architecture:**
 - Use actual server names when configuring additional .NET UI builds
 - Files/Directories that contain hostname and Port information:
 - DELETE: /<TOMCAT>/webapps/<UI NAME>/screen.xml
 - DELETE: /<TOMCAT>/webapps/<UI NAME>/headerhtml.out
 - DELETE: /<TOMCAT>/webapps/<UI NAME>/cache/*
 - CHANGE SERVER NAME: /<TOMCAT>/webapps/<UI NAME>/WEB-INF/conf/connectionManagerConfig.xml
 - CHANGE SERVER NAME: /<TOMCAT>/webapps/<UI NAME>/WEB-INF/conf/process-config.xml
 - CHANGE SERVER NAME: /<TOMCAT>/webapps/qadhome/configurations/<UI NAME>/client-session.xml

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.NET UI Load Balancing

- **Configuration Guidelines for this Load Balancing Architecture (con't):**
 - Make sure that each client config file in the qadhome directory points to its respective instance
 - Use the load balancer URL to install or re-install .NET UI clients
 - **Example:**
 - Instead of `http://mydot net:8080/qadhome`
 - Use `http://loadbalancer:8080/qadhome`

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.NET UI Load Balancing

- **Benefits of using this load balancing architecture:**
 - Maximizes uptime by providing automatic failover
 - Improved user performance as load is distributed
 - Improved user experience as the load balancer device will skip failed or busy instances
 - No need to manage persistent connections

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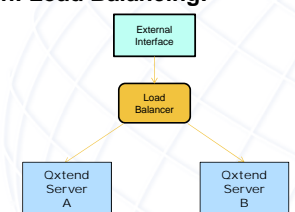
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Qxtend Inbound Monitoring

- URL can be used to monitor Connection Pool:
 - `http://<Tomcat>:<Port>/qxtendserver/admin/idle.jsp?SessionAction=INFO&Info=3&name=<POOL NAME>&type=UIAPI`
 - This returns the number of idle sessions
 - Idle.jsp derived from ConnectionManagerDetail.jsp
 - URL can also be accessed by "Lynx"
 - Lynx can be incorporated in scripts to automatically send alert when a connection pool is down or has 0 idle connections

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Qxtend Inbound Business Continuity

- Qxtend Challenge
 - High Availability and redundancy required to ensure delivery of inbound data
- Solution: Load Balancing:
 

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Qxtend Inbound Load Balancing

- Load balancing features:
 - The "idle" URL can be used to determine whether or not a particular Qxtendserver connection pool is accepting connections
 - The connections are balanced using the round-robin method.
- Load balancing benefits:
 - Provides automatic failover capability in the event that one of the QxtendServer instances goes down

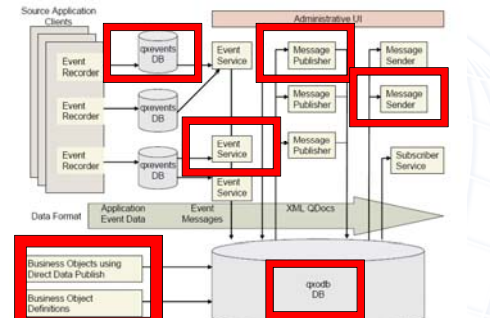
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Qxtend Load Balancing

- Configuration Guidelines for this Load Balancing Architecture:
 - Use the load balancer URL for configuring external interfaces
 - Keep both instances in sync by making changes in one host and replicating onto the other
 - When synchronizing, change host name to corresponding host in `<Tomcat>/webapps/qxtendserver/WEB-INF/conf/qxtendconfig.xml`

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Qxtend Outbound Architecure



Source: Qxtend 1.6.3 User Guide

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Qxtend Outbound Monitoring

- Databases: Scripts / OE Management
- Name Server and AppServer (Used for Business Objects):
 - `nsman -i NS1 -q |grep <broker>`
- Event Service, Message Sender and Message Publisher:
 - Session Control Tool:
 - `./sess-control.sh {START|STOP|QUERY} {service-name}`

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Qxtend Outbound Business Continuity

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- No redundancy or high availability requirement as outbound data will stay pending in the QXEvents database
- OpenEdge Replication is in our plans to implement disaster recovery for Qxtend Outbound

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Conclusion

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- Disasters are not rare occurrences
- OpenEdge Replication is an excellent product for protecting your Progress databases against a disaster
- Monitoring can easily be scripted for .NET UI & Qxtend
- Business continuity for .NET UI and Qxtend can be achieved with the help of load balancing

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Agenda

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- Introduction
- Business Continuity
- Databases: OE Replication
- .NET UI
- Qxtend Inbound/Outbound
- **Questions**

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Questions?

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Questions

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- Questions or comments? Feel free to e-mail us:

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For a copy of this presentation and for other useful stuff, visit our website:
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Thank You!

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