AWS re:Invent

ENT303 - Migrating Enterprise Applications to AWS: Best Practices, Tools, and Techniques

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amazon web services

We Will Discuss

1

Calculating Total Cost of Ownership (TCO)

2

Licensing and Architecture

3

Migration Approach and Best Practices

4

Migration Tools and Services

5

Customer Project Migration: Lessons Learned

1 Calculating TCO

In Your TCO Analysis

DOs

- 3- or 5-year amortization
- Use 3-year heavy RIs or fixed RIs
- Use volume RI discounts
- Ratios (VM:physical, servers:racks, people:servers)
- Mention tiered pricing
  (Less expensive at every tier : network I/O, storage)
- Cost benefits of automation (Auto Scaling, APIs, AWS CloudFormation, AWS OpsWorks, Trusted Advisor, optimization)

DON'Ts

BONUS

In Your TCO Analysis

DOs

DON'Ts

BONUS

Forget power/cooling
(compute, storage, shared network)

Forget administration costs (procurement, design, build, operations, network, security personnel)

Forget rent/real estate
(building deprecation, taxes, shared services staff)

Forget VMware licensing and maintenance costs

Forget to mention cost of "redundancy", multi-AZ facility

In Your TCO Analysis

DOs

DON'Ts

BONUS

Time from ordering to procurement
(Releasing early = increased revenue)

Cost of "capacity on shelf" (top of step)

Incremental cost of adding an on-premises server when physical space is maxed out

Real cost of resource shortfalls (bottom of step)

Cost of disappointed or lost customers when unable to scale fast enough

2 Licensing and Architecture

Licensing and Support

Microsoft

Pay-as-you-go

- SQL Server Standard Edition
- Windows Server

BYOL

- SQL Server Enterprise Edition
- SharePoint Server
- Microsoft Windows Server

Microsoft “License Mobility through Software Assurance”

Licensing and Support

Oracle

Pay-as-you-go

- RDS for Oracle SE One

BYOL

- Enterprise license agreement
- Unlimited license agreement
- Oracle partner network
- BPO license
- Oracle Technology Network

Processor & socket licensing

0.25 core multiplier for standard licenses (sockets)
0.5 core multiplier for enterprise licenses (processor)

Licensing and Support

SAP

Pay-as-you-go

- SAP Hana One Business Edition
- BOBJ BI 4.0 w/5 user licenses
- Trial / Developer Editions

BYOL

- Primary model for most SAP applications
- Existing licenses can be used on AWS

User-based Licensing

On-Premises Infrastructure Mapped to AWS

Technology Stack	On-Premises Solution	AWS
Network	VPN, MPLS	Amazon VPC, VPN, AWS Direct Connect
Security	Firewalls, NACLs, routing tables, disk encryption, SSL, IDS, IPS	AWS security groups, AWS CloudHSM, NACLs, routing tables, disk encryption, SSL, IDS, IPS
Storage	DAS, SAN, NAS, SSD	Amazon EBS, Amazon S3, Amazon EC2 Instance storage (SSD), GlusterFS
Computer	Hardware, virtualization	Amazon EC2
Content delivery	CDN solutions	Amazon CloudFront
Databases	DB2, MS SQL Server, MySQL, Oracle, PostgresSQL, MongoDB, Couchbase	Amazon RDS, Amazon DynamoDB, DB2, MS SQL Server, MySQL,PostgesSQL, Oracle, MongoDB, Couchbase
Load balancing	Hardware and software load balancers, HA Proxy	Elastic Load Balancing, software load balancers, HA Proxy
Scaling	Hardware and software clustering, Apache ZooKeeper	Auto Scaling, software clustering, Apache ZooKeeper
Domain name services	DNS providers	Amazon Route 53

On-Premises Infrastructure Mapped to AWS

Technology Stack	On-Premises Solution	AWS
Analytics	Hadoop, Cassandra	Amazon Elastic MapReduce, Hadoop, Cassandra
Data warehousing	Specialized hardware and software solutions	Amazon RedShift
Messaging and workflow	Messaging and workflow software	Amazon Simple Queue Service, Amazon Simple Notification Service, Amazon Simple Workflow Service
Caching	Memcached, SAP Hana	Amazon ElastiCache, Memcached, SAP Hana
Archiving	Tape library, off site tape storage	Amazon Glacier
Email	Email software	Amazon Simple Email Service
Identity management	LDAP	AWS IAM, LDAP
Deployment	Chef, Puppet	AMIs, AWS CloudFormation, AWS OpsWorks, AWS Elastic Beanstalk, Chef, Puppet
Management and monitoring	CA, BMC, Rightscale	Amazon CloudWatch, CA, BMC, Rightscale

Services Key to Enterprise Migrations

VPC

Services Key to Enterprise Migrations

PIOPS

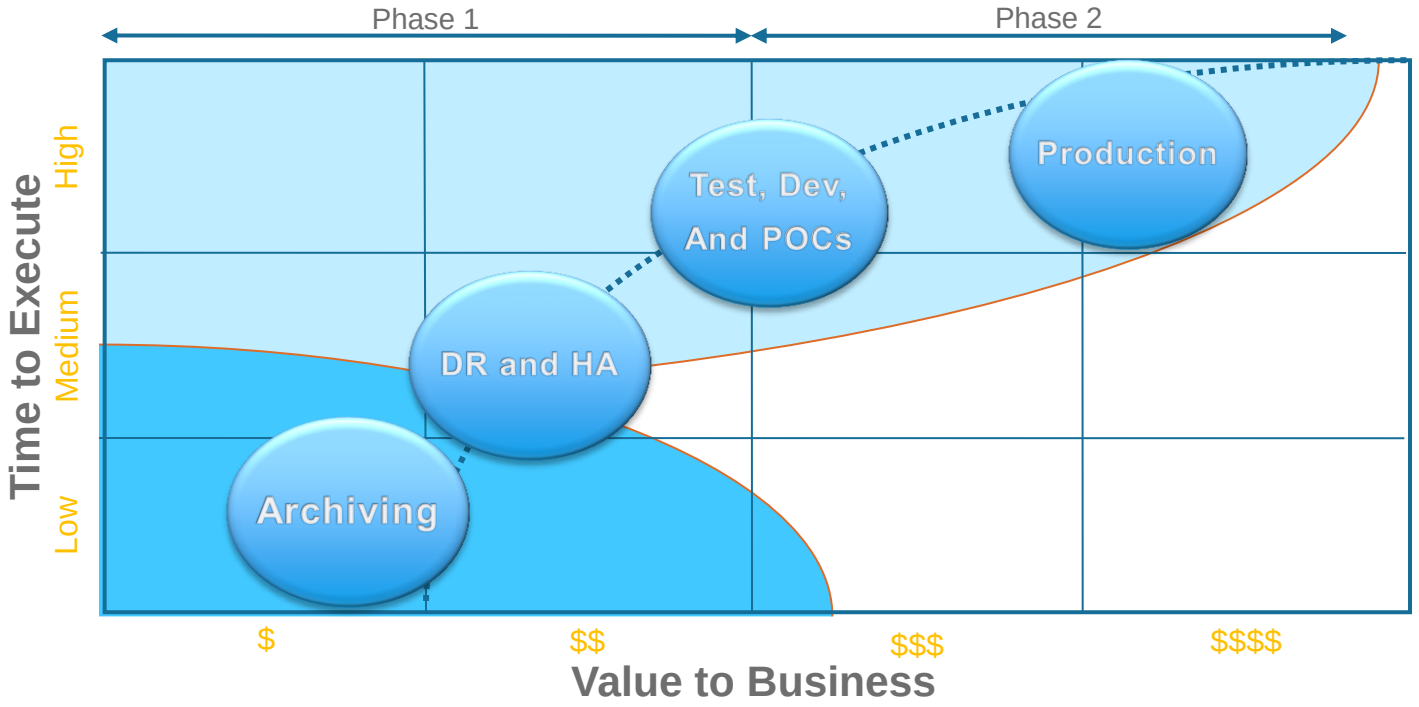
Services Key to Enterprise Migrations

AWS Direct Connect

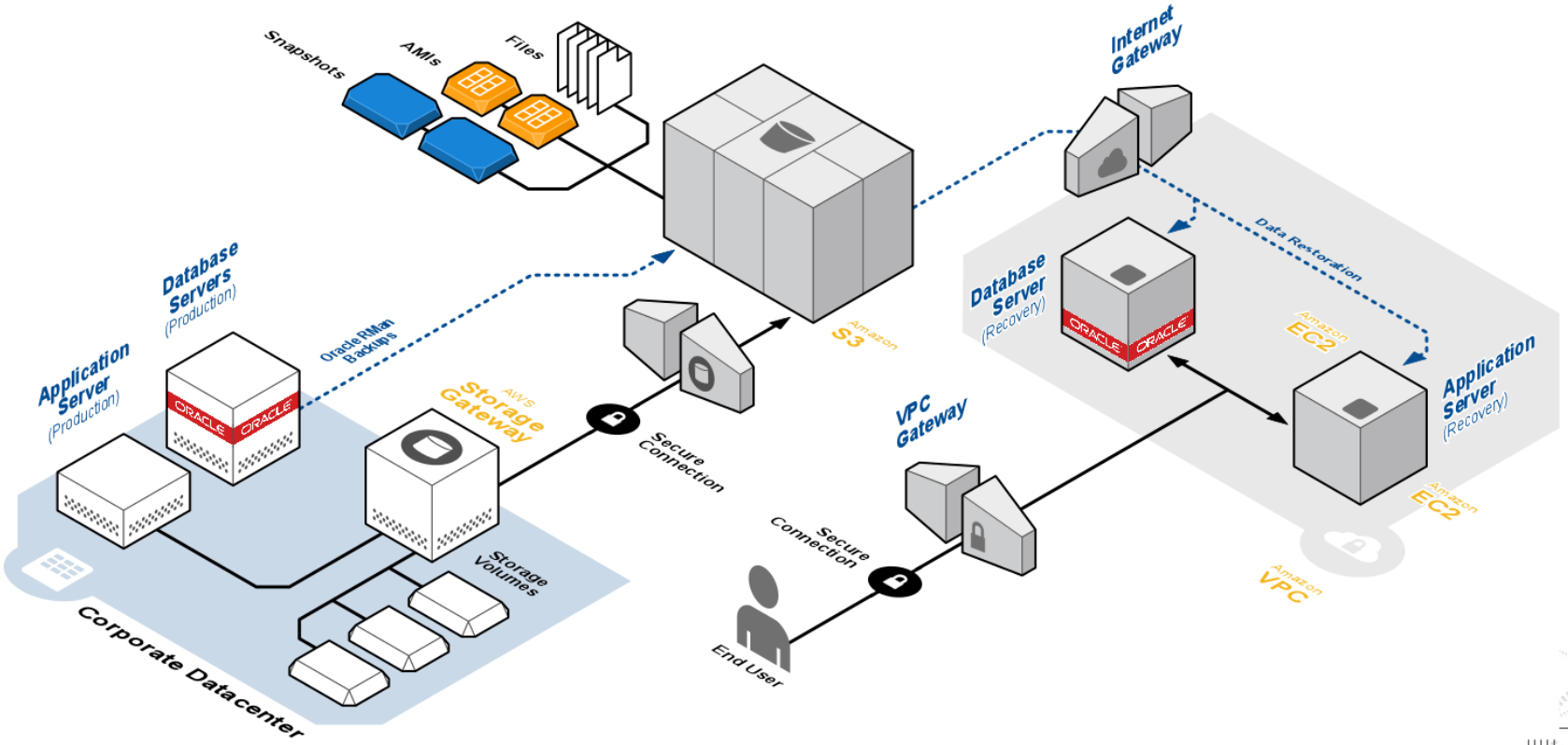
Services Key to Enterprise Migrations

AWS CloudFormation

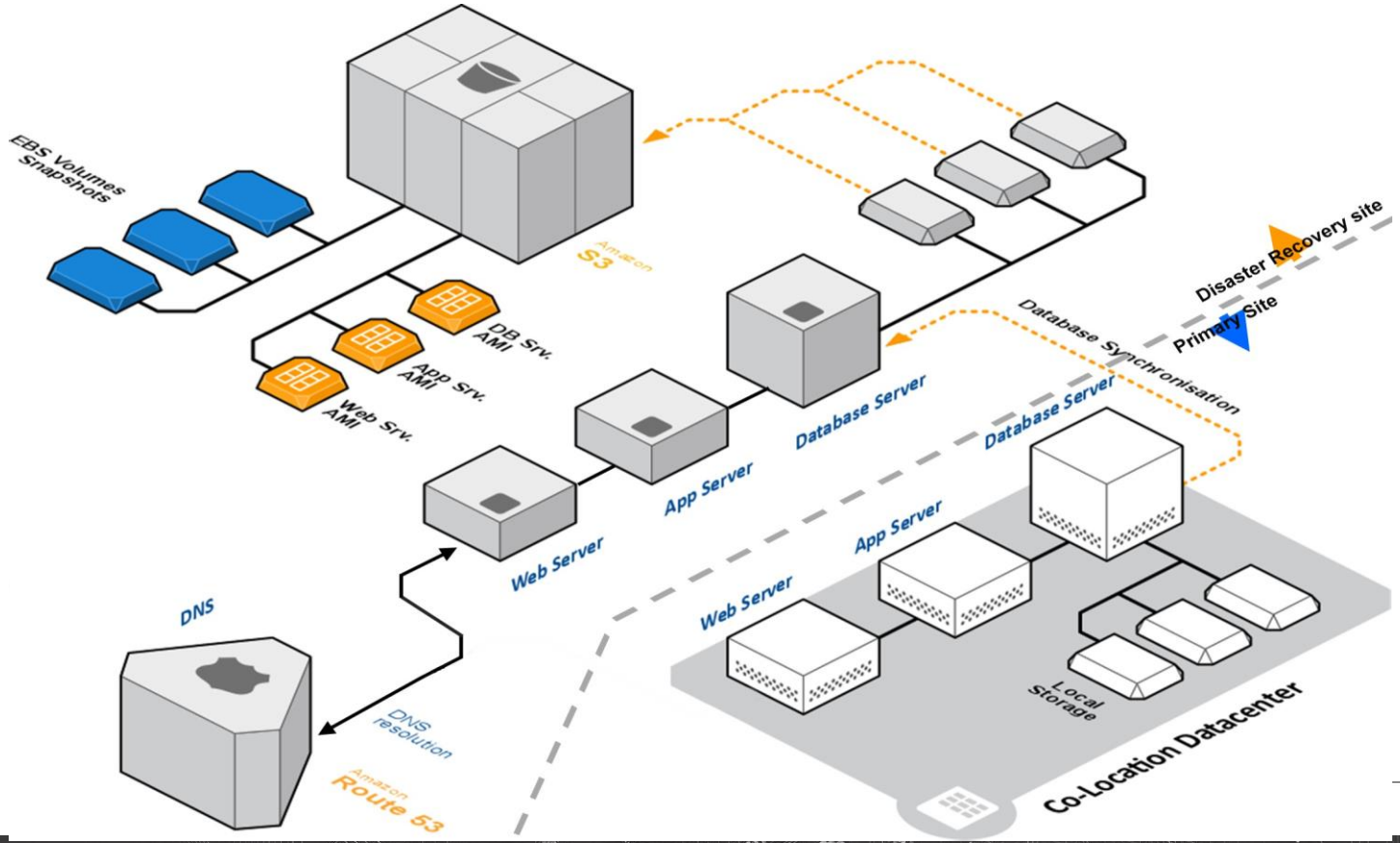
Enterprise Migration Path



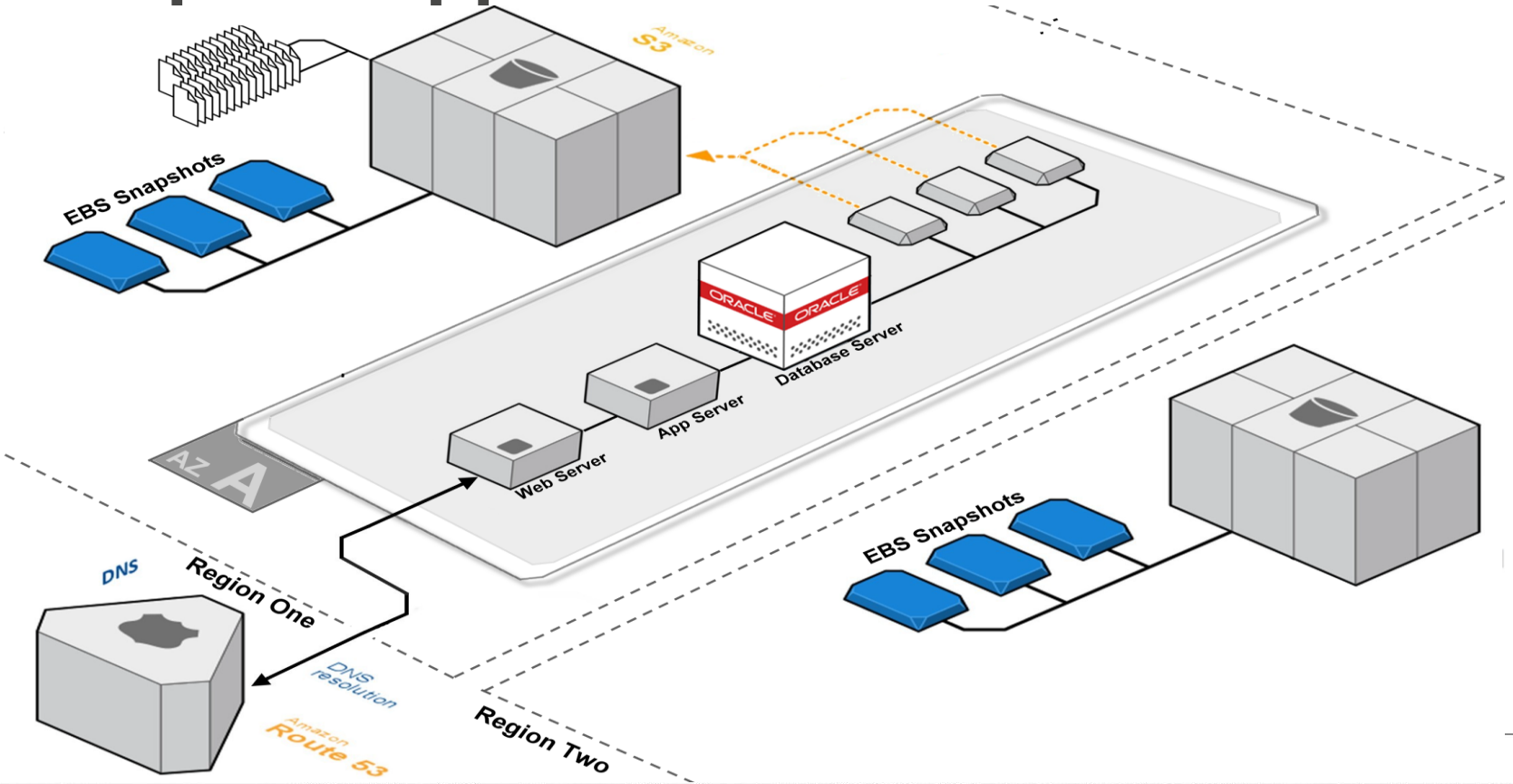
Database Backup to AWS



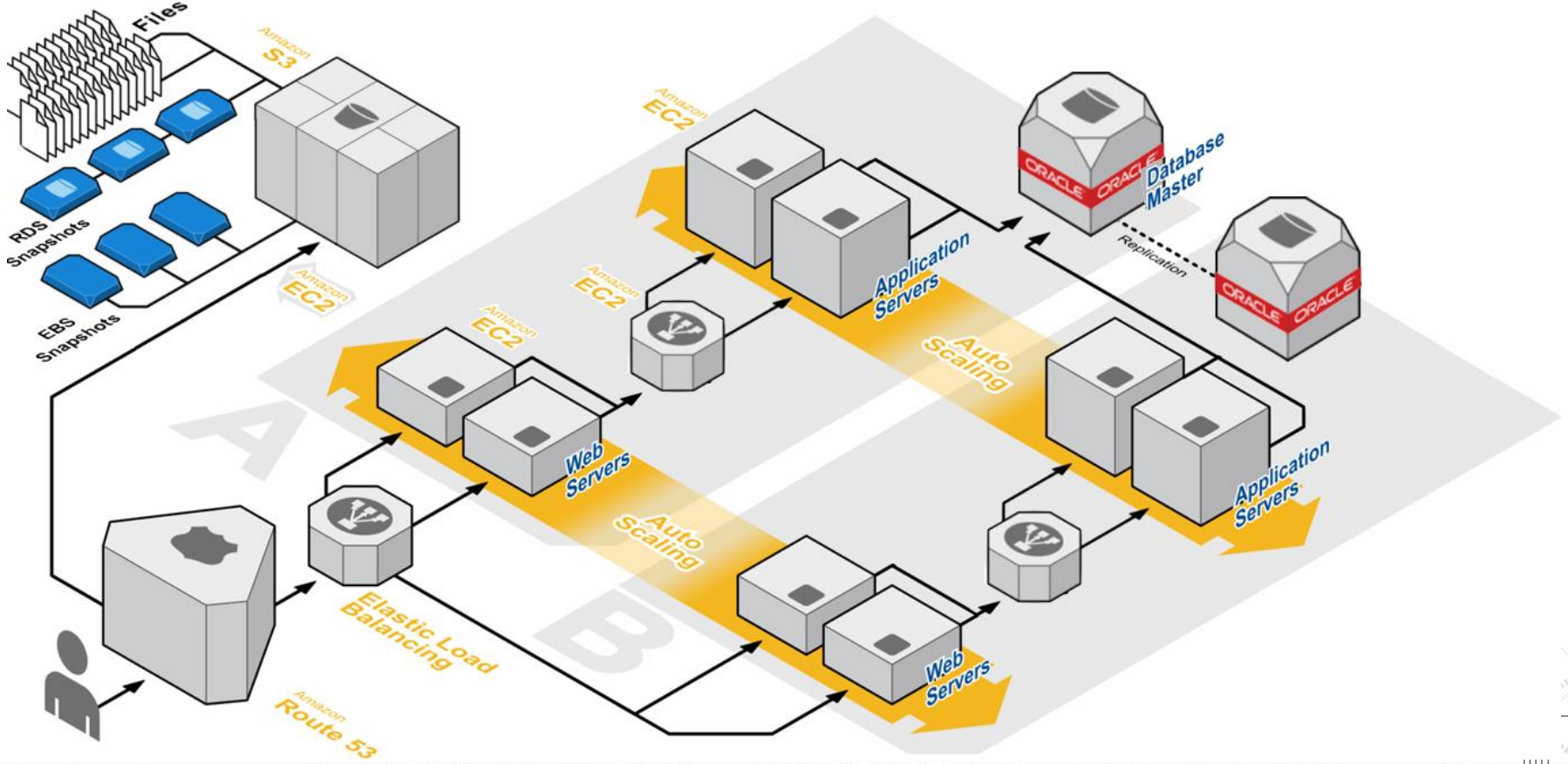
Disaster Recovery Site on AWS



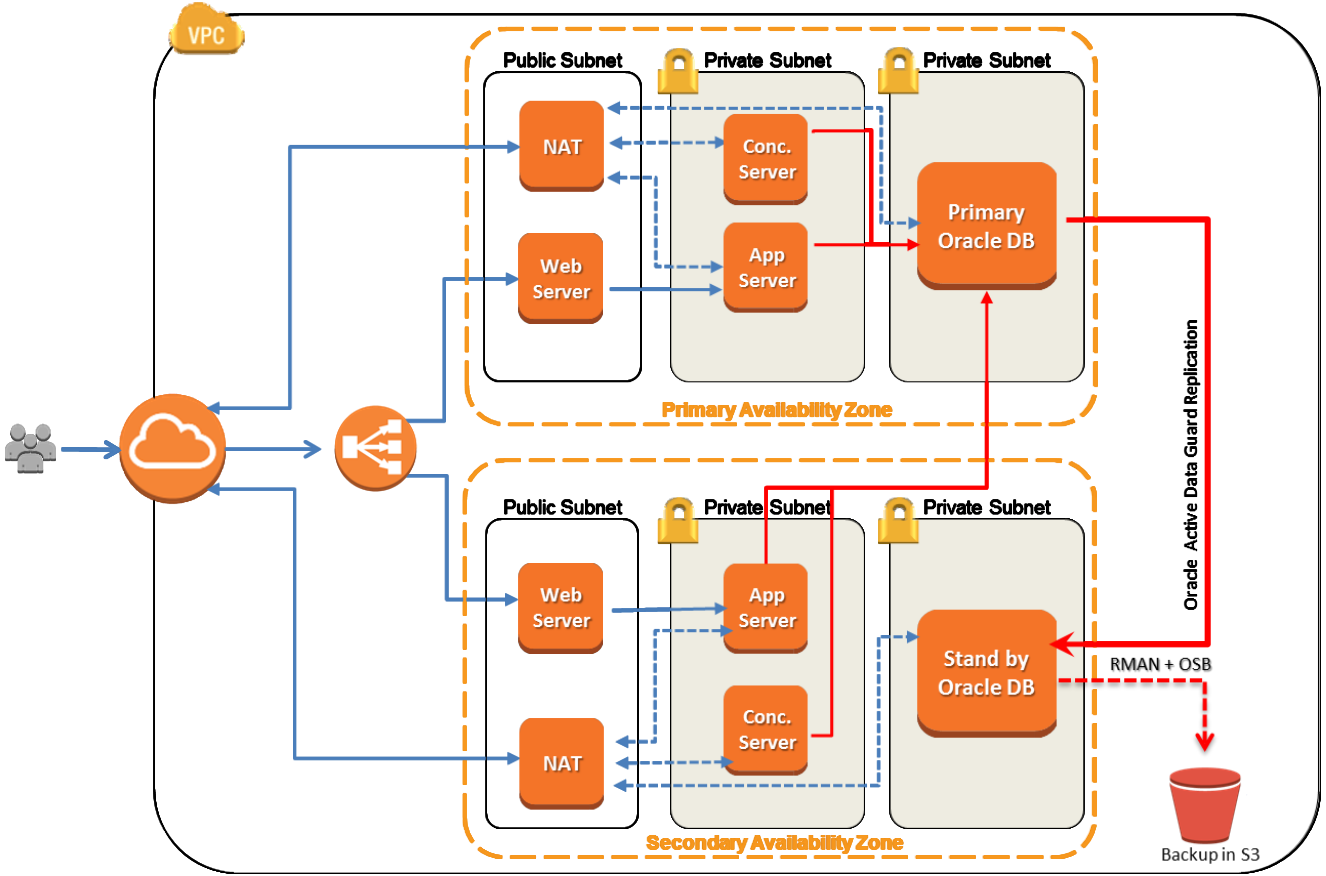
Enterprise Application Basic Architecture



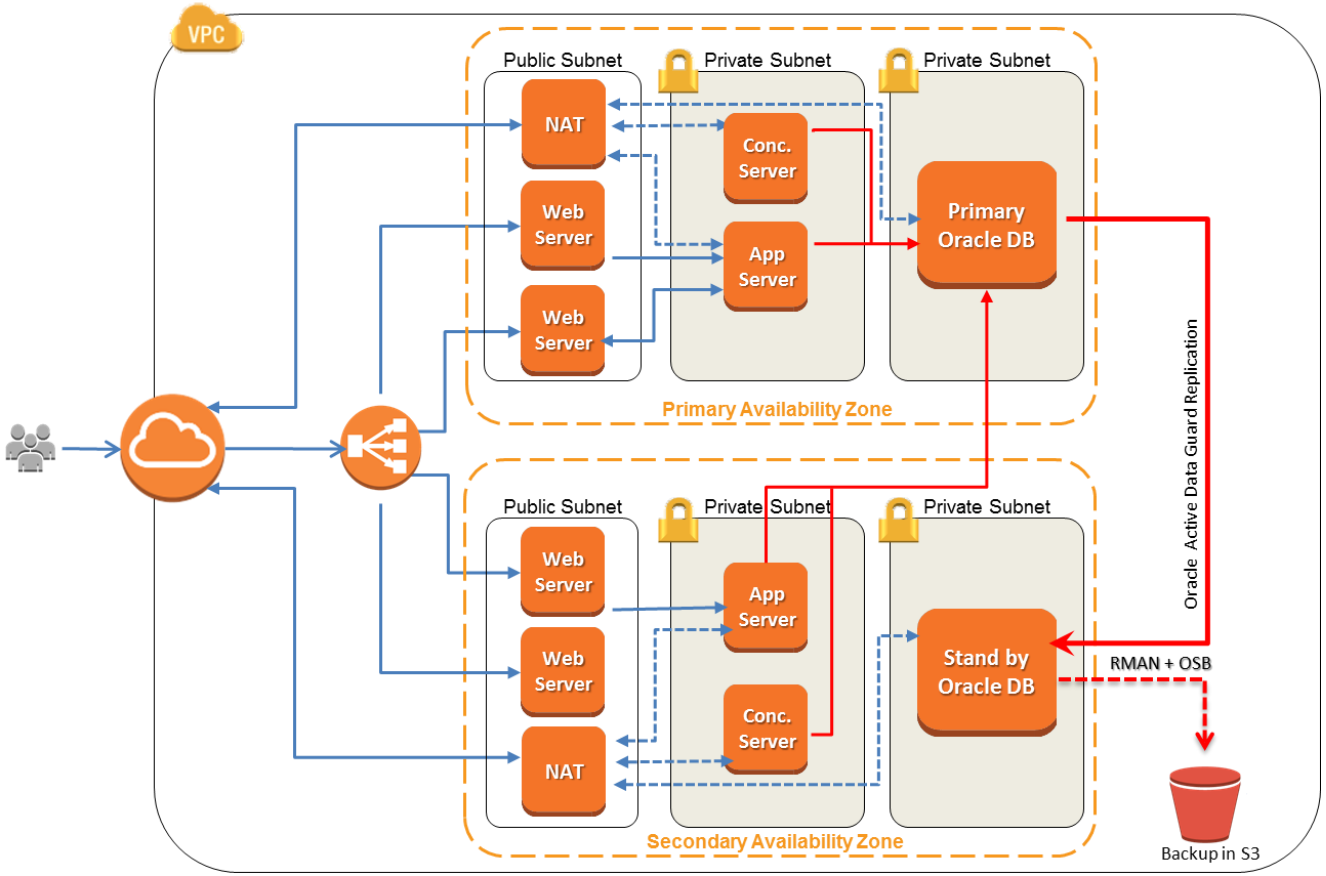
Enterprise Application HA Architecture



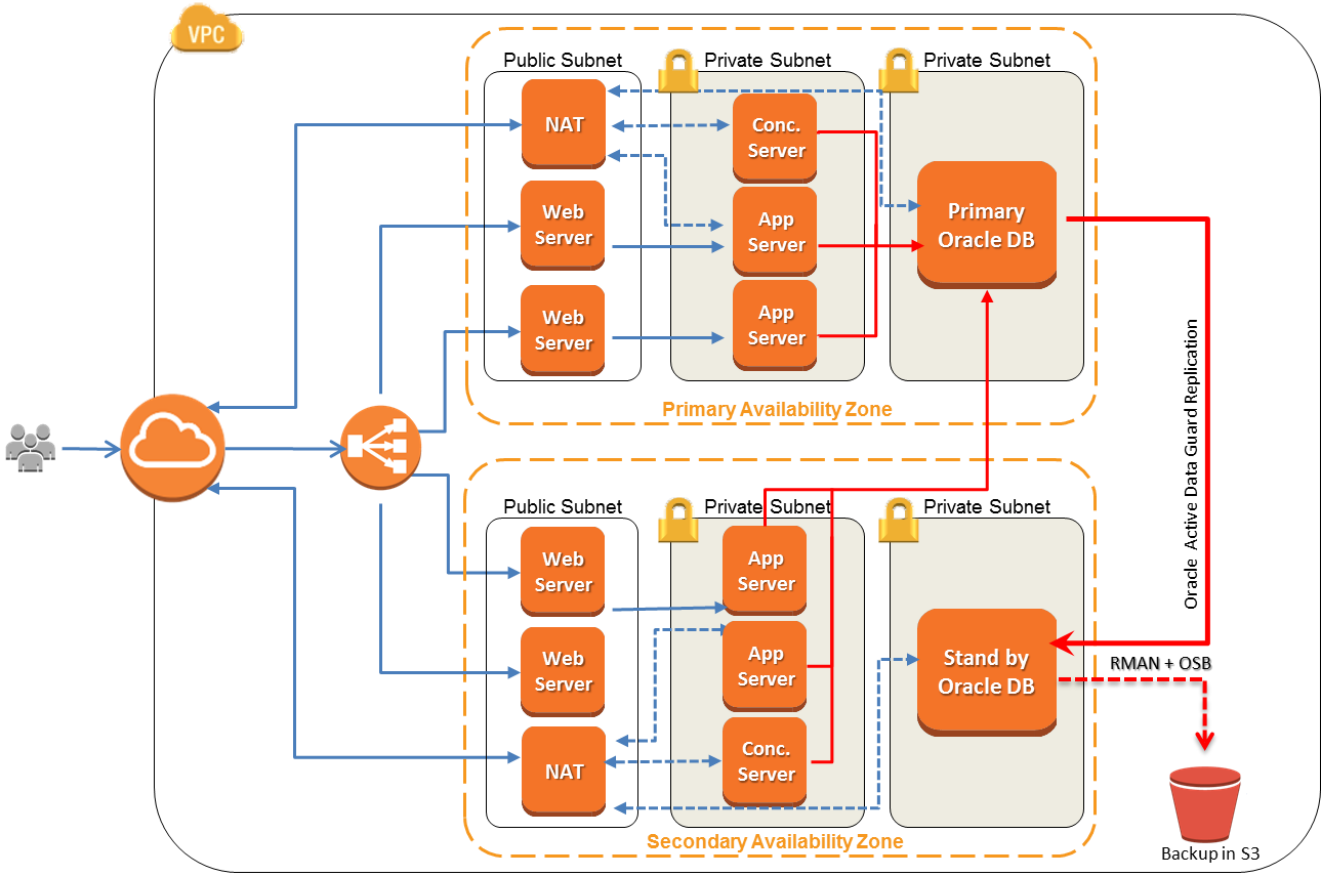
Enterprise Application Detailed Architecture



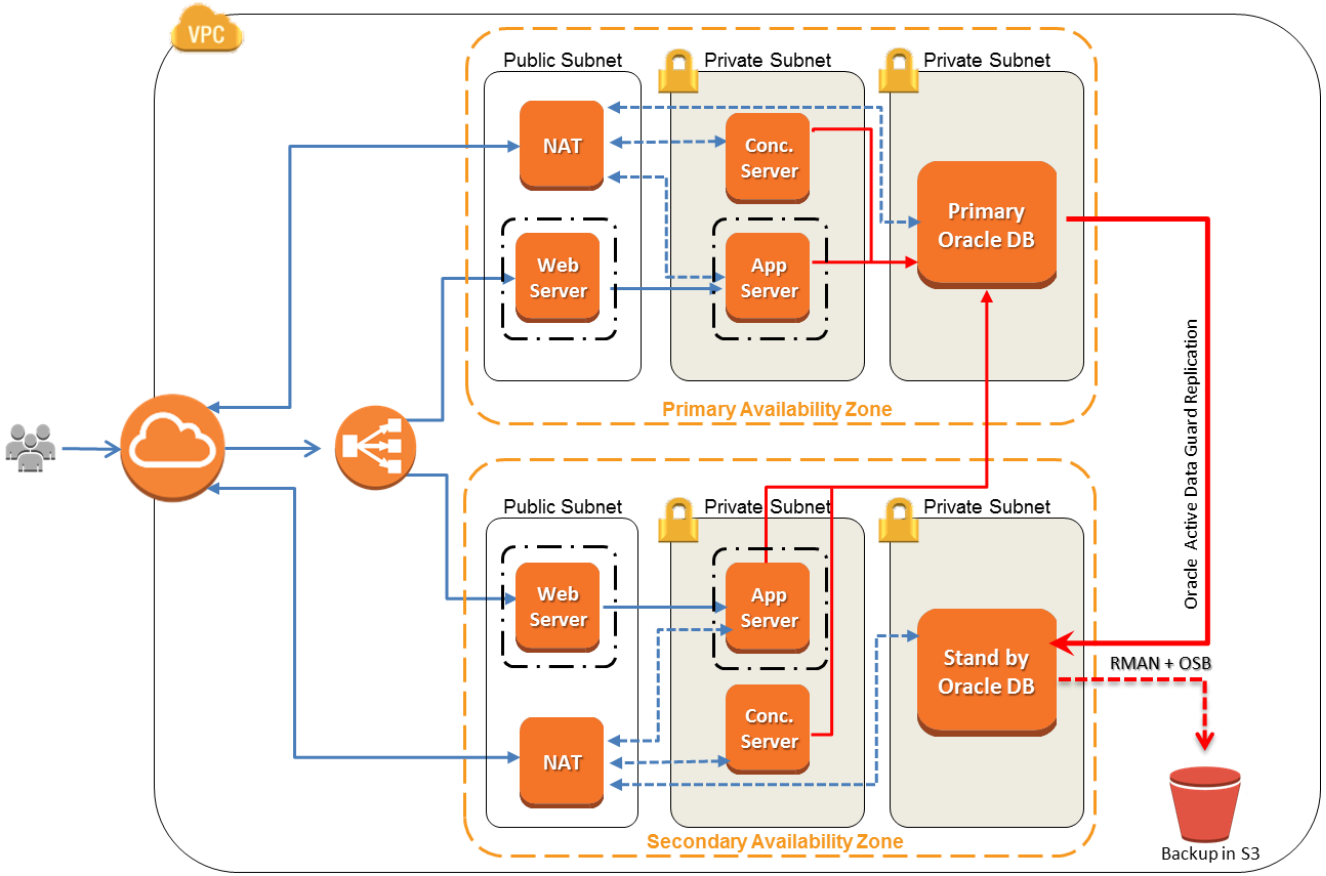
Enterprise Application Detailed Architecture



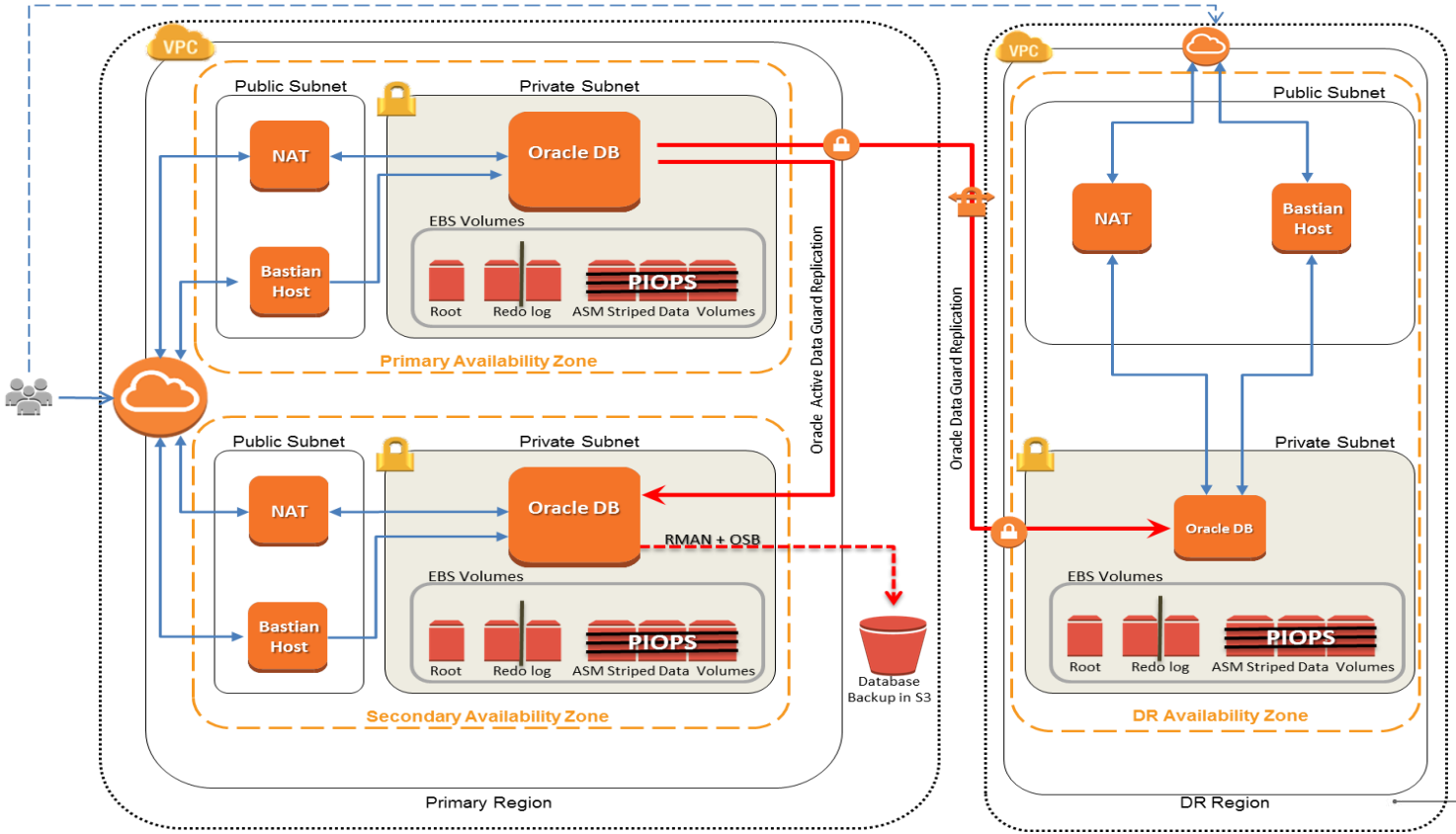
Enterprise Application Detailed Architecture



Enterprise Application Detailed Architecture

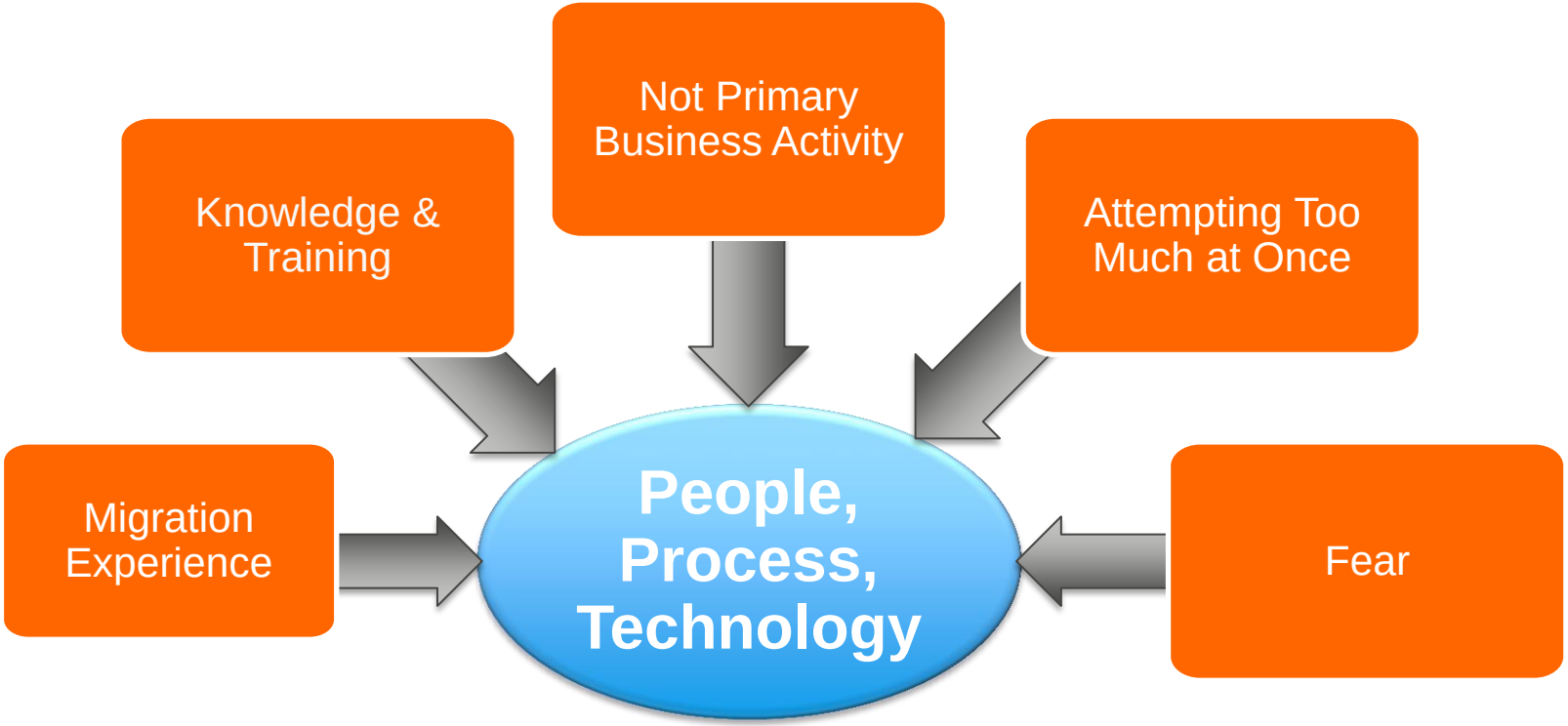


Enterprise Database Detailed Architecture



3 Migration Approach and Best Practices

Migration Challenges



Identifying Applications to Move

Standalone applications are **easy** to move

Application with **loosely coupled SOA**-based integrations are **good candidates**

Tightly integrated application needs more planning

Invest in Proof of Concept Early

Proof of concept will **answer** tons of **questions** quickly

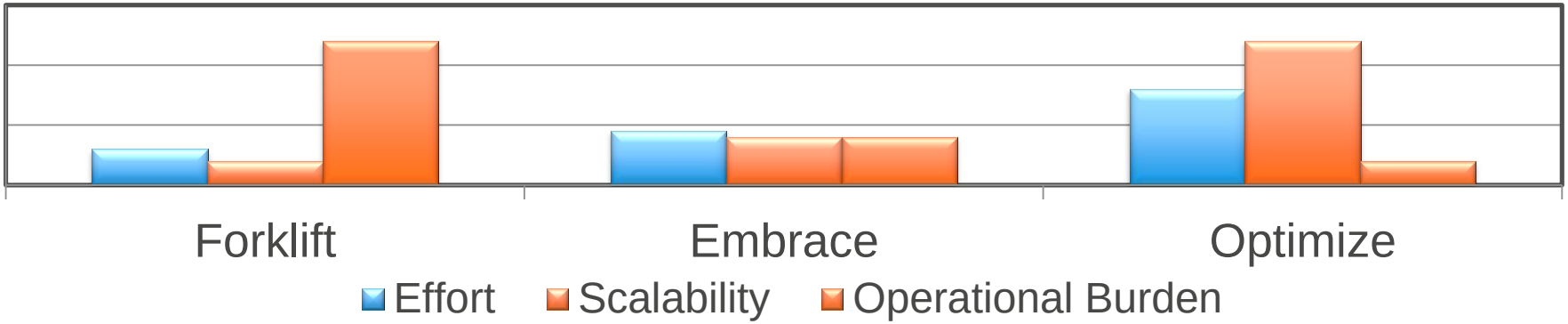
Will help identify **gaps** and **touch points**

Give you a good **estimation** of the task ahead

Migrating Data into AWS Cloud

- **File transfer** to Amazon S3 or EC2 using S/FTP, SCP, UDP, Aspera, Attunity
- Configure on-premises **backup application** (like NetBackup, CA, CommVault, Riverbed) to use Amazon S3
- AWS **Storage Gateway** for asynchronous backup to Amazon S3
- AWS Import/Export service: **Ship** your **disk to AWS**
- **Database backup** tools like Oracle Secure Back
- Database **replication** tools like GoldenGate, DbVisit

The Migration Continuum



Forklift	Embrace AWS	Optimize for AWS
• May be only option for some apps • Run AWS like a virtual co-lo (low effort) • Does not optimize for on-demand (overprovisioned)	• Minor modifications to improve cloud usage • Automating servers can lower operational burden • Leveraging more scalable storage	• Redesign with AWS in mind (high effort) • Embrace scalable services (reduce admin) • Closer to fully utilized resources at all times

4 Migration Tools and Services

Migration Services

Application Portfolio Analysis

Racemi, Blue Phoenix, Cast Software, Micro Focus, TSRI

Cast Software Is Open Systems

Code Migration

Blue Phoenix, Ispirer, TSRI, Racemi

PowerBuilder to Java, Oracle Forms to Java

Data Migration Services

Data Strategies (tape), mLogica, PracTrans

Same to Same, or One Vendor to New Vendor

ERP Systems

App Associates (Oracle EBS), Back Office Associates(SAP), DLZP (Peoplesoft), Loyalty Methods (Siebel)

Requires Deep Application Knowledge

AWS Specific

AWS Import/Export, CloudTP (PaasLane), Racemi

Automated Tools

Migration Tools

Management and Monitoring

BMC CLM, Boundary, HP OpenView, Tivoli, CA Spectrum Automation Manager, MS System Center Plug-in, Oracle EM Plug-in, RightScale, SAP Data Provider

AWS CloudWatch

Auditing and Logging

Alert Logic Log Manager

CA Audit, CloudCheckr Trend Micro, Xceedium Xsuite Ylastic

AWS CloudWatch Alert

Data Migration

Data Expedition Aspera

Attunity CloudBeam Riverbed Whitewater Tsunami

AWS Storage Gateway

Backup and Recovery

CA, Commvault EMC Data Domain Netapp

Oracle OSB Panzura

Riverbed Whitewater Symantec, Zadara

Amazon EBS Snapshot

Cost Management

CloudHealth

Apptio

AWS Trusted Advisor

5 Customer Project Migration Lessons Learned

Business Overview

Global manufacturing company with operations in APAC, Europe, and North America

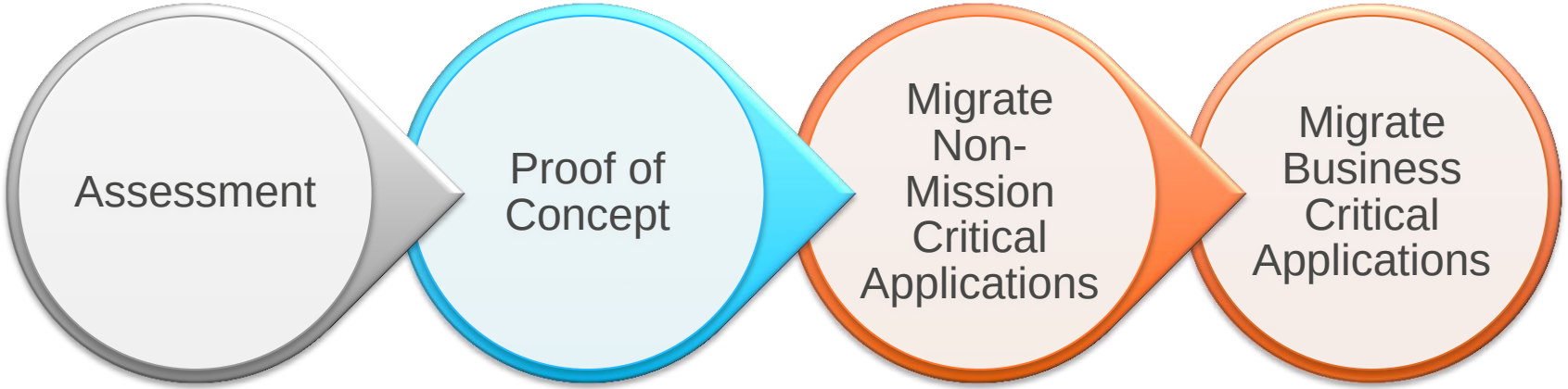
Key Business Drivers

1. Vendor consolidation
2. Infrastructure management challenge across multiple locations
3. Hardware refresh cycles and cost optimization

What Was Achieved

- Capital and operational cost reduction by avoiding new hardware purchases and by redeploying IT staff to projects that directly supported the core business
- Other benefits included:
  - **55%** reduction in total IT **operations costs**
  - **35%** reduction in backup **infrastructure costs**
  - Ability to start and stop nonproduction services to reduce operational costs
  - Reduction in the number of IT vendors (from 6 to 3)
  - Able to perform an office relocation of HQ in early 2013, with **no interruptions** to business leveraging the centralized AWS computing platform

Migration Process



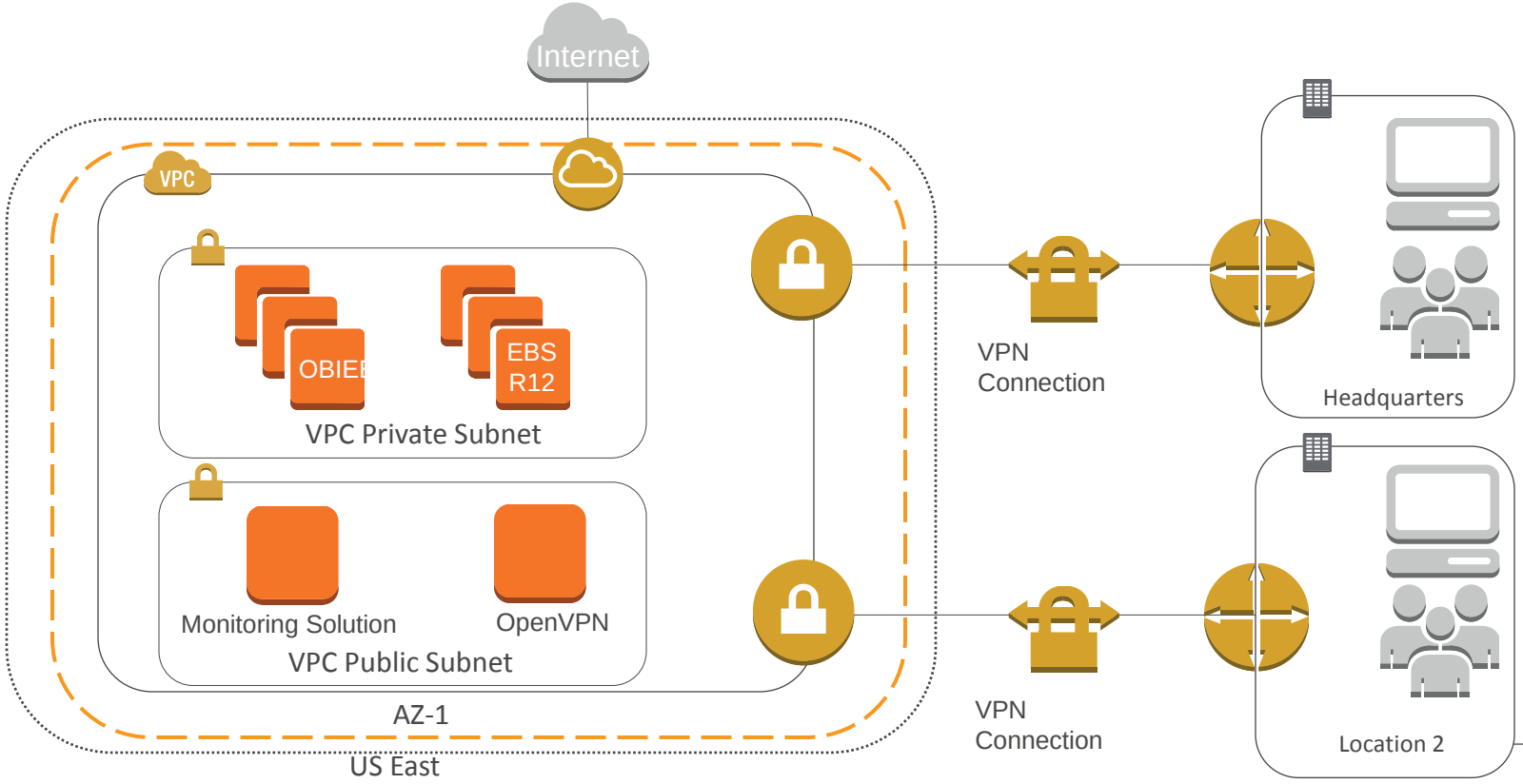
- Complete study of IT infrastructure & costs, including recommendations and a detailed plan
- Perform cost analysis and estimate project duration and resources

- Build POC environments for each critical application and validate functionality
- Perform functional, integration testing

- Migrate Test / DEV application
- Migrate noncritical applications like Track-it
- Migrate backups and validate restore process

- Migrate infrastructure components like domain controller, monitoring solutions
- Migrate E-Business Suite, OBIEE
- Tune – enhance - optimize

AWS Architecture



AWS Infrastructure

- Complete infrastructure for North America on Amazon Web Services
  - Office locations and warehouses connected via VPN to VPC on AWS
  - Oracle EBS/OBIEE on Linux
- Complete in-house infrastructure including SQL Server, Oracle EBS, OBIEE and domain controllers, track-it applications , LACROSSE etc.
- Migrate from Tivoli tape backups to Amazon S3 backups using Zamanda/Glacier, Snapshots
- Integrated active directory with Salesforce.com, Office 365, various file, print, fax services throughout North America
- All production backups to Amazon S3 using third-party tool
- All nonproduction backups to Amazon S3 (reduced redundancy store)

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Please give us your feedback on this presentation

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As a thank you, we will select prize winners daily for completed surveys!

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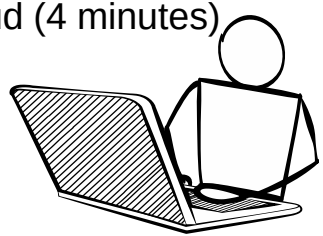
Resources

Here are some additional resources:

- Get started with a free trial
  - http://aws.amazon.com/free
- White papers
  - http://aws.amazon.com/whitepapers/
- Reference architectures
  - http://aws.amazon.com/architecture/
- Enterprise on AWS
  - http://aws.amazon.com/enterprise-it/
- Executive-level overview : Extending Your Infrastructure to the AWS Cloud (4 minutes)
  - http://www.youtube.com/watch?v=CsGqu5L_PFI
- Simple Monthly Pricing Calculator
  - http://calculator.s3.amazonaws.com/calc5.html
- TCO calculator for web applications
  - http://aws.amazon.com/tco-calculator/



Customer Migration (Discussed in the Slides) Overview

- Source
  - Infrastructure – on-premise hosted servers
  - Hardware – (Dell PowerEdge, HP ML110)
  - Storage – (Dell Power vault)
  - Database – Oracle 9i/10g, SQL server
  - Fusion middleware
  - Packaged applications – Oracle E-Business Suite, Oracle Business Intelligence Suite, La-crosse, Mobile Field Service
  - Integration with Force.com platform
  - Firewalls, direct connectivity across multiple locations - (CISCO , Barracuda)
  - Tape backups - (Dell ML6000)
- AWS
  - EC2, Amazon EBS, Amazon VPC
  - Multiple instance types (m1.medium, m1.large, m1.xlarge)
  - Storage EBS , PIOPS, Amazon S3, Amazon Glacier
  - Management and monitoring using Nimsoft Monitoring Solution hosted on AWS
  - Connectivity using VPN tunnels
  - Archiving using Amazon Glacier
  - Data transfer using AWS Export/Import
  - DR configuration across regions

Customer Source System Technical Details

- Oracle E-Business Suite
  - Database (RHEL 4)
    - Oracle 9i – 8 cores / 32-bit
  - E-Business Suite (RHEL 4)
    - 11.5.8 – 4 cores / 32-bit
- Oracle Business Intelligence
  - Database (RHEL 5)
    - Oracle 10g – 4 cores
  - OBIEE 10g (RHEL 5)
    - OBIEE 11g – 4 cores
- Microsoft SQL servers
  - Database (Win2008\Hyper-V)
    - MS SQL Server 2005
- Mobile Field Server
  - MWA (Win 2008\VM Ware)

- Oracle E-Business Suite
  - Database & E-Business Suite
- Oracle Business Intelligence
  - Database & OBIEE 10g
- Multiple VPN tunnels from multiple customer locations