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JD EDWARDS BUSINESS CONTINUITY, HIGH AVAILABILITY, AND DISASTER RECOVERY IN THE PUBLIC CLOUD





Agenda

- Presenters Introduction
- About Syntax
- Business Continuity Overview
- High Availability (HA)
- Disaster Recovery (DR)
- Summary
- Q&A

Presenter

Colin Dawes

Chief Solution Architect

Global Director, Product Portfolio Management

Syntax

- Strategic and innovative technology leader
- 25+ year of IT experience encompassing ERP, Cloud, and Architecture
- Expert on numerous databases and platforms
- Performed over 70+ EnterpriseOne installs, upgrades and migrations
- Consulting engagements with over 350 ERP customers



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About Syntax

JD Edwards Business Continuity, High Availability, and Disaster Recovery in the Public Cloud



Syntax overview



Our cloud services and solutions



Our technical capabilities - Oracle



350+

Systems

Successful Cloud Migrations



Expertise in Oracle Cloud Platform -**Oracle Cloud Platform Integration** in North America



Expertise in Oracle ERP Cloud in North America

ORACLE

Sell ORACLE Partner

Sell

Partner

Expertise in Oracle SCM Cloud in North America

Fusion

Applications



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JDE Business Continuity, HA, and DR in the Public Cloud

Our JD Edwards focus

250+

Active JD Edwards Customers

60

Customer NPS score

15+

Average years of experience per JD Edwards Professionals

180+

JD Edwards Cloud Migrations

130+

JD Edwards Application Managed Services (AMS) Customers 200+

JD Edwards Upgrades

70+

JD Edwards Customers Deployed in a Syntax Managed Cloud #1

Largest Oracle JD Edwards Partner in North America

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Business Continuity Basics

JD Edwards Business Continuity, High Availability, and Disaster Recovery in the Public Cloud



Organizational Disruptive Events

An organization may be subject to a wide range of disruptive events

Natural Disasters Technological Failures Biological or Health Crises Cybersecurity Incidents • Earthquakes Server or hardware failures • Pandemics (e.g., COVID-19) Ransomware attacks • Floods • Data center outages • Widespread illness or Data breaches or leaks workforce absenteeism • Hurricanes or tornadoes Power outages or utility • Denial-of-service (DoS) disruptions Contamination or biohazard attacks Wildfires events Network or internet •Insider threats or sabotage • Severe storms or blizzards downtime

Man-Made or Human-Caused Events

- Fires or explosions
- •Acts of terrorism or civil unrest
- •Vandalism or theft
- Supply chain disruptions

Operational & Business Risks

- •Vendor or partner failures
- Regulatory changes
- Financial crises or cash flow interruptions
- •Loss of critical personnel or leadership

Physical Infrastructure Events

- Building damage or collapse
- •Transportation disruptions
- •Equipment or machinery failure

Business Continuity

- Business continuity is an organization's ability to ensure operations and core business functions are not severely impacted by an unplanned incident.
- A Business Continuity Plan (BCP) outlines how a company will continue operations during and after a disruptive event.
- Not having a business continuity plan in place can put the organization at risk of high financial costs, reputation loss and even greater risks for its clients and customers.
- This discussion will focus in on High-Availability (HA) and Disaster Recovery (DR).



High Availability vs Disaster Recovery

High Availability and Disaster Recovery are aimed at the same problem:

- High Availability is intended to handle problems while a system is running
- Disaster Recovery is intended to handle problems after a system fails

	High Availability	Disaster Recovery
Data Loss (RPO)	Near zero	Minutes to days
Down Time (RTO)	Near zero to minutes	Minutes to days
Process	Automated /Light	Manual / involved
System Status	Running	Down
Status	Hot or Warm	Cold or Warm
Licensing	Significant	Minimal

Who needs High Availability and Disaster Recovery?

High Availability

- 24/7 manufacturing plants
- Global operations
- Customer-facing service functions
- Strict compliance or audit requirements (downtime affects transaction, regulatory or legal obligations)
- Mission critical service delivery for essential services

Disaster Recovery

- Highly regulated industry with audit and compliance requirements
- Larger transaction volumes and potential financial loss
- Customer service, negative impact on customers
- Service delivery to the public
- Complex supply chain

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High Availability (HA)

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High Availability in the Public Cloud

- A common misconception is that the public cloud makes all applications and infrastructures highly available and redundant
- Cloud technologies can enable applications to run in a highly available, fully redundant environment at a much lower cost than dedicated infrastructure
- The key is building high availability into both the infrastructure and the applications



High Availability Spectrum



Planned and Unplanned Outages

Infrastructure High Availability (HA) Options Summary

Configuration A

 Ideal for customers where the priority is <u>performance</u>, or where specific EnterpriseOne modules, batch jobs, customizations and/or 3rd party applications <u>demand zero latency</u>



Configuration B

 Ideal for customers where the priority is <u>availability</u> and performance is sufficient and not as critical or time sensitive



Infrastructure High Availability Configuration A



Infrastructure High Availability Configuration B



Application High Availability for JD Edwards EnterpriseOne

Web Servers

- High Availability implemented using load balancers
- Different levels of skill required for smarter health checks and probes
- Load balancers are the most common method for increasing web server availability

Enterprise Servers

- Treats any number of Enterprise Servers as one big host using EnterpriseOne Virtual Batch Queues (VBQ)
 - Tools Release 9.2.5.x and later (minimum recommended tools release for minimal features)
 - Tools Release 9.2.8.x and later (preferred tools release for zero downtime package deployments)
- Virtual host ties multiple EnterpriseOne batch processing servers to the virtual host name which simplifies scaling of EnterpriseOne batch processing.
- Awesome for server patching (manual E1 schedule change required)
- With VBQ's, there is no need to hardcode queue names in versions

E1 Application HA Design

Web Servers and Enterprise Servers

- VBQ addresses Enterprise Server HA beautifully!
- Web Servers and Enterprise Servers can be linked in 'PODS'
- Each POD can be in a different Placement Group / Fault Domain / Availability Zone / Availability Domain
- A pseudo environment can be created for each POD to force LOGIC to run on a specific Enterprise Server
- All HA achieved via flexible E1 configuration with no hardcoding / networking changes



E1 Application HA Design

Database Servers

SQL Server

- Both Standard and Enterprise Editions scales vertically and not horizontally (no TAF)
- AWS
 - Compute manual configuration of failover clustering
 - DBaaS multi-AZ feature allows for simple HA
- Azure
 - Compute manual configuration of failover clustering
 - DBaaS AzureDB provides simple HA
- OCI
 - Compute manual configuration of failover clustering
 - DBaaS N/A

Oracle Database

- Only Oracle RAC scales horizontally (TAF) which is available with Oracle Database Enterprise
- AWS
 - Compute manual configuration of failover clustering
 - DBaaS multi-AZ feature allows for simple HA
 - OracleDB@AWS Oracle Exadata, options for Dataguard
- Azure
 - Compute options for Dataguard
 - OracleDB@Azure Oracle Exadata, options for Dataguard
- OCI
 - Compute leverage Dataguard for HA
 - DBaaS Oracle Exadata, options for Dataguard

High Availability Benefits and Limitations

BENEFITS

- ~24/7/365 uptime possible
- A High Availability configuration also creates a Scalable Architecture
- Advanced monitoring and automation enables a Self-Healing Environment
- ~Zero data lose in case of DBMS failure
- ~Near-zero RTO in case of DBMS failure
- Superior end user experience
- Most tasks re-initiate and continue automatically
- Phased Package Deployments possible

LIMITATIONS

- Failover at different tiers produce different end user experiences
- Database support for Transparent Application Failover (TAF) is limited to Oracle RAC
- With SQL Server Active/Passive DB replication, in case of a DB failure user sessions may hang (and possibly disconnect) until the other database is integrated in and set to active
- Not all EnterpriseOne services and jobs support TAF and jobs can get cancelled or users may need to login again

High Availability Considerations

LICENSING

- Bring-Your-Own-License (BYOL) model
- Use your existing JD Edwards EnterpriseOne application licenses
- High Availability solution involves an active workload
- Licenses may be required for non-ERP workloads

CONSIDERATIONS

- Environments where continuous system availability is required
- Applies to systems where a low RPO and RTO are needed in conjunction with a short-range disaster recovery and where long-range disaster recovery is acceptable
- Adhere to public cloud best practices
- EnterpriseOne Servers should leverage common locations for report output, integrations, etc. Nothing other than log files should reside on the servers
- Requires E1 and Cloud specialized skills

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Disaster Recovery (DR)

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Cloud Infrastructure and Disaster Recovery

Disaster Recovery (DR) can be short-range (within region) or long-range (between regions)



Disaster Recovery

Moderate **RPO and RTO** using nightly transfer of backups between Very Low **RPO and RTO** using data replication

Disaster Recovery Types

Short-Range Disaster Recovery



Azure

- Within one region
- Leverage Availability Zones / Availability Domains
- Leverage Cloud Hyper Scaler redundancy
- Redundancy may be default or additional charge, depending on the Public Cloud
- Standard Architecture: RPO ~0 and RTO < 6 hrs (DBMS)
 - Provided Region with Multiple Zones (AWS > Azure > OCI)
- High Availability: RPO ~0 and RTO < 15 minutes
 - Provided Region with Multiple Zones (AWS > Azure > OCI)

Long-Range Disaster Recovery



- Replication between regions
- At a minimum should leverages replication of backups and/or machine images between regions
- Database transaction logs can be replicated more frequently to lower RPO
- Enhanced solution leverages replication software to synchronize storage between regions (warm not hot)
- Enhanced solution may replicate to a hot database (AWS DMS, Oracle DataGuard, etc.)
- Backup: RPO < 1 hrs and RTO < 12 hrs (DBMS)
- Replication: RPO ~0 and RTO << 2 hrs

Disaster Recovery Metrics and Strategy

Disaster Recovery Metrics

MAO

Maximum Acceptable Outage

The maximum outage duration without significant revenue or reputation damage; Justifies TCO for required RPO/RTO

Restore from Backup	Data Replication	Partial Live System	Complete Live System
Snapshots (\$)	Block Level (\$\$)	Warm Standby (\$\$\$)	Hot Standby (\$\$\$\$)
RPO: Hours to 1 day RTO: Hours to 1 - 2 days	RPO: Minutes to hours RTO: Hours	RPO: Minutes RTO: Minutes to hours	RPO: Seconds RTO: Minutes

RTO Recovery Time Objective

- The maximum time to restore functionality after an outage
 - Determined by automation and infrastructure state
 - Primary driver of DR expense

RPO

Recovery Point Objective

- The amount of data loss that could occur in an outage, represented in minutes, hours or days
 - Determined by last available backup or rate of data replication

Backups for Various Storage Types

	Block Storage		File Storage	Object Storage	
Machine Images	Non-DB Volume Snapshot	Database Data Volume Snapshot	Database Log Volume Snapshot	Native Hyperscaler Backup	Native Hyperscaler Backup
• improve recovery from a failed O/S volume	Latest disk volume(s)	Latest database data volume(s)	• Latest 15 min database	• Latest 15 min database	• Latest 15 min database
Azure	Azure			Azure	Azure

Backup Data Replication

- Ensure the protection of backups by ensuring that they are replicated (1) locally within a region, between Availability Zones / Domains and (2) geographically, across Regions for even greater resilience
- Replication across regions is like an "off site backup" where replicates backups between a client's primary region to a secondary region. Client's can elect to reduce the backup frequency and retention period or eliminate them completely based on their business risk tolerance





Comparison of Backup Services

Feature/Capability	AWS Backup	Azure Backup	OCI Backup Services
Service Name	AWS Backup	Azure Backup	OCI Backup, OCI Autonomous Backup, OCI ZDLRA
Workload Support	EC2, EBS, RDS, DynamoDB, EFS, FSx	Azure VMs, SQL DB, Files, Blob, SAP HANA	Compute, Block Volumes, DB Systems, Autonomous DB
Backup Type	Snapshot-based & incremental	Application-aware & snapshot	Incremental, application-aware, and continuous
Retention Management	Yes (customizable policies)	Yes (Long-term, GRS/RA-GRS)	Yes (policy-driven in Autonomous and ZDLRA)
Immutability	Vault Lock	Immutable Vault	Retention rules; ZDLRA ensures write-once backups
Automation	Backup policies + AWS Backup Vault	Recovery Services vaults + policies	Autonomous DB backups are automatic; ZDLRA automates data ingest
Recovery Options	Point-in-time recovery for RDS, etc.	VM-level restore, file-level recovery	DB-level, PITR, and sub-second recovery (ZDLRA)
Cross-region/cross-AD backup	Yes (manual or policy-driven)	Yes (Geo-redundant)	Yes (manual for Block Volumes; Autonomous DB supports cross-region)
Encryption	KMS integrated	Azure Key Vault integrated	OCI Vault integrated, TDE for DBs
Compliance and Security	SOC, ISO, HIPAA, etc.	SOC, ISO, GDPR, HIPAA	ISO, SOC, HIPAA; ZDLRA meets financial compliance

Disaster Recovery in the Public Cloud

Benefits

- Scalable: DR plans grow with your infrastructure.
- Flexible: Choose between hot, warm, and cold DR based on budget.
- Faster RTO: Compared to on-prem tape or SAN replication.
- Automation-ready: DR orchestration tools are built-in (e.g., AWS DRS, Azure ASR, OCI FSDR).
- Global coverage: Multiple regions for geo-redundancy.

Limitations

- Cost can escalate with hot DR and continuous replication.
- Custom apps may require tailored runbooks for full recovery.
- Cross-region latency can impact sync timing for near real-time DR.
- **Complexity** increases with multi-tier app DR (app + middleware + DB).
- Vendor lock-in risk when using native DR for managed services.

Disaster Recovery Test Types

ISOLATED 'BUBBLE TEST'

- Comprised of all replicated components
- Performed pre-deployment
- 3rd party components included
- Integrations available on the replicated servers are tested
- Simplified testing in an isolated network
- No Production down-time

FULL 'INTEGRATED' TEST

- Tests the 'end-to-end' business process (applications and interfaces)
- Tests all key networking paths and interfaces
- Testing on the production network
 - Optional Role Swap (DR becomes Prod and Prod becomes DR)
- Production Down for 24 to 36 hours during testing window

Disaster Recovery Test Types

Cold Site		Hot Standby	
Option 1: Cold DR and Isolated DR Test	Option 2: Rapid DR and Isolated DR Test	Option 3: Rapid DR and Full DR Test	Option 4: Rapid DR and Failover / Failback Event
Offline Replication or 'Cold' DR RPO = 24 hours, RTO = 48 hours Tape or Storage Based Applicable Environments Non Critical Production Test or Development 	Online Replication or 'Rapid' DR RPO ~ 0 hours, RTO < 6 hours	Online Replication or 'Rapid' DR • RPO ~ 0 hours, RTO < 6 hours	Online Replication or 'Rapid' DR • RPO ~ 0 hours, RTO < 6 hours
 Isolated "Bubble" DR Test Testing in an isolated network Environment becomes temporarily available Less intrusive for 24/7 customers No Production downtime Networking, Servers, Storage, etc. must be created for each test. Data must also be replicated / restored Comprised of all replicated systems Integrations available on the replicated systems are tested within the 'bubble' Creation / updating of DR runbook Failover test only, no Failback or live transactions in DR 	 Isolated "Bubble" DR Test Simplified testing in an isolated network Environment always available Less intrusive for 24/7 customers No Production downtime No pausing of replication Comprised of all replicated systems Integrations available on the replicated systems are tested within the 'bubble' Creation / updating of DR runbook Failover test only, no Failback or live transactions in DR 	 Full "Integrated" DR Test Tests the 'end-to-end' business process (applications and interfaces) Performed after a successful 'bubble test' (required) Tests all key networking paths, interfaces and Microsoft Active Directory Production downtime of 48 hours minimum No pausing of replication Creation / updating of DR runbook Failover test only, no Failback or live transactions in DR Additional DR test charges 	 Full "Integrated" DR Test Tests the 'end-to-end' business process (applications and interfaces) Performed after a successful 'bubble test' and a successful 'integrated' test Tests all key networking paths, interfaces and Microsoft Active Directory Production downtime < 4 hours Run in DR for 96 hours+ No pausing of replication Minimal maintenance of DR runbook Failover test with live transactions in DR and Failback to Production Additional DR test charges Additional licensing

Disaster Recovery Public Cloud Comparison

Feature	AWS	Azure	OCI
Cross-Region DR	Use Cross-Region Replication, Route 53, and CloudEndure DR.	Azure supports Geo-Redundant Storage (GRS) and Azure Site Recovery (ASR) across regions.	Cross-Region Replication, Data Guard, and Object Storage replication.
Backup Services	AWS Backup, Snapshots, S3 Cross- Region Replication.	Azure Backup, GRS for storage accounts, Snapshot replication for VMs.	OCI Backup, Block Volume Backup, and Cross-Region Object Storage replication.
DR Orchestration Tools	AWS Disaster Recovery, AWS Resilience Hub, and Route 53 failover.	Azure Site Recovery (ASR) provides full DR orchestration and replication.	DR orchestration via Resource Manager, Data Guard, and custom scripts.
RPO/RTO Support	RPO/RTO depends on service: Aurora Global DB ~1s RPO, CloudEndure ~few mins RTO.	Azure ASR supports low RTO/RPO (minutes) for supported workloads.	Oracle Data Guard and Autonomous DB DR can support <1 min RPO and low RTOs.
Cold/Warm/Hot DR Models	All supported: cold (backup only), warm (standby resources), hot (active-active).	All supported; ASR enables warm DR; GRS and paired regions support hot setups.	Supports all models; especially strong hot DR for Oracle DB workloads.
Testing DR	Simulated failovers and Resilience Hub assessments.	Non-disruptive DR drills using Azure Site Recovery.	DR testing supported via scripts and native Oracle tools.

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Summary

JD Edwards Business Continuity, High Availability, and Disaster Recovery in the Public Cloud



Summary

High Availability (HA) in the Cloud

- **Goal**: Prevent downtime by keeping systems running during component failures.
- Achieved through:
 - Multi-AZ deployments (e.g., AWS, Azure, OCI)
 - Load balancers to distribute traffic
 - Auto-scaling for resilience and performance
 - Redundant infrastructure for critical services

Disaster Recovery (DR) in the Cloud

- Goal: Restore services/data after a major failure or outage.
- Achieved through:
 - Cross-region replication
 - Automated backups & snapshots
 - Failover orchestration tools (e.g., AWS DRS, Azure ASR, OCI FSDR)
 - Hot/warm/cold DR environments

Category	AWS	Azure	OCI
HA Method	Availability Zones (Multi-AZ) and Placement Groups	Availability Zones	Availability Domains and Fault Domains
DR Tool	AWS DRS (CloudEndure) / , Route 53, Resilience Hub	Azure Site Recovery, GRS	Data Guard, RM, OCI Backup

Business Continuity: Licensing Impact

Backup Category	Software Status	Oracle	Microsoft	IBM
Cold	Not Started	No Additional Licensing	No Additional Licensing	No Additional Licensing
Storage Replication	Not Started but rapid availability	No Additional Licensing	No Additional Licensing	No Additional Licensing
Warm (Idle Standby)	Started but Idle	Partial License	No Additional Licensing	No Additional Licensing
High Availability	Started and available for work	Full License	Full License	Partial to Full License
Hot	Started and doing work	Full License	Full License	Full License

You cannot run active workloads against the HA or DR machines without a license.

JD Edwards ecosystem approach

- The ERP ecosystem includes more than just JD Edwards EnterpriseOne
- Customers need to consider the complete ecosystem in their Business Continuity scope:
 - ERP Applications
 - 3rd Party Applications
 - Interfaces & Integrations
 - Identity and Access Management



Syntax Business Continuity Solutions

HIGH AVAILABILITY (APPLICATION LEVEL)

- Continuously operational for a desirably long length of time and quickly recover from any sort of failure state to minimize interruptions for the end user
- RPO = zero to minutes
- RTO = zero to minutes

DISASTER RECOVERY

- Recover critical business systems and normal operations in the event of a catastrophic disaster like a major weather event or a cyberattack
- RPO = hours to days
- RTO = hours to days

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RATE THIS SESSION!

SESSION TITLE:

JD Edwards Business Continuity, High Availability, and Disaster Recovery in the Public Cloud

Speaker: Colin Dawes

Presentation ID: P-050732 Session
 Future Ready: Preparing for the Age of AI

Location : Chantilly East Date : Tuesday, May 7 7:30 AM Duration : 1 hour

Is an exciting time. It is a terrifying time. Technology seems to be moving faster than anyone could have imagined, upending industry after industry, but providing tremendous opportunities in its wake at the same time. This all leaves us wondering... what can we do to be Future Ready given these new and uncertain times brought about by potent technologies like AI?

You might be surprised to know that this is hardly the first time that society has been confronted with massive upheavals due to the introduction of

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We will then shift over to a more modern take on what is going on today. Here again we look at people and companies that can teach us more about what the future holds. Tesla, Apple, SpaceX, and Amazon are remarkable firms with charismatic Complete 3 or more session surveys in a day and you'll be entered to win a **\$500 gift card**!



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