Mind your E1 V's B's and Q's Learn about E1 Virtual Batch Queues

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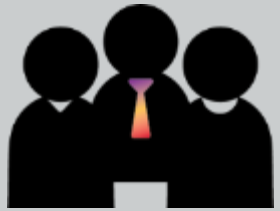

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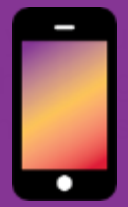

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Introduction

- **Frank Jordan** Director JD Edwards Technology

ERP Suites

- Works with ERP Suites Consulting, AI/ML, Cloud and Products divisions for products/services
- Over 28 years CNC experience with 350+ customers
- AI/ML, Orchestrations, AIS and E1/Composed Pages experience
- Private cloud (ERP Suites), Oracle Cloud, AWS and Azure
- Co-author Advanced Tuning for JD Edwards EnterpriseOne Implementations

Agenda

- E1 Virtual Batch Queues (VBQ) Overview
- VBQ Architecture
- VBQ Advantages
- VBQ “Lessons Learned”/Gotchas
- Questions

E1 Virtual Batch Queues (VBQ) Overview

1. EnterpriseOne 9.2 apps on tools 9.2.5.0 and later introduces VBQ or Virtual Batch Queues
2. Before VBQ the ability to load balance UBE servers was a consulting implementation with TCP load balancing. It worked, but had many special considerations to configure, operate and maintain. (Example is in EnterpriseOne Advanced Tuning Guide on load balancing)
3. VBQ allows you to scale your batch jobs and provides virtualization of the E1 batch submission process.
4. Using VBQ allows you to add/remove batch servers as needed for performance and maintenance.
5. The ability to run a single job queue across multiple servers for those UBE's that require only one job at a time

E1 Virtual Batch Queues (VBQ) Overview

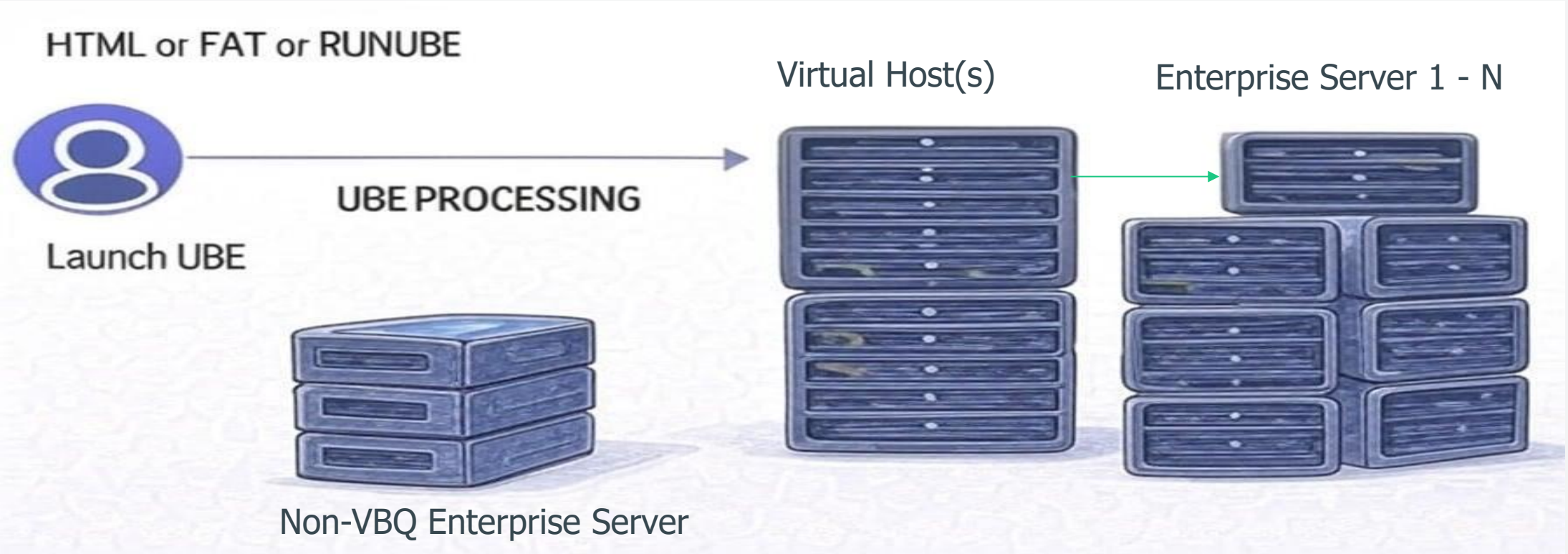
1. Report output must go to the database into the System table F986110R to ensure PDF files are accessible to all the Enterprise servers
2. The virtual cluster must use homogenous (same type) of Enterprise servers in the cluster. Example they must all be Windows, Unix or Linux.
3. Not available for IBM i since it already has native job queue management and you typically don’t have multiple production Enterprise servers

E1 Virtual Batch Queues (VBQ) Overview

1. Some useful My Oracle Support (MOS) documents and E1 sites
2. My Oracle support documents
   - E1: UBE: Virtual Batch Queues (VBQ) in E1 9.2.5.x And Later - What Are They, And How Does One Set Them Up? (Doc ID 2748939.1)
   - E1: UBE: Virtual Batch Queues - Balancing Of UBEs (Doc ID 2819398.1)
   - E1: UBE: Maximum Number of Concurrent / Parallel UBE Jobs Using Virtual Batch Queues (Doc ID 2809955.1)
3. LearnJDE site has several docs and training (Search for virtual batch queue)
4. LearnJDE/Tools & Technology/System Administration/Implement/Understanding Virtual Hosts Setup

VBQ Architecture

1. High level submission to virtual host/cluster
2. Users, fat client, runube/runubexml or scheduler can submit to the virtual host name instead of individual batch servers

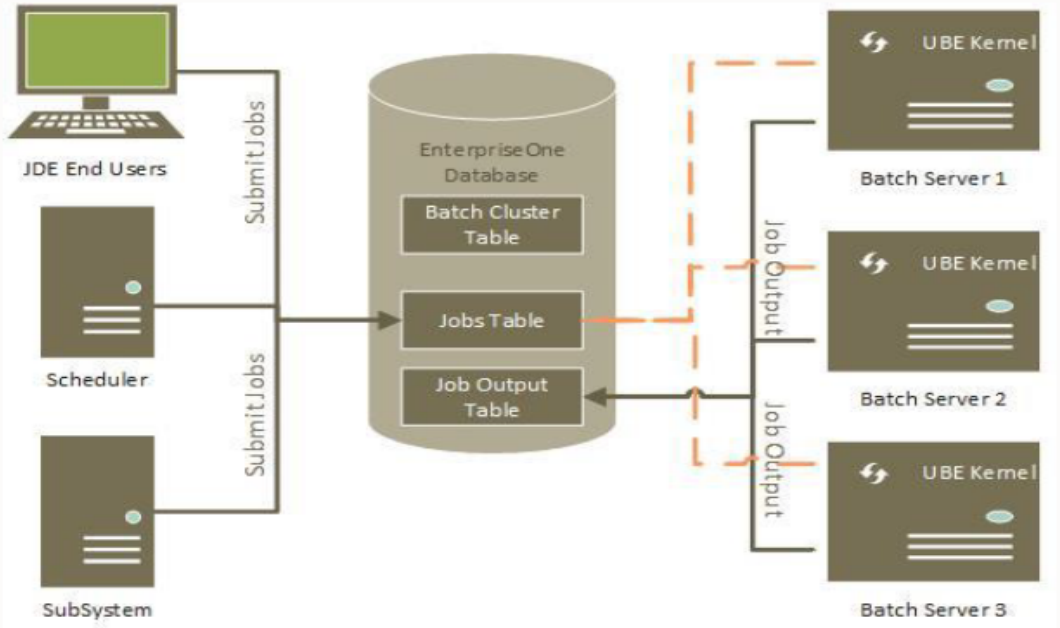


VBQ Architecture

9.2.5

Virtual/Elastic Batch Queue (VBQ)

Enhanced Report Management for EnterpriseOne 9.2



Key Drivers:

- Enact Single Batch Queue Properties Across Multiple Servers
- Elastic Batch Queue Server Scaling
- Supports Multiple Submission Methods

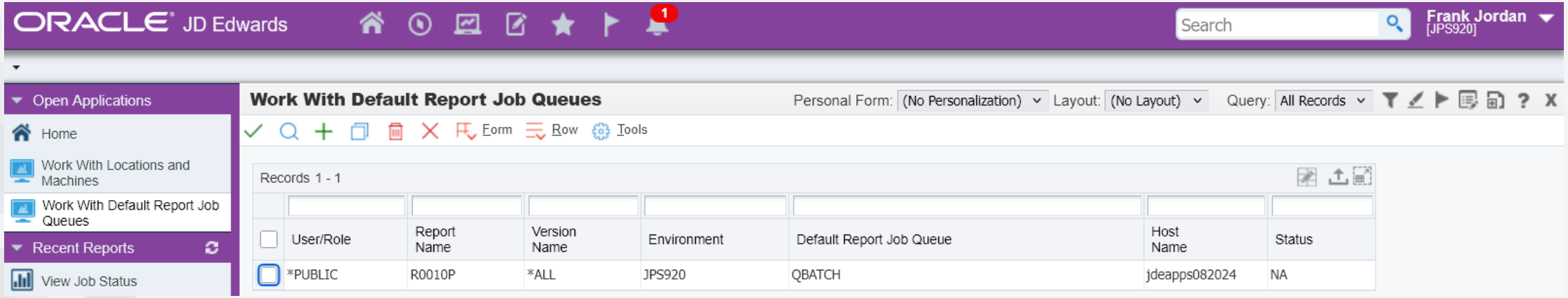
Value Solution:

- Establish "Virtual" Batch Cluster
- Automatically Combine Batch Resource Across Multiple Instances
- Utilize Batch Job Resubmission Solution – Job Detail Submitted to Database
- UBE Kernels Watch Job Table & Take Jobs as Available
- Output Centralized to Repository for Anytime/Anywhere Access

Quest Enhancement ID 11471 & 12008

VBQ Architecture

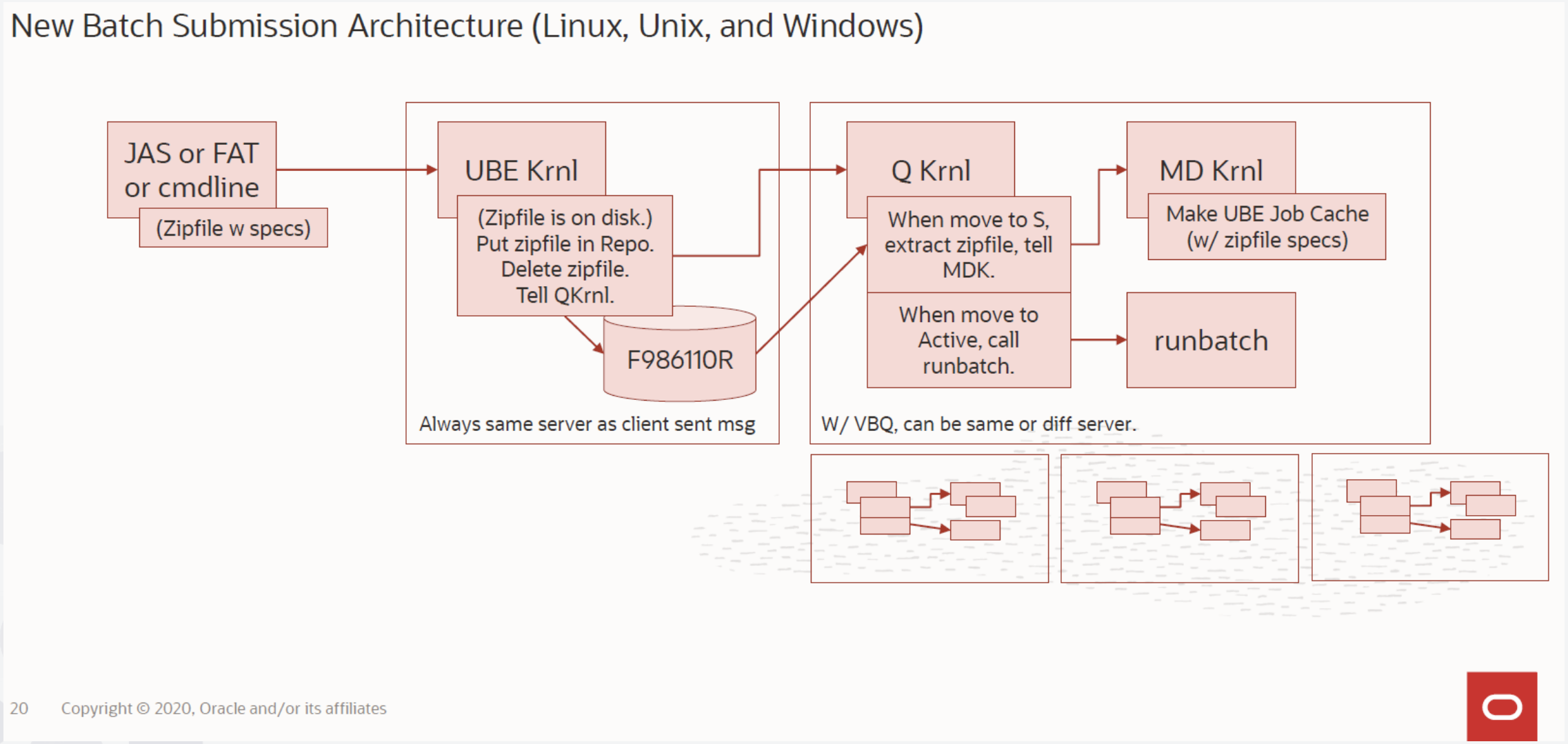
- Some of the Configuration Prerequisites
  - Must be the same Operating System, bitness (Typically now 64-bit), database type (Oracle or SQL Server) and using the same jdenet port
  - The P98617 Output for *PUBLIC/*ALL must be set to Database at a minimum. (You can have both database and file with a slight performance penalty)
  - Can also use P98617 (Form Exit/Job Queue) to set the job queue at various levels such as User/Role, Environment, Report, Version. This is the recommended process now instead of using the E1 scheduler job entry or UBE version specification



VBQ Architecture

- Some of the Configuration Prerequisites
  - All the batch servers in virtual host cluster must be using the same full/update package deployment
  - All batch servers in virtual host cluster must share the same System and Server map datasource
  - The batch servers OS time zone must be the same. Typically, you would leverage a NTP server to provide time synchronization.

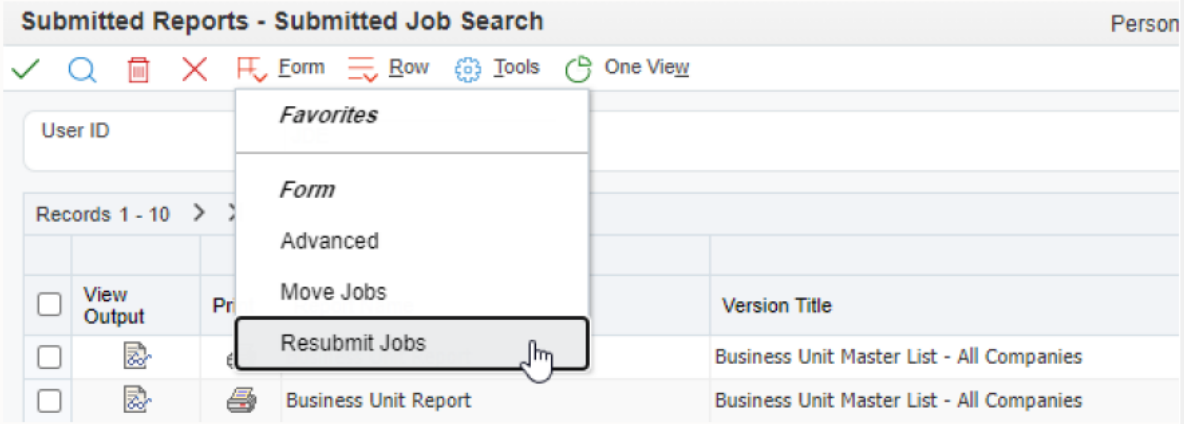
VBQ Architecture

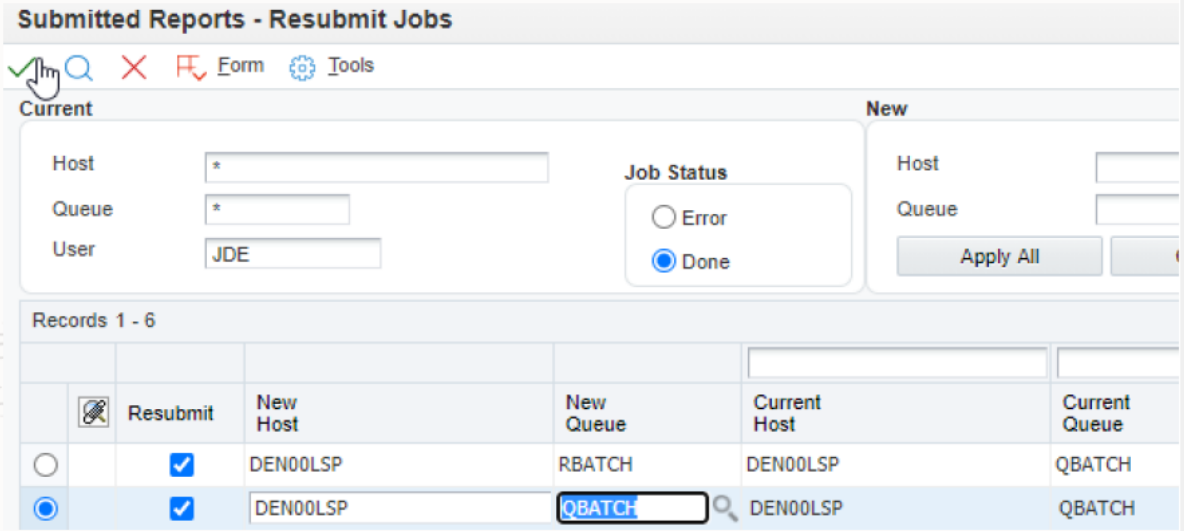


VBQ Architecture

Architecture Update Implications: Move and Resubmission of Jobs

1. Jobs that are Waiting or Held can be moved between servers and/or job queues
   - Default: Can only see own jobs
2. Jobs in Done or Error status can be resubmitted.
   - Default: Can only see own jobs
   - Always run with EOne Security Profile of resubmitting user.
3. New forms from exits on Work With Server Jobs App (WSJ/P986110B) allow moving and resubmitting jobs.



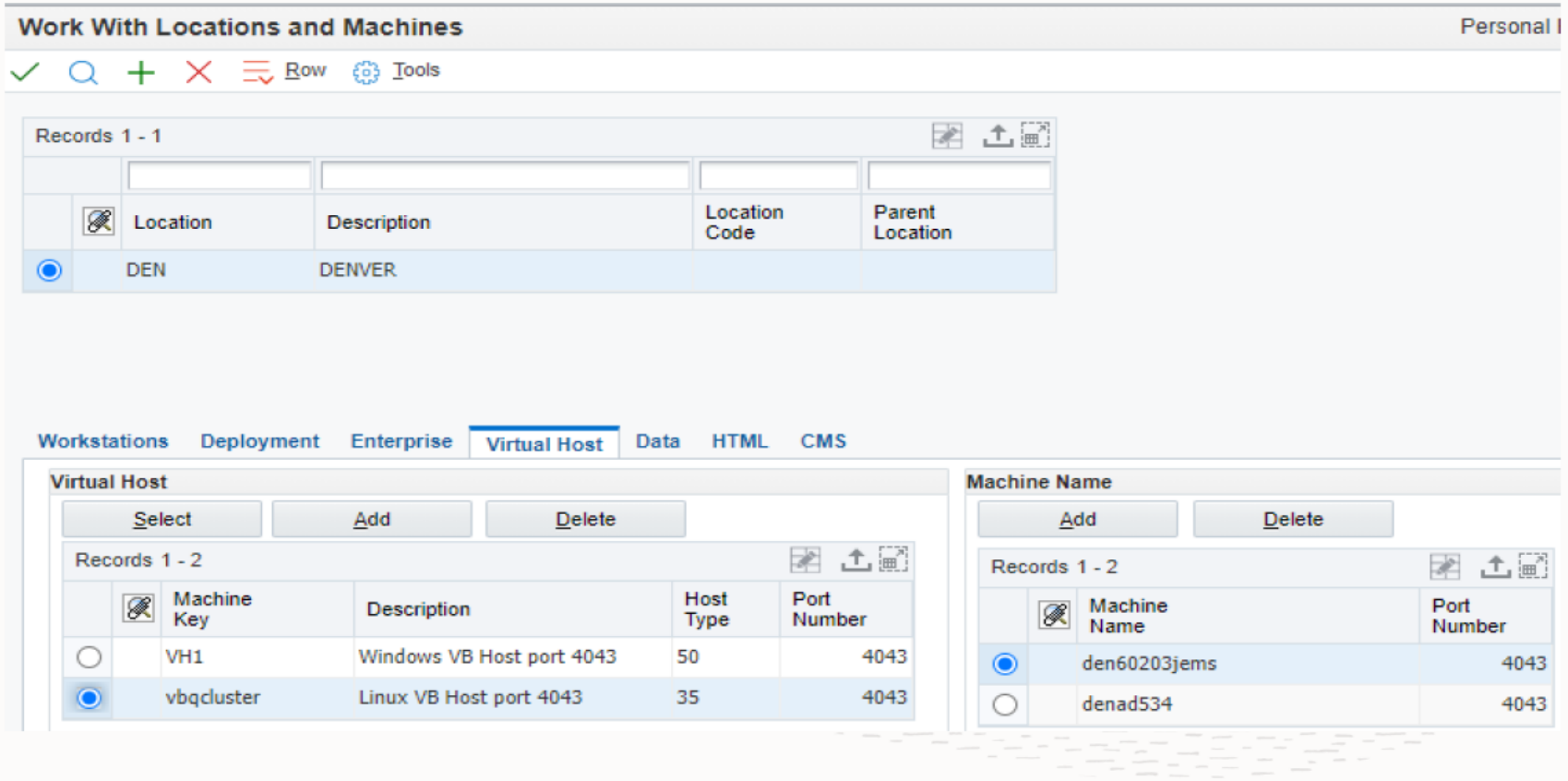


VBQ Architecture

Virtual Batch Queues – Configuration

Defining the virtual batch hostname & adding Enterprise servers

1. Work with Machine and Locations: App P9654A (FAT) and P9654W(JAS) allow access to machine master and creation of a new Machine Usage, “Virtual Host” via menus H9083 or GH9611 “Machine Identification”.
2. Hosts added must be same type as virtual batch hostname.



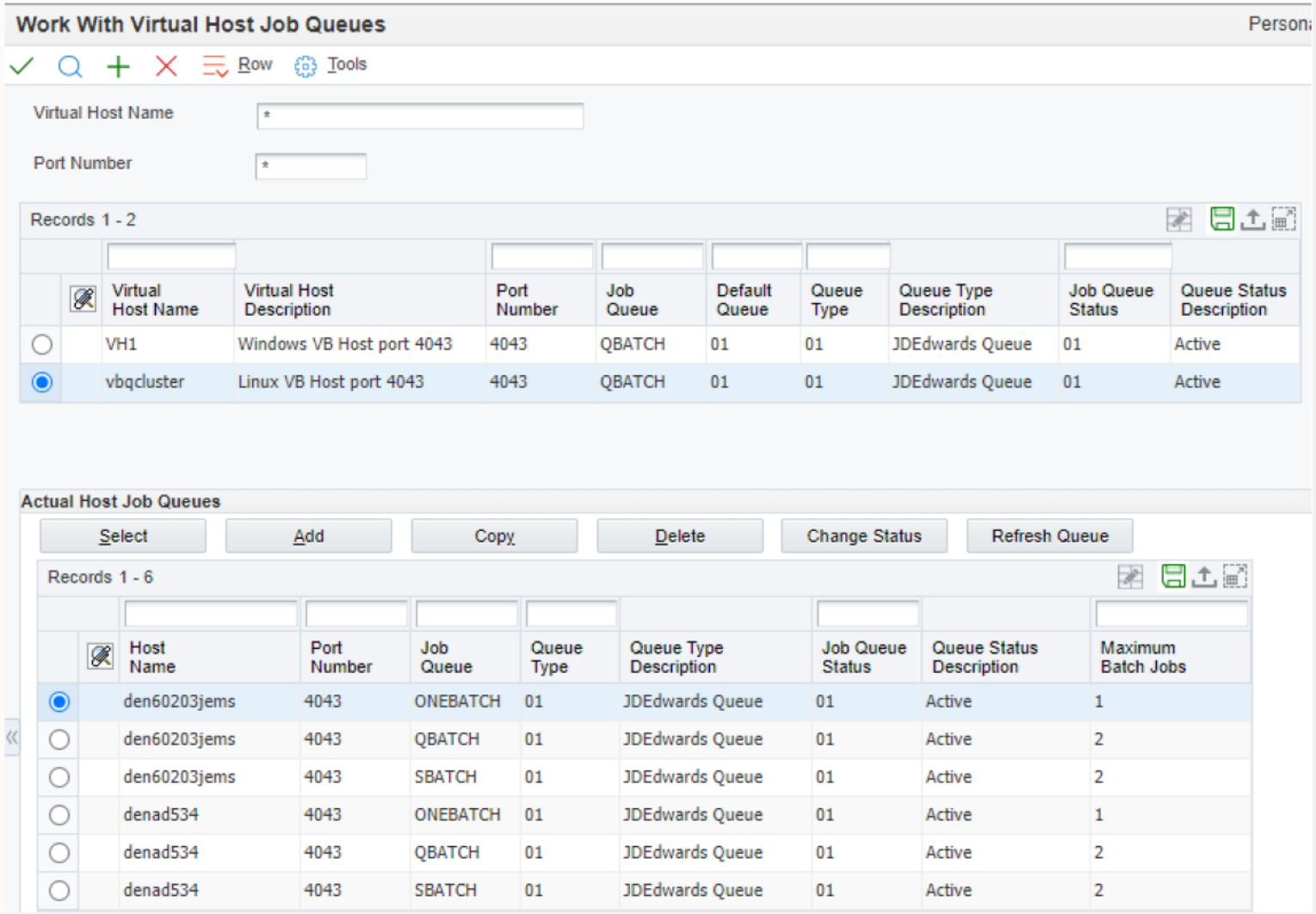
VBQ Architecture

Virtual Batch Queues – Configuration

Job Queue Setup and Management

1. A new form exit for P986130 – "Work with Job Queues"
2. Each server still defines Queue Names & number of jobs each queue can run using the actual hostname
   - Each server may have different system resources available. A CNC configures the load allocation for each server to match hardware capabilities.

Bounce services on servers & load the new config!



VBQ Architecture

Virtual Batch Queues – Architecture

Queue Kernel

1. When part of a virtual batch host, Queue Kernel schedules jobs submitted to that virtual batch hostname instead of the actual hostname.
2. Queue names used and queue depth are read from P986130 based on actual hostname.
3. Queue Kernel uses row locking to transition jobs from 'Waiting' to any other status to ensure only one Queue Kernel can schedule or hold a job.
4. Queue Kernel ensures single-threaded queue behavior across a virtual batch hostname

UBE Kernel

1. New Waiting Jobs
   - When part of a virtual batch host, the UBE Kernel adds new waiting jobs using the virtual batch hostname (& obtains new job numbers using that name as well)
2. Install Specs Only
   - UBE Kernel creates an 'install specs only' type job for each server defined as part of the virtual batch host to ensure all are updated in parallel.
3. Resubmitted jobs
   - Jobs that are resubmitted get a new job entry using the virtual batch hostname, and are picked up and run by any member of the virtual host.

VBQ Architecture

Virtual Batch Queues – Architecture

Subsystem UBEs

1. Sub-System Triggers
   - Subsystem 'next trigger' numbering moved from a protected value in a single allowed subsystem kernel to instead use a F986111 next number.

2. Sub-System Execution
   - Subsystem UBEs already fetch and execute triggers from the same environment across multiple servers.
   - Since UBE execution now uses the virtual batch hostname when defined, no other changes are needed for Subsystem control.

BIP Publisher

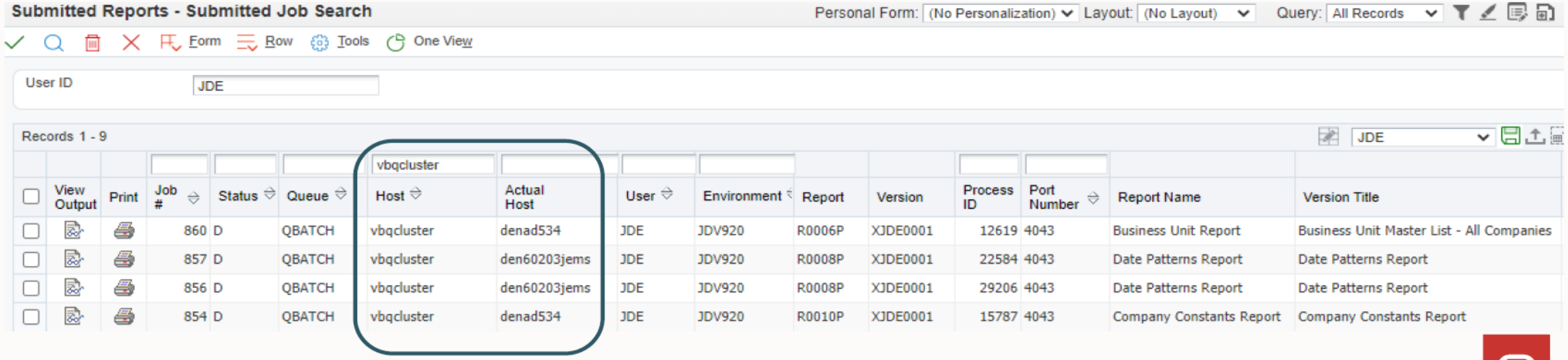
1. BIP Server Groups
   - An existing feature for BIP called "Server Groups" will continue to be used to define an embedded BI Publisher server group.
   - The configuration of the group should match the group of servers in the virtual host configuration in P9654W/P9655.

VBQ Architecture

Virtual Batch Queues – Architecture - continued

UBE Execution

- UBEs now check on startup to see if they are part of a virtual host & then use that virtual batch hostname across execution.
- When Queue Kernel prepares a job to run, it moves the job to 'Spec prep' status ('S') and updates a previously unused column in the F986110 with the actual hostname that is now preparing to run the job.
- This actual hostname column is used to send job termination messages to the server's queue kernel where the job is running ('P' status) when a user requests termination from WSJ.



View Output	Print	Job #	Status	Queue	Host	Actual Host	User	Environment	Report	Version	Process ID	Port Number	Report Name	Version Title
		860	D	QBATCH	vbqcluster	denad534	JDE	JDV920	R0006P	XJDE0001	12619	4043	Business Unit Report	Business Unit Master List - All Companies
		857	D	QBATCH	vbqcluster	den60203jems	JDE	JDV920	R0008P	XJDE0001	22584	4043	Date Patterns Report	Date Patterns Report
		856	D	QBATCH	vbqcluster	den60203jems	JDE	JDV920	R0008P	XJDE0001	29206	4043	Date Patterns Report	Date Patterns Report
		854	D	QBATCH	vbqcluster	denad534	JDE	JDV920	R0010P	XJDE0001	15787	4043	Company Constants Report	Company Constants Report

VBQ Advantages

- This virtual architecture provides flexibility and the ability to scale
- Jobs can be run and resubmitted to another server when needed
- You can move jobs and queues before they are executed
- A UBE submitted to a queue within the virtual batch cluster can process on ANY of the server in the cluster if that queue exists
- You can dynamically add or remove batch servers from the virtual cluster for different processing times such as nightly or weekly batch
- PDF/CSV output is stored in F986110R repository, so all servers go to a common location. Less overhead than file-based storage with potentially thousands to hundreds of thousands of files

VBQ Advantages

- **Customer example:**
  - Decision to leverage VBQ to help the 15 – 20,000 UBE's per day and embedded BIP process more efficiently
  - 6 UBE servers in virtual batch cluster instead of specific UBE's on a certain server. (Previous architecture had 12 UBE servers)
  - 1 UBE server outside the virtual batch cluster where E1 scheduler runs and a small number of specific UBE's for document retention is leveraged
  - Batch servers also provide logic/security services for integration AIS and BSSV servers, so they don't contend for web/app logic resources
  - Over 50 job queues defined for various scheduled and user UBE's
  - OCM mappings for UBE's were removed for over 98% of entries (100's down to 6)
  - Up to 1,200 concurrent users in the system can submit UBE's at various times
- **Results:**
  - VBQ with 6 servers reduced user batch execution times significantly. (Except for single job queues) Fewer servers than before (12 batch to 7 batch), but much better utilization/distribution.
  - VBQ improved many UBE's that launched multiple versions. MRP parallel subsystem jobs went from 4 - 6 hours to 2- 2.5 Instead of a single server now the UBE's running on six servers
  - Backlog of jobs in wait status reduced by 95% (Over 100 jobs waiting at times to less than 5 - 10 unless in single job queue. Majority of the time no waiting jobs now
  - Database improvements significantly also helped the batch runtimes, so more jobs processed in less time

VBQ “Lessons Learned”/Gotchas

1. Some useful support documents
2. My Oracle support documents
   - E1: UBE: Spec-Only UBE Submission to Virtual Batch Queues (VBQ) Host Does not Propagate Specs to All VBQ Servers (Doc ID 2971396.1)
   - E1: UBE: Custom UBEs Which Are Using GetOneWorldJobNumber Are No More Able to Retrieve the Job Number After Virtual Batch Queues Feature Has Been Enabled (Doc ID 3012153.1)
   - E1: UBE: XMLP: After Configuring Virtual Batch Queues on JD Edwards EnterpriseOne With Tools Release 9.2.5.X Where Old Enterprise Servers Have Been Added to the Virtual Batch Hosts, the Output of the Old Submitted Jobs Cannot Be Accessed (Doc ID 2761243.1)
   - E1: UBE: UBEs are Failing Randomly in Virtual Batch Queue(VBQ - P9655) Setup When Submitted From Fat Client But Works Fine When Submitted From Web Client/Webdev Client (Doc ID 2973054.1)

VBQ "Lessons Learned"/Gotchas

1. One customer incorrectly defined the virtual host in P9654A/P9654W as both a physical and virtual host. It actually worked to a degree, but the P986130 virtual queue would not allow virtual host queues to be defined. Resolved by removing the Enterprise Server host definition which should only have "real/physical" hosts and the virtual host with the cluster members would then work as expected
2. Several fixes/ESU's since tools 9.2.5.x for VBQ are present. Most now are in tools 9.2.7.5 and above. Earlier tools releases can work, but depending on your configuration you may observe some known issues.
3. E1 scheduler can submit jobs to VBQ, but you need to change your existing scheduled jobs from physical server in cluster to the virtual host. Otherwise, you will see job monitor errors and the jobs will stay at launched 10 status instead of going to 20 Successful. If you don't correct this, you have to either use the Scheduler purge UBE (R91300B) or SQL the F91320 entries status. See Doc ID 3037767.1

VBQ “Lessons Learned”/Gotchas

1. My Oracle support documents
   - E1: SCHED: After Enabling the Virtual Batch Queue Feature on Two Enterprise Servers, the Status of the Scheduled Jobs Submitted Through One Enterprise Server Were Left as "Launched" (Doc ID 3037767.1)
   - E1: XMLP: Enhancement Request due to Report Definition Output Cannot Be Fetched in a Virtual Batch Queue Environment if the Enterprise Server Which Processed the Report Definition Output Is Stopped (Doc ID 2938250.1)

Summary

- If you have/need more than 2 E1 batch servers strongly consider using virtual batch queues (VBQ)
- VBQ available starting in E1 tools 9.2.5.0, but sweet spot is tools 9.2.7.5 and later
- VBQ allows your batch workload to be more performant, flexible and scalable than using a single UBE server

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Questions?

- fjordan@erpsuites.com

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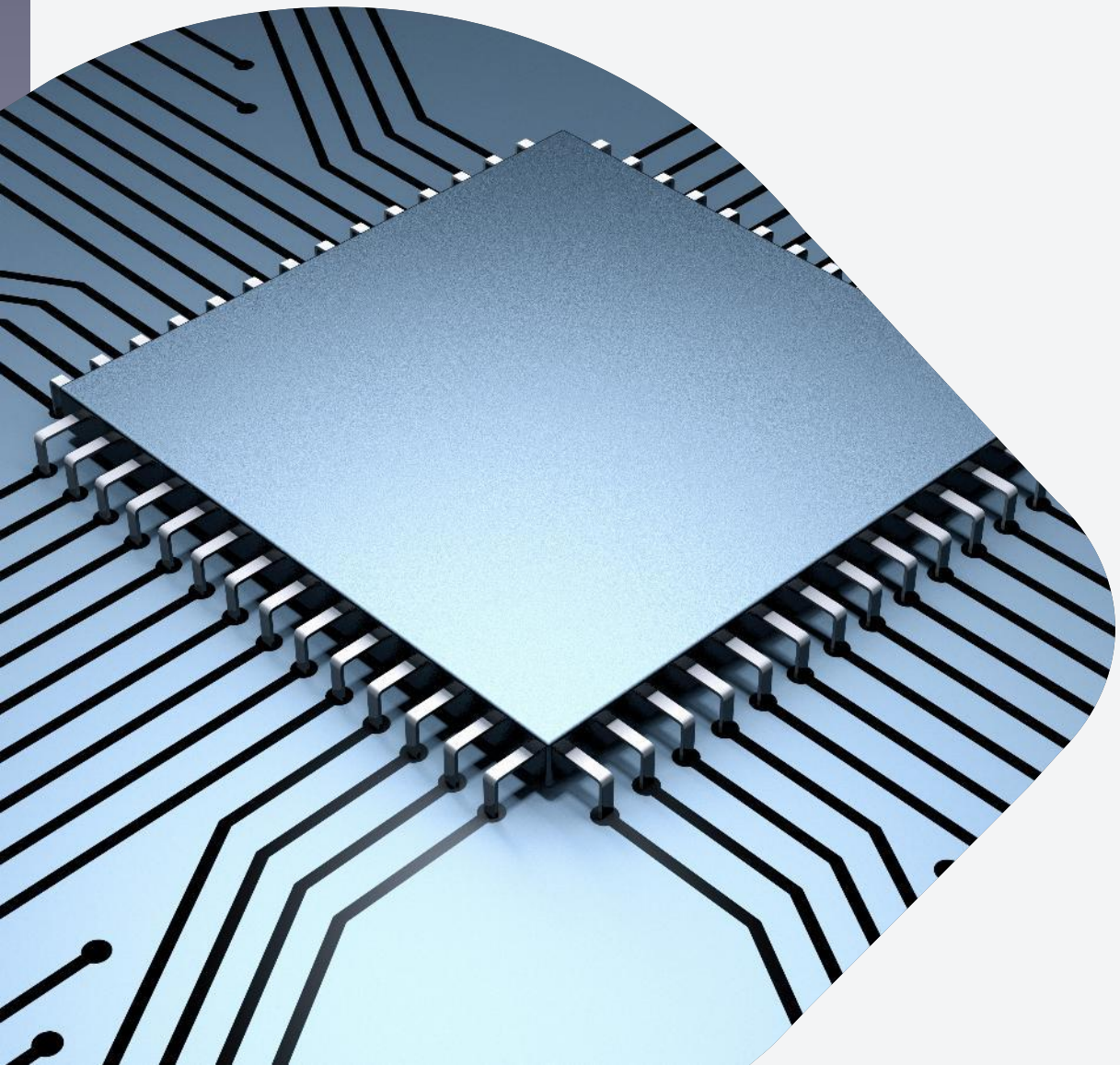

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Bibliography

- E1 documentation, Oracle support documents, learnjde.com
- Screenshots from various Oracle presentations since 2020
  - John Holder of Oracle “Batch Cloud Elasticity via Virtual Batch Queues”

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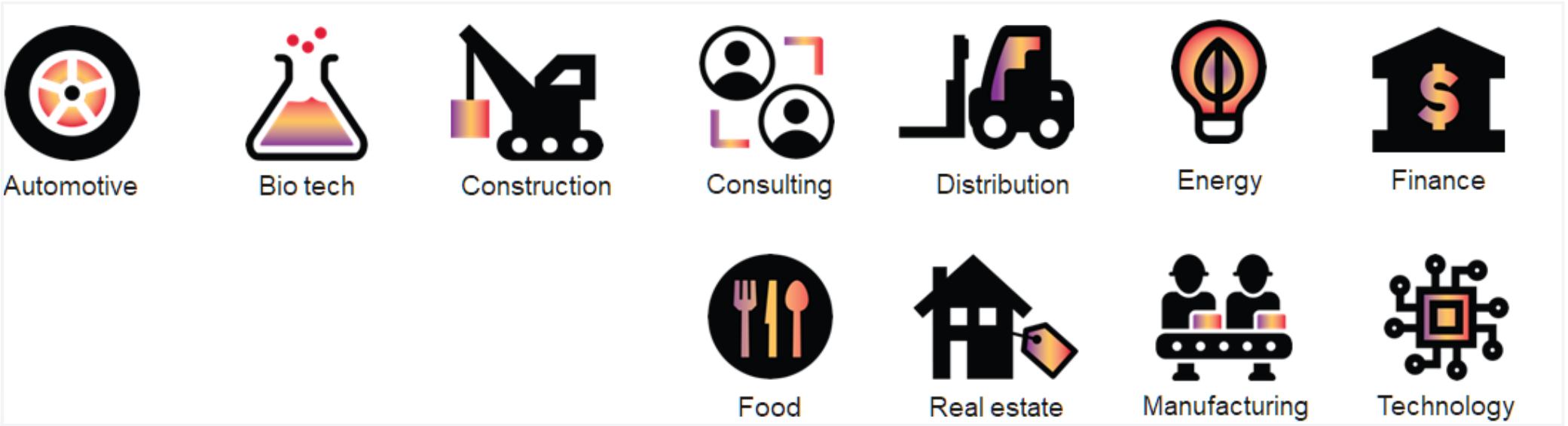

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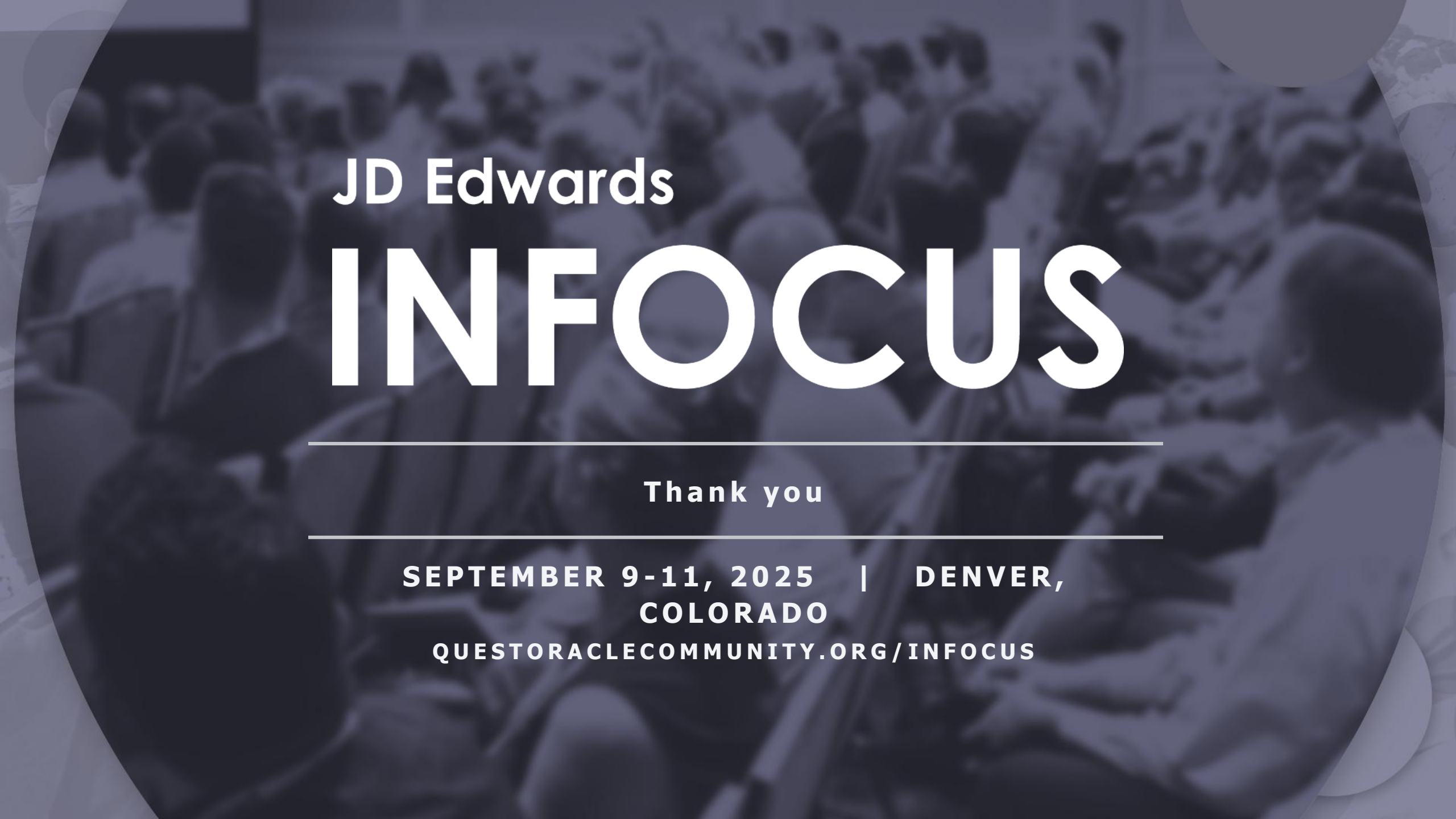
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