Transforming Cisco's XaaS Business leveraging Process Automation Architecture

CamundaCon 2023

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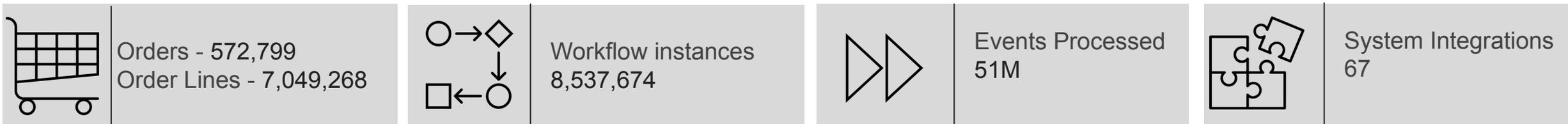
Date: Sept 27, 2023

Who are we ?
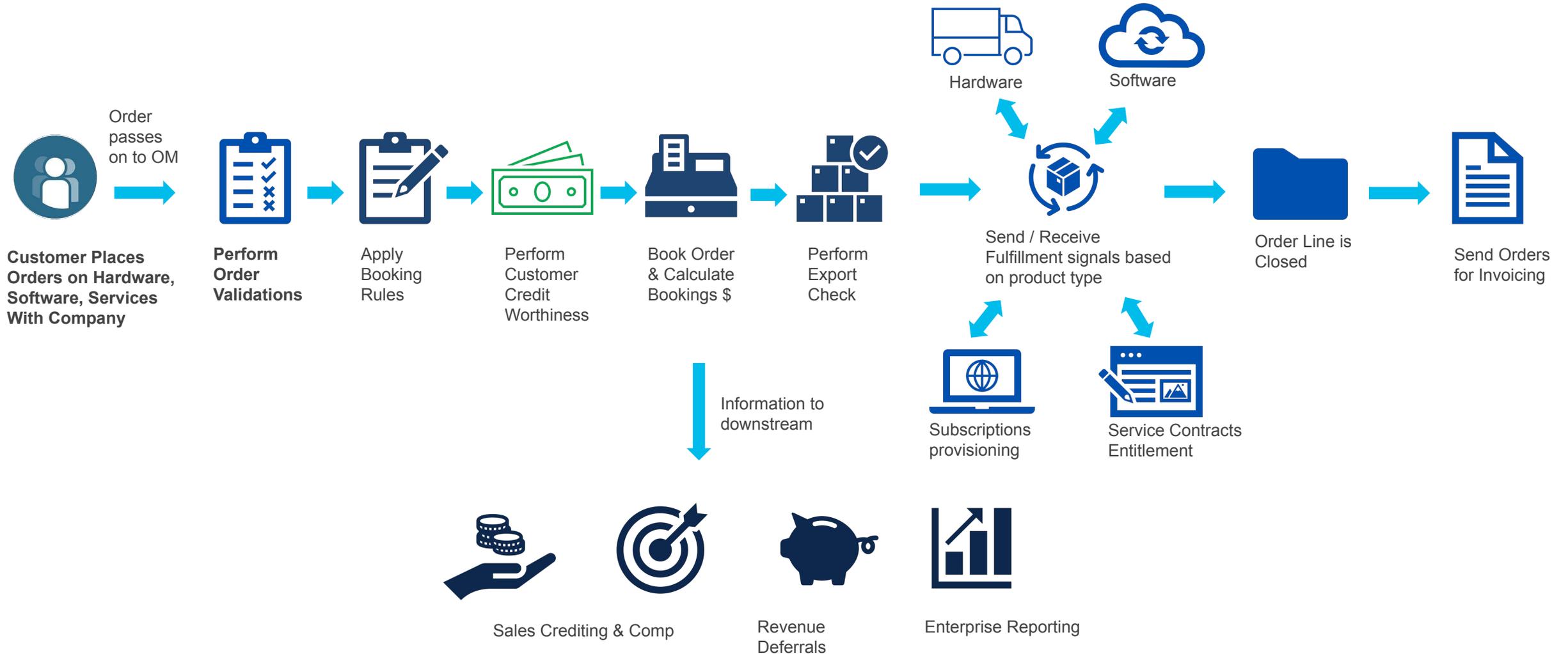## Cisco IT – Commerce Operations - Order Management

We orchestrate, process customer orders through the lifecycle stages across Company's business models.

We are responsible to support successful booking, derive accurate valuation and attribution, claims processing, orchestrate and publish orders to consumer systems

Orders - 572,799 Order Lines - 7,049,268	Workflow instances 8,537,674	Events Processed 51M	System Integrations 67

What we do ?
Cisco Backoffice Orchestration

Order passes on to OM

Customer Places Orders on Hardware, Software, Services With Company

Perform Order Validations

Apply Booking Rules

Perform Customer Credit Worthiness

Book Order & Calculate Bookings $

Perform Export Check

Hardware

Software

Send / Receive Fulfillment signals based on product type

Order Line is Closed

Send Orders for Invoicing

Information to downstream

Subscriptions provisioning

Service Contracts Entitlement

Sales Crediting & Comp

Revenue Deferrals

Enterprise Reporting

Simplified for Illustration Purposes only

Objective

Current Pain points

- Purpose built workflow engine

- Custom tooling for operations

- Embedded business logic

- Orchestration is tied to offer structures, order source, route to market, etc.

A modern cloud integration stack that provides a robust orchestration layer across diverse applications with a seamless pluggable architecture
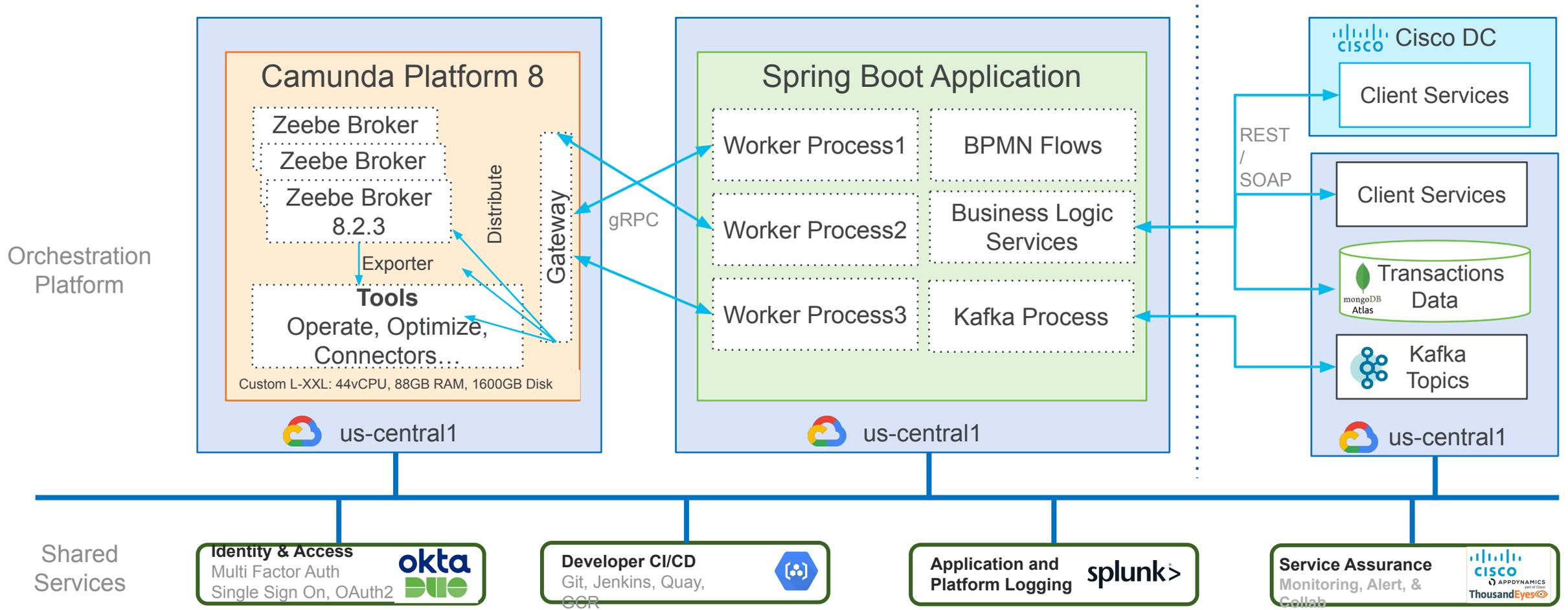
Design Goals

- General purpose

- Standardized modeling capability

- Run-time visualization

- Operations and monitoring capability

- Support for extensive Integration & workflow patterns

- Configurable for low code/no code design

- Separation of concerns (core engine vs business logic)
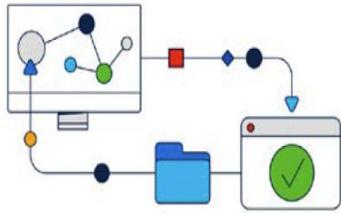
- Multi-Cloud support

Outcomes

- Transition key **orchestration activities to cloud**

- Provide a way to **integrate new applications and services into core**

- Enable **flexible and pluggable design for event-based** order processing and orchestration

- Generic orchestration by **standardizing offer structure and process simplification**

Architecture

Camunda Platform 8

Zeebe Broker

Zeebe Broker

Zeebe Broker
8.2.3

Distribute

Gateway

Exporter

Tools
Operate, Optimize,
Connectors...

Custom L-XXL: 44vCPU, 88GB RAM, 1600GB Disk

us-central1

Orchestration
Platform

gRPC

Spring Boot Application

Worker Process1

BPMN Flows

Worker Process2

Business Logic
Services

Worker Process3

Kafka Process

us-central1

Cisco DC

Client Services

REST
/
SOAP

Client Services

Transactions
Data

mongoDB
Atlas

Kafka
Topics

us-central1

Shared
Services

Identity & Access
Multi Factor Auth
Single Sign On, OAuth2

okta
DUO

Developer CI/CD
Git, Jenkins, Quay,
GCR

**Application and
Platform Logging**

splunk>

Service Assurance
Monitoring, Alert, &
Collab

CISCO
APPDYNAMICS
part of Cisco
ThousandEyes

Approach

Design

39 custom workflows to 23 standardized BPMN process flows

20K LoC reduced to set of configuration and BPMN files

Reduced lead time for new business capabilities

| Standardize | Generic | Accelerate |

Operations

Real-time visualization capability for operations

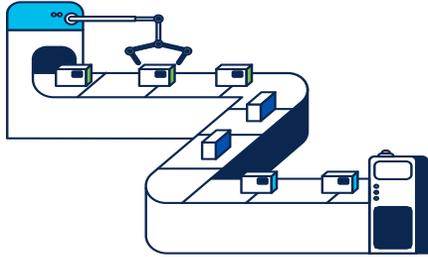Monitoring dashboards with data filtering capability to optimize

Improved operations with real-time visualization and optimization

| Support | Optimize | Excellence |

Next steps

Automation

Test Automation

- Explore automation libraries (process-execution-automator and camunda-bpm-assert-scenario)
- Functional and E2E test automation by integrating with tools like UiPath

Process Instance Migration

- Active process instance migration strategy
- Capability to be available in Camunda platform 8 in spring 2024

Fluent Builder API

- Dynamic Process Flow creation

Demo

Dynamic generation of process flow using Fluent Builder API

Load Test Summary

Scenario	Result	Notes
Regular Order (100 Lines) 100 Orders	SUCCESS	13 process flows and 8600 process instances completed in 45 mins mainly simulation took time for the wait tasks progressions
Regular Order Flow (100 Lines) 20 Orders / Min	TBD	
Large Order (1000 Lines)	SUCCESS	Setting: zeebe.client.worker.max-jobs-active=20 (default 32)
Very Large Order (8500 Lines)	RESOURCE_EXHAUSTED	**Back Pressure Issue: Failed to activate jobs due to RESOURCE_EXHAUSTED: gRPC message exceeds maximum size 4194304** Reduce fetch variables only required by worker Set zeebe.client.worker.max-jobs-active to 3
Largest Possible Order (start with 10K+ lines)	TBD	

Learnings and best practices

|	
Payload Handling	**Limit the context values** required only for the specific process and sub-process.
Attribute Handling	**Limit the fetch variables**. Fetch attributes only required for that process.
Backpressure Handling	RESOURCE_EXHAUSTED due to queue overload with message exceeding max size of 4MB. **Set performance tuning Zeebe properties** to handle backpressure. 1. zeebe.client.worker.max-jobs-active=3 (32 default max jobs) 2. zeebe.client.worker.threads=3
Apply new version for active instances	**Process Migration Tool** is not yet available in Camunda Platform 8. Migration tool between processes will be available in 8.3 (this autumn) and **fully available in 8.4 (spring 2024).**
Update context data of active instances	Leverage Zeebe APIs and Methods to update the process context variables. i.e. zeebe.newSetVariablesCommand({processInstanceId}).variables(variable).send();
Modeling	**Message Task behavior**: Multiple send message required if multiple receive message tasks are waiting for same flow, but only one send message will suffice if multiple receive message tasks are of different flow.
Versioning	• Artifacts for multiple versions • Long running processes • Use of call activities

Summary

Platform: Horizontally Scalable State machines
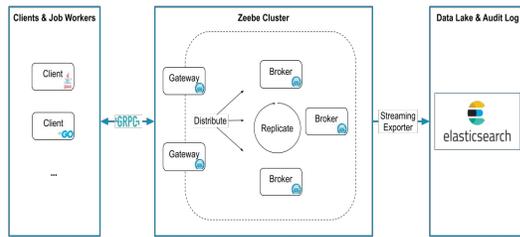
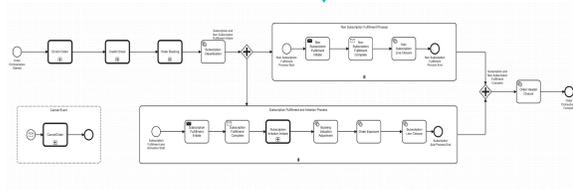Monitor and support business processes with visualization capability

Rich dashboard and optimization capability for pro-active improvements
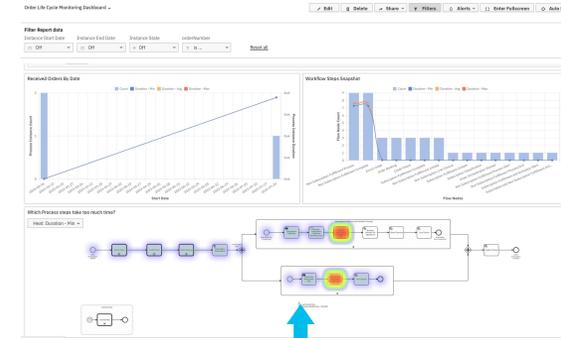
Jun-2022 Dec-2022 Jun-2023 Oct-2023 Dec-2023 Jun-2024

Design: Standardized BPMN flow with Graphical Notation

Dynamic Process Flow creation using Fluent Builder API

Process Instance Migration to apply changes to active instances

```
BpmnModelInstance modelInstance = Bpmn.createProcess()
  .startEvent()
  .userTask()
  .parallelGateway()
    .scriptTask()
    .endEvent()
  .moveToLastGateway()
    .serviceTask()
    .endEvent()
  .done();
```

```
MigrationPlan migrationPlan = processEngine.getRuntimeService()
  .createMigrationPlan("orderBooking:1", "orderBooking:2")
  .mapActivities("checkBookingHolds", "checkBookingHolds")
  .mapActivities("bookingDecision", "bookingDecisionNonUS")
  .mapActivities("updateOrderToBook", "updateOrderToBook")
  .mapActivities("bookingValuation", "bookingValuation")
  .build();
```
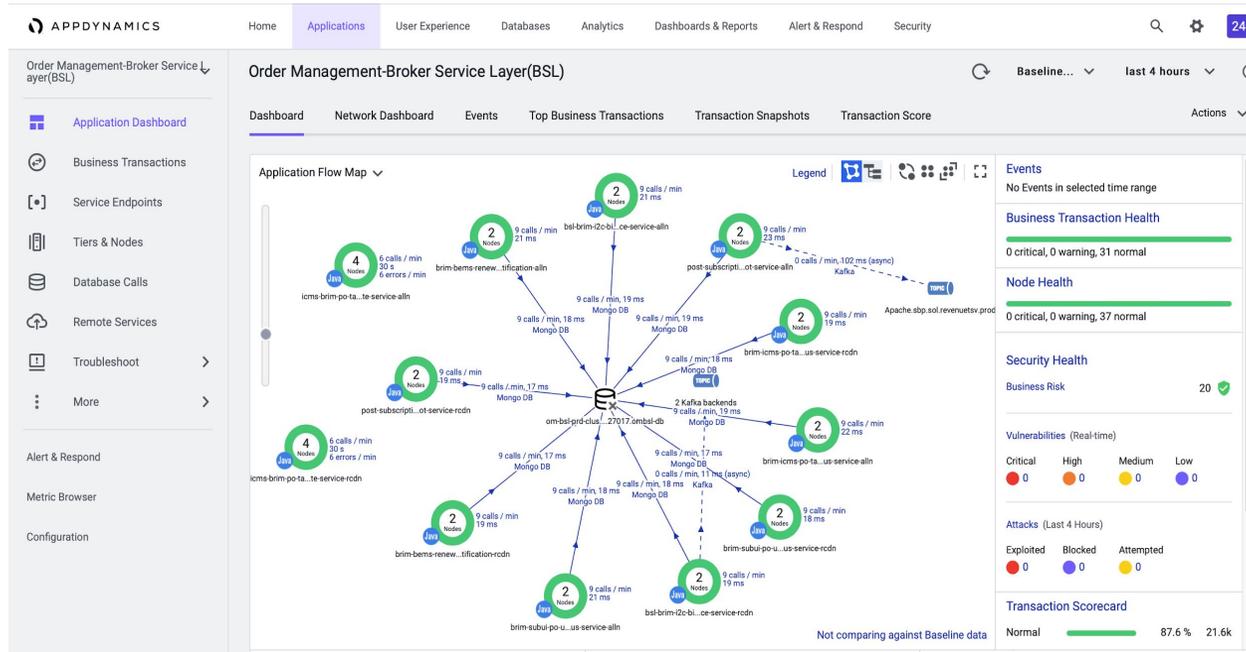
CISCO

The bridge to possible

Backup

Service Assurance with AppDynamics & ThousandEyes

Application performance monitoring

Network and internet performance metrics