



TRADING PLATFORM ARCHITECTURE

FOR A WALL STREET INVESTMENT BANK

JOSH WEST

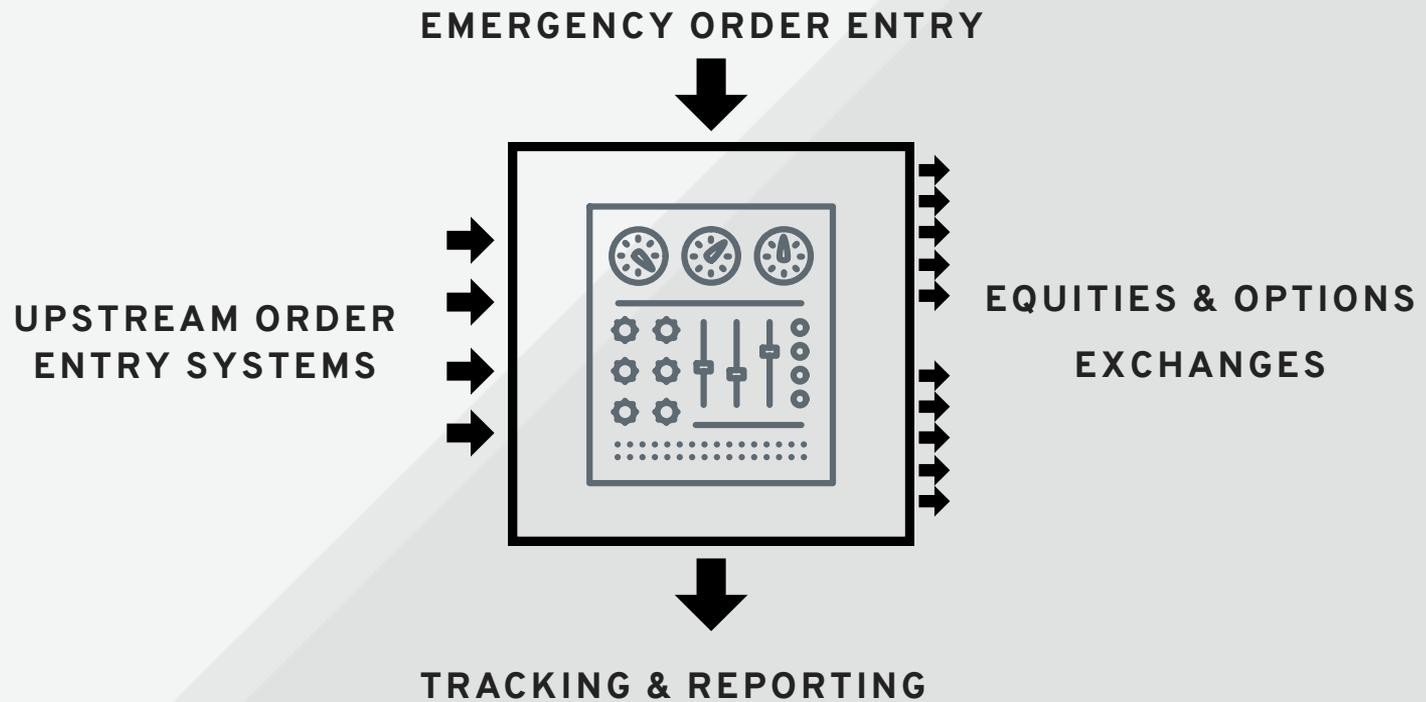
SOLUTIONS ARCHITECT

RED HAT FINANCIAL SERVICES

**RED HAT
SUMMIT**

USE CASE

ORDER PROCESSING AND MARKET DELIVERY



LEGACY SOLUTION

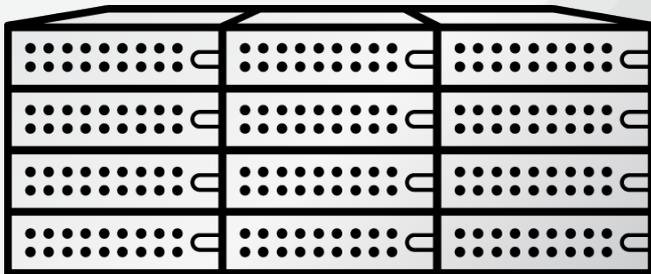
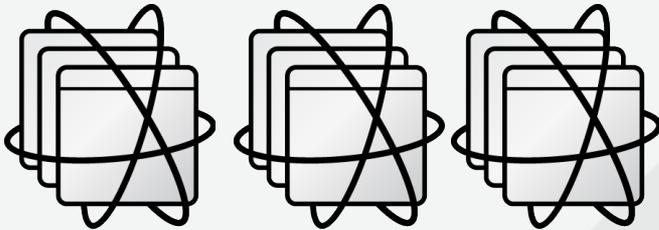
PROPRIETY HIGHLY AVAILABLE HARDWARE - STRATUS



- Expensive to maintain
- Dedicated Staff
- Specialized Support Skills
- Difficult to Update
- Scalability

MODERN SOLUTION

**DISTRIBUTED OPEN
SOURCE SOFTWARE STACK**



COMMODITY HARDWARE

- Modular
- Enable Agility
- Lower Cost
- No-Lockin
- Transparent
- Viable Support

FSI ... NOT SILICON VALLEY



- Always consistent, versus eventually
- ACID Transactions
- High Throughput, versus Internet Scale

OPERATIONAL REQUIREMENTS



UPTIME



**DISASTER
RECOVERY**



**FAULT
TOLERANT**



SLA



SCALABLE

OPERATIONAL REQUIREMENTS



UPTIME

- 99.9999% uptime required
- Operation hours only
- Loss of availability = \$\$\$\$ and customers



DISASTER
RECOVERY



FAULT
TOLERANT

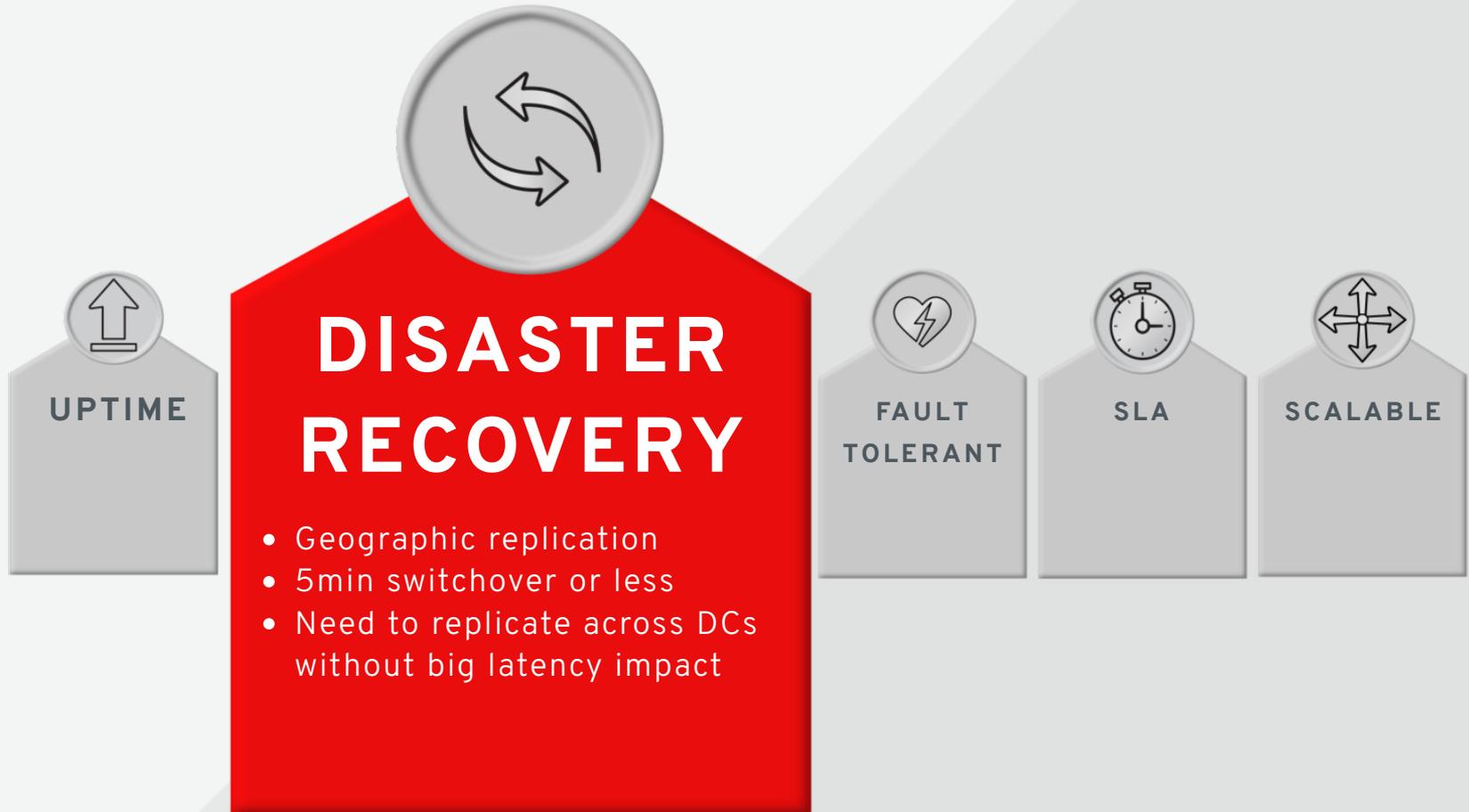


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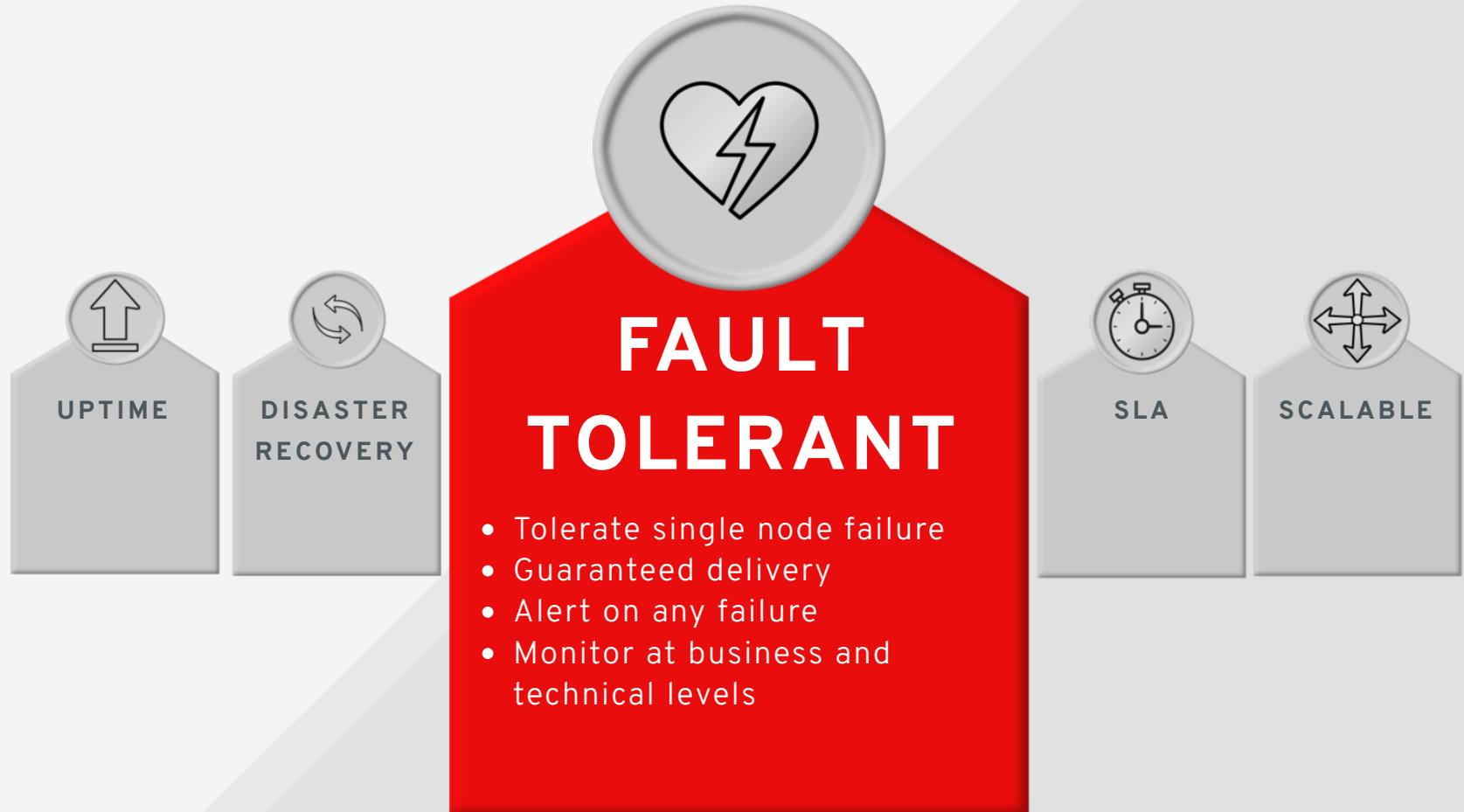


SCALABLE

OPERATIONAL REQUIREMENTS



OPERATIONAL REQUIREMENTS



OPERATIONAL REQUIREMENTS



OPERATIONAL REQUIREMENTS



SCALABLE

- Increasing upstream sources
- Planned throughput growth
- Ability to add capacity easily



UPTIME



DISASTER
RECOVERY



FAULT
TOLERANT

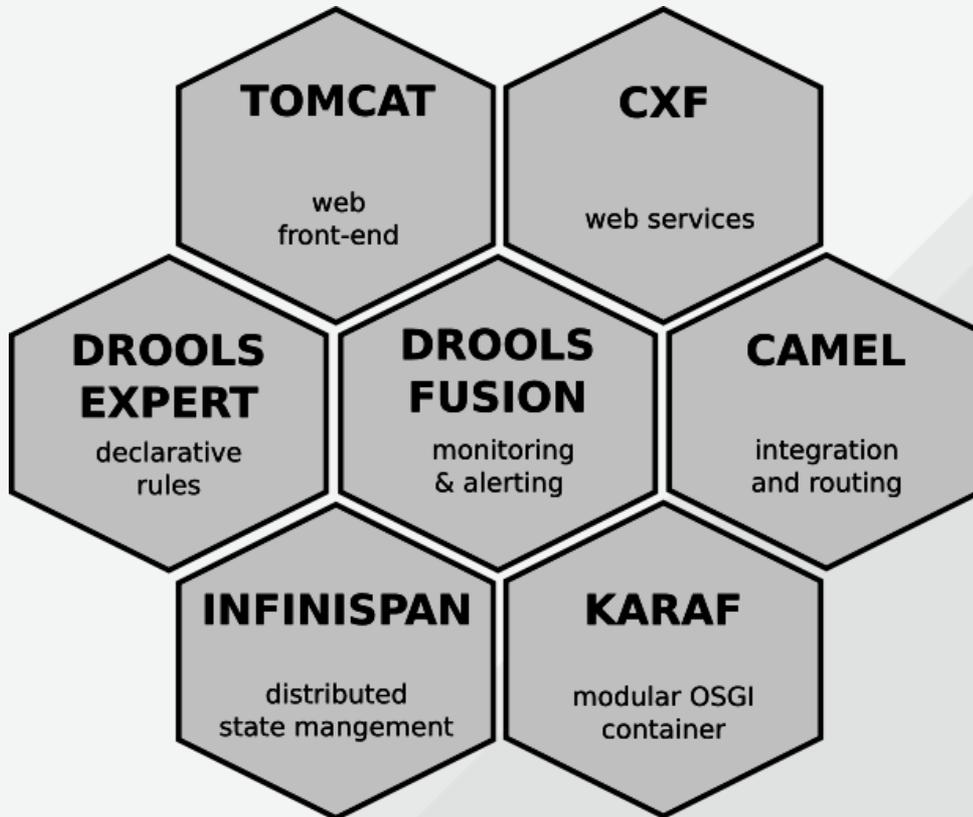


SLA

NOTABLE REQUIREMENTS

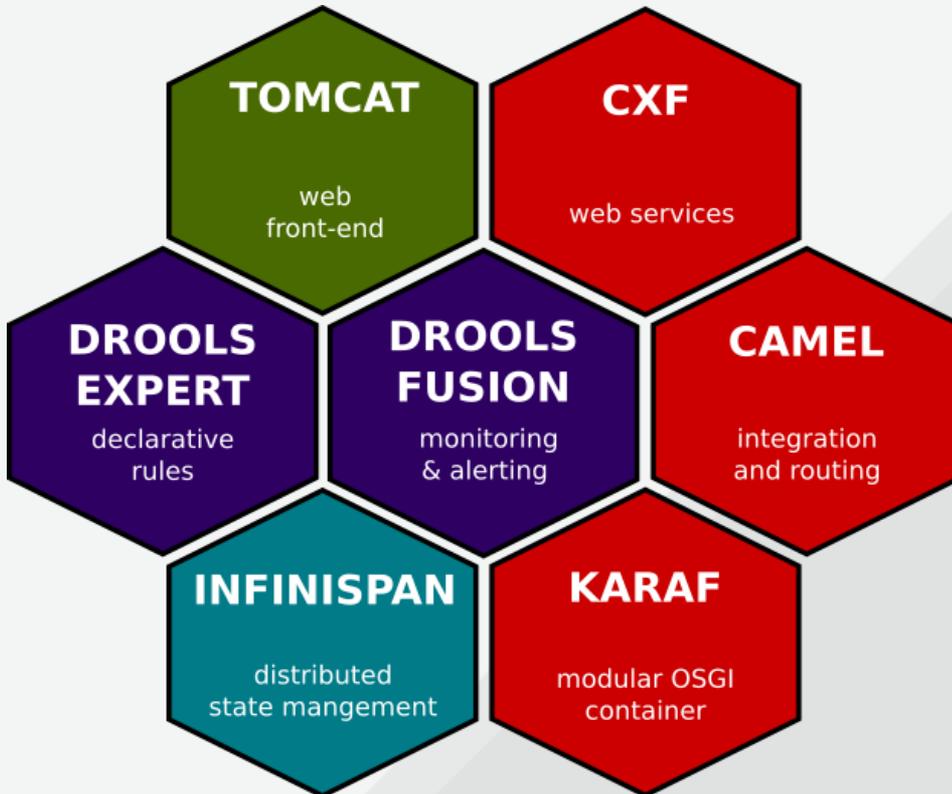
- State Management
- Transactional
- Modularization
- Declarative Business Logic and Validations
- Content Based Routing
- Destination specific formatting
- System Monitoring and Alerting
- User Auditing
- System Wide Reporting
- Web Front-End

BUILDING BLOCKS



x86 Hardware, 16 core, 128MB RAM

BUILDING BLOCKS



SUPPORTED BY:

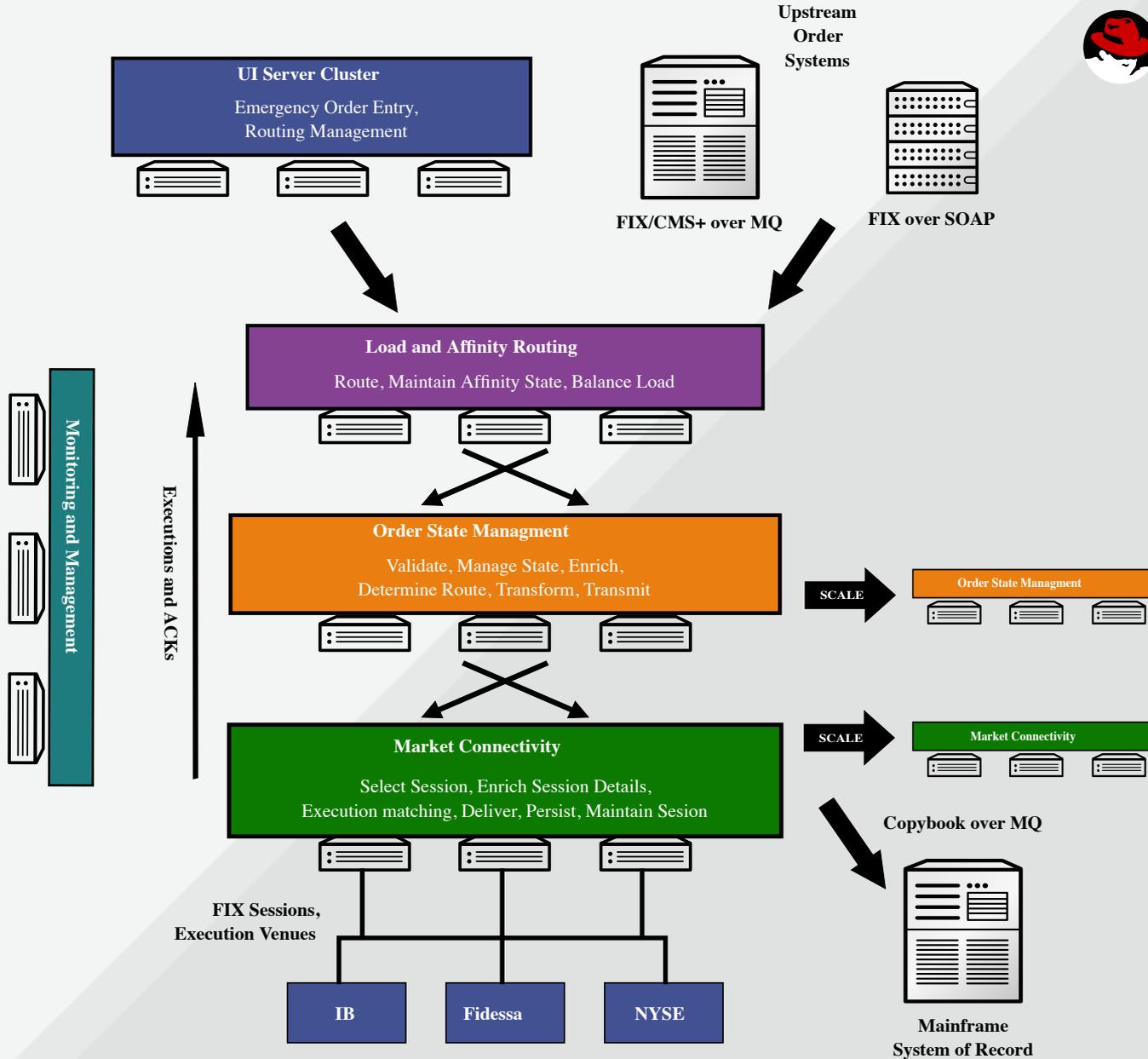
RED HAT® JBOSS®
WEB SERVER

RED HAT® JBOSS®
BPM SUITE

RED HAT® JBOSS®
DATA GRID

RED HAT® JBOSS®
FUZE

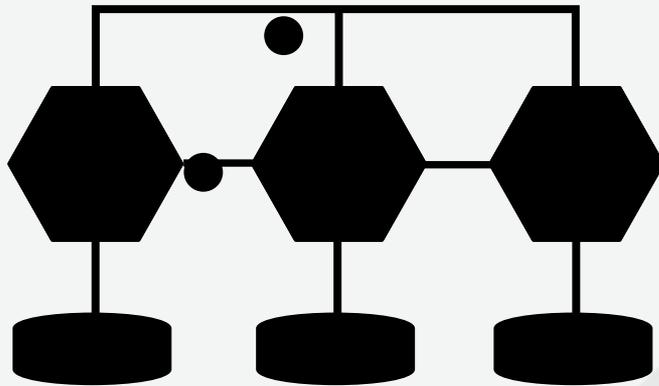
x86 Hardware, 16 core, 128MB RAM



INTERESTING PATTERNS

- Distributed State
- Data Affinity & Correlation
- Data Processing with Updatable Logic
- Performance Instrumentation

DISTRIBUTED STATE MANAGEMENT



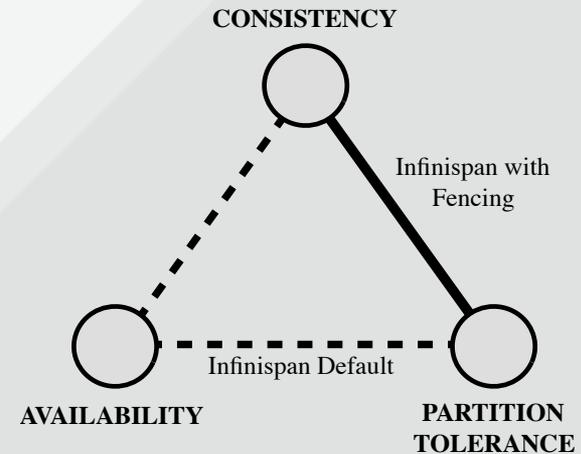
In-memory cache

LevelDB Backed

Transactional

3 Node Replicated Cluster

Tolerates 1 failure



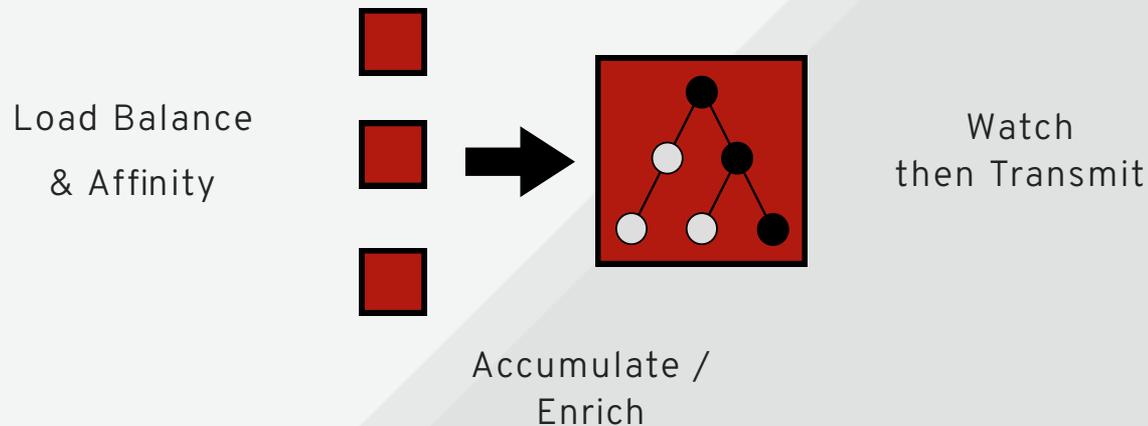
CAP Theorem

Infinispan with Fencing

JGroups API

Master Election

DATA AFFINITY & CORRELATION



Accumulate Payload from Multiple Correlated Messages

Blackboard Pattern

Smart Load Balancing

Fast Data Lookup with Cache

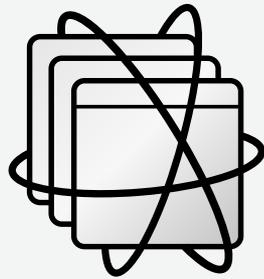
UPDATABLE LOGIC

- Plumbing versus and Processing
- Represent business rules in a declarative model using Drools
- Plumbing with Enterprise Integration Patterns using Camel
- Future goal to enable editing and deployment of rules

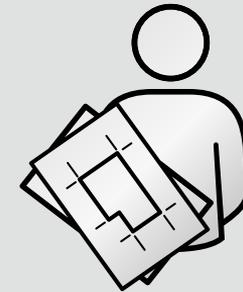
PERFORMANCE INSTRUMENTATION

- Gather metrics and events from the cluster
- Process with Complex Event Processing
- Enforce SLAs and alert on issues
- Business Oriented Policies

CONCLUSIONS



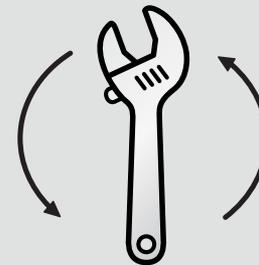
Ultimate Toolkit
with Open Source



Modern Design
Patterns for FSI



Cost Savings



Maintainability



redhat[®]
FINANCIAL SERVICES



redhat.