Hiding Scheduled Maintenance at Epsilon

Gairik Chakraborty

EPSILON

Agenda

- Snapshot of Epsilon
- Case Study

EPSILON

Snapshot of Epsilon

EPSILON

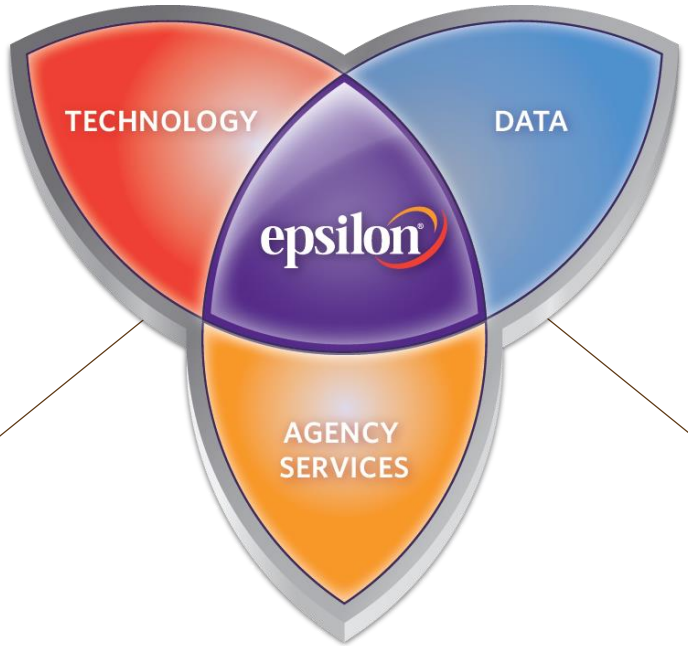
Epsilon at a Glance

Marketing Database
Design • Development • Hosting

Digital & Interactive
Email Service Provider
Web design & hosting
Real-time decision support

Loyalty Management
Technology platforms & Program Strategy Services

Data Processing Services
CDI/PDI
Data Hygiene
NCOA, PCOA, M/P



Demographics
115 million HH, 225 million individuals with 31 different sources.

Financials
HH Income, Credit Card Capacity, Financials Stress Indicators, Home Value, Net Worth

Lifestyles
Self-reported lifestyles & interests from 40 million consumers

Market Activity
Online and Offline purchase Information, with details RFM data For 60 millions+ HH

Triggers
Behavioral data w/life event and life stage triggers, + purchase propensity

Digital Engagement
Websites, Microsites & Custom Landing Pages, Email & Mobile Campaigns, Social & Word-of-mouth Programs, Online Communities

Direct Response
Concept-to-Mailbox Campaigns, Web-to-print Technology, Database Management & In-house Lettershop

Strategic Consulting & Advanced Analytics
Program Strategies, Investment Justification, Implementation Road Maps, Customer Segmentation, ROI Analytics, Predictive Modeling & Marketing Mix Modeling

Creative Services
Strategic Thinking, Creative Ideation, Copywriting, Art Direction, Digital Design & Production

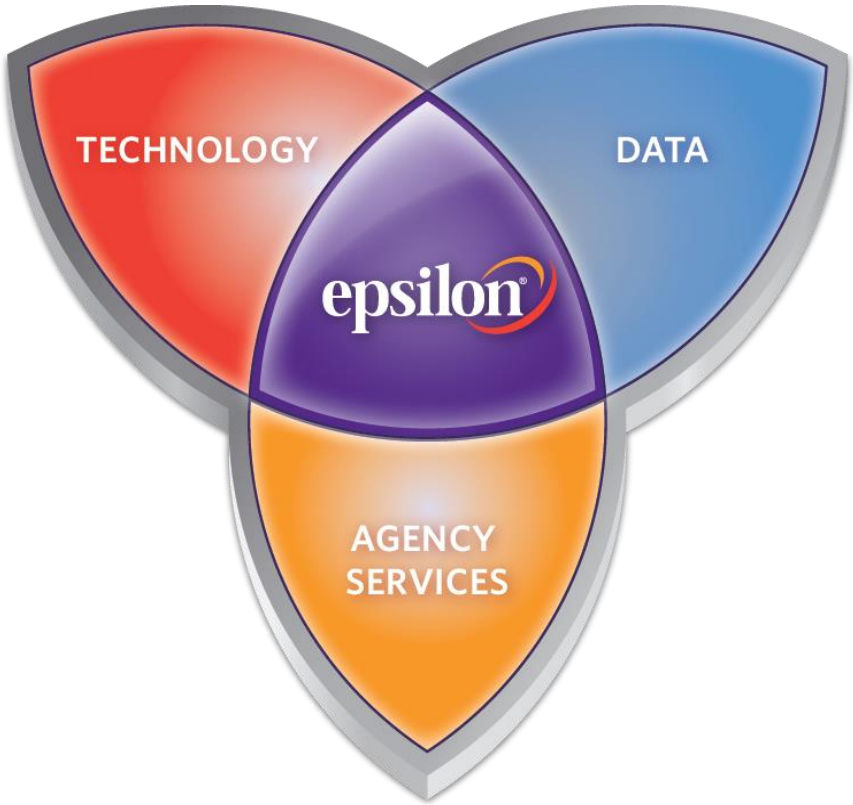
Consumer Promotions & Events
Loyalty & Continuity Programs, Partnerships & Sponsorships, In-Store Marketing, Mobile Tours, Guerilla Marketing & Sampling, Events

Hispanic Marketing
Consumer Promotions, Direct, Digital & Experiential Marketing

EPSILON

Epsilon at a Glance

- Epsilon is comprised of three divisions that deliver a global platform for customer experience marketing
- More than 7000 associates and 70 offices worldwide
- Largest permission-based e-mailer in the world, delivering over 47 billion emails annually
- World's leading source of data with information covering over 250 million consumers and 273M devices
- More than 2,000 global clients, including 26 of the Fortune 100
  - 9 out of 10 Top Banks
  - 8 out of 10 Top Retailers
  - The Top 10 Pharmaceutical Companies
  - The Top 10 Automotive Companies



EPSILON

About Me

- Senior Director , Database Technology team
- Primarily focused on delivering best practices and standards for deploying marketing technology solutions at Epsilon
- High availability and Engineered Systems implementation for multiple large fortune 100 clients
- Over 14 years of experience working on Oracle technology platform
- OCP and OCE (RAC and Exadata)

EPSILON

Hiding scheduled maintenance – Case study

EPSILON

High Level Business Requirements

- New client opportunity with extreme performance and availability requirements
- Real time POS integration with over 10000 sites
- Decrease time to market
- Real-time monitoring and reporting of system performance and health
- Need to run OLTP, batch and reporting workload concurrently against real time data without impacting user experience
- Support over 2000 real-time transactions per second with SLA of less than 100 ms and 99.95% availability
- Less than 8 hours RPO and RTO

EPSILON

Previous State and Challenges

- Dedicated connection model from application server to database
- Application was using ODAC 11gR5
- Database hardware platform using HP DL980 server with PCIe Flash storage and Hitachi storage array
- Database version 11gR2 11.2.0.3

- No draining was available using dedicated connection model
- Every planned maintenance/unplanned outage needs application layer restart – a major pain point
- Every application executable needs FAN notification port in odp.net
- Due to large number of dedicated connection , application server CPU utilization was high
- No support for commit outcome in case of failure in 11g
- Running mixed workload was not very user friendly on non-engineered system as there is no IO prioritization in tradition storage array
- Premier support of 11.2.0.3 was coming to an end (Aug 2015)

EPSILON

Current State and Resolutions

- Used connection pool instead of dedicated connection
- Application is now using ODAC 12cR3
- Database hardware platform using Exadata X4-2 half rack
- Database version 12cR1 RAC and Active Data Guard -12.1.0.2 BP10

- Connection pool drains quickly after receiving FAN events
- **No longer application server restart required** for planned maintenance or unplanned outage of oracle stack – a big relief
- Only one port required for ONS remote communication (6200) in 12c instead of many ports in 11g
- **CPU utilization reduced by 40%** in application servers after connection pool implementation
- Fast Application Notification , Transparent Application Failover and Transaction Guard provides a robust error handling mechanism
- Exadata is ideal platform for running mixed workload with both CPU and IO prioritization handling
- Moved to a supported release good for next 3 years

EPSILON

Technology Stack

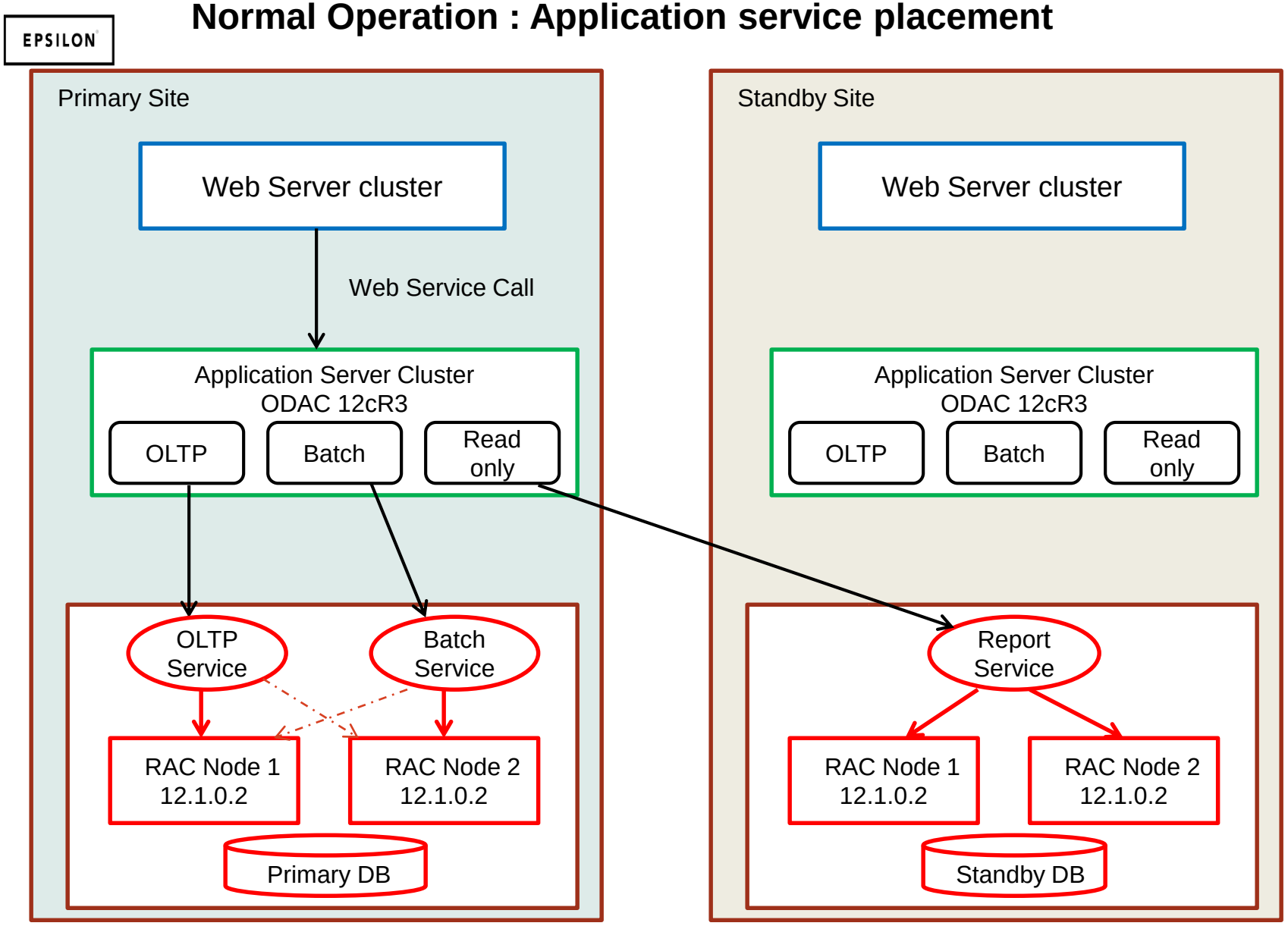
- Exadata X4-2 half rack for both Primary and DR site

- Web servers
- Application server uses :
  - ODP.NET (ODAC 12cR3)
  - WebLogic Server using Active Gridlink

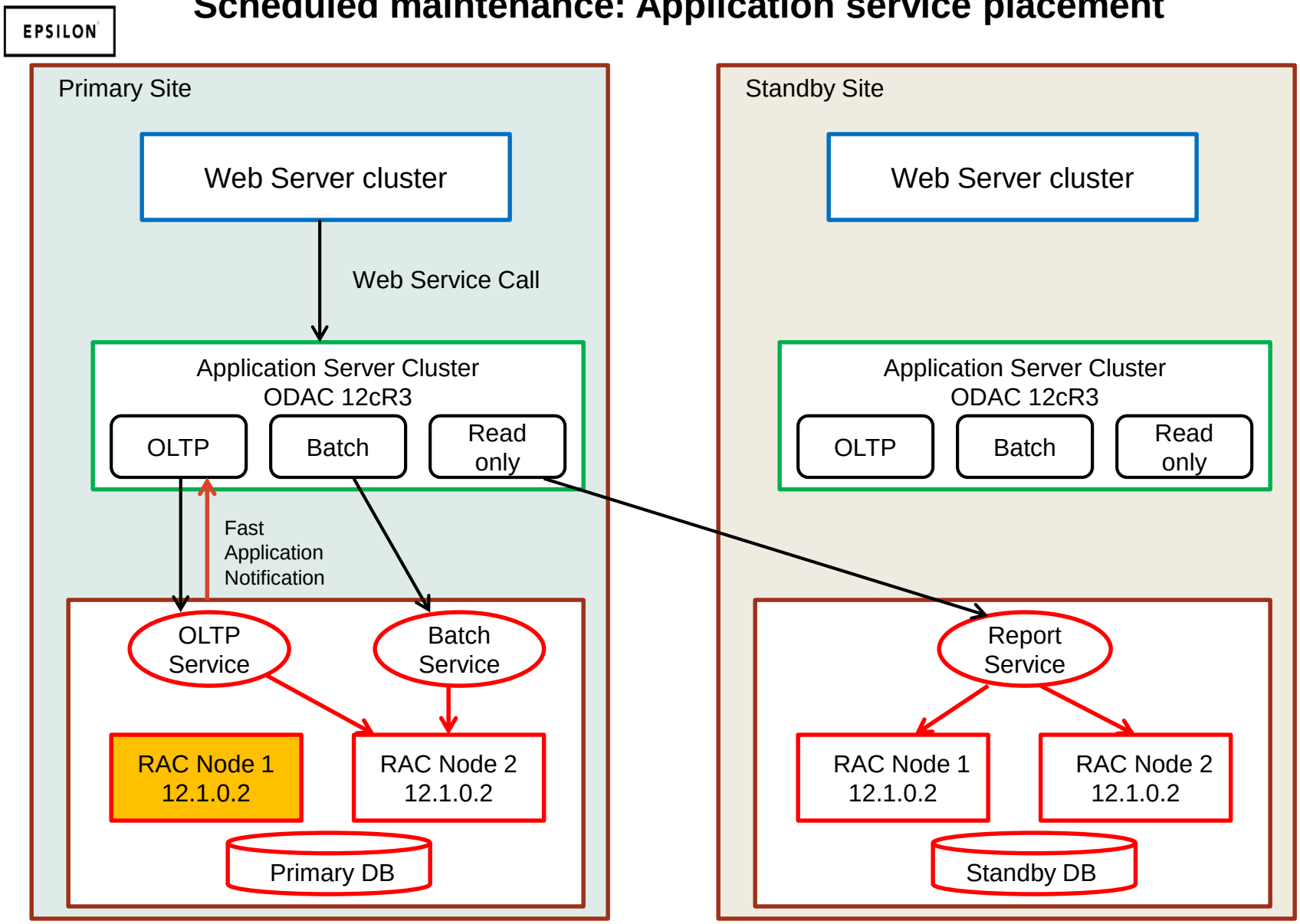
- Oracle Database 12c (12.1.0.2)
  Real Application Cluster (RAC)
  Active Data Guard
  Fast Application Notification (FAN)
  Transparent Application Failover (TAF)
  Transaction Guard (TG)

- Database backup uses ZFS Backup Appliance (ZS3-BA)

Normal Operation : Application service placement

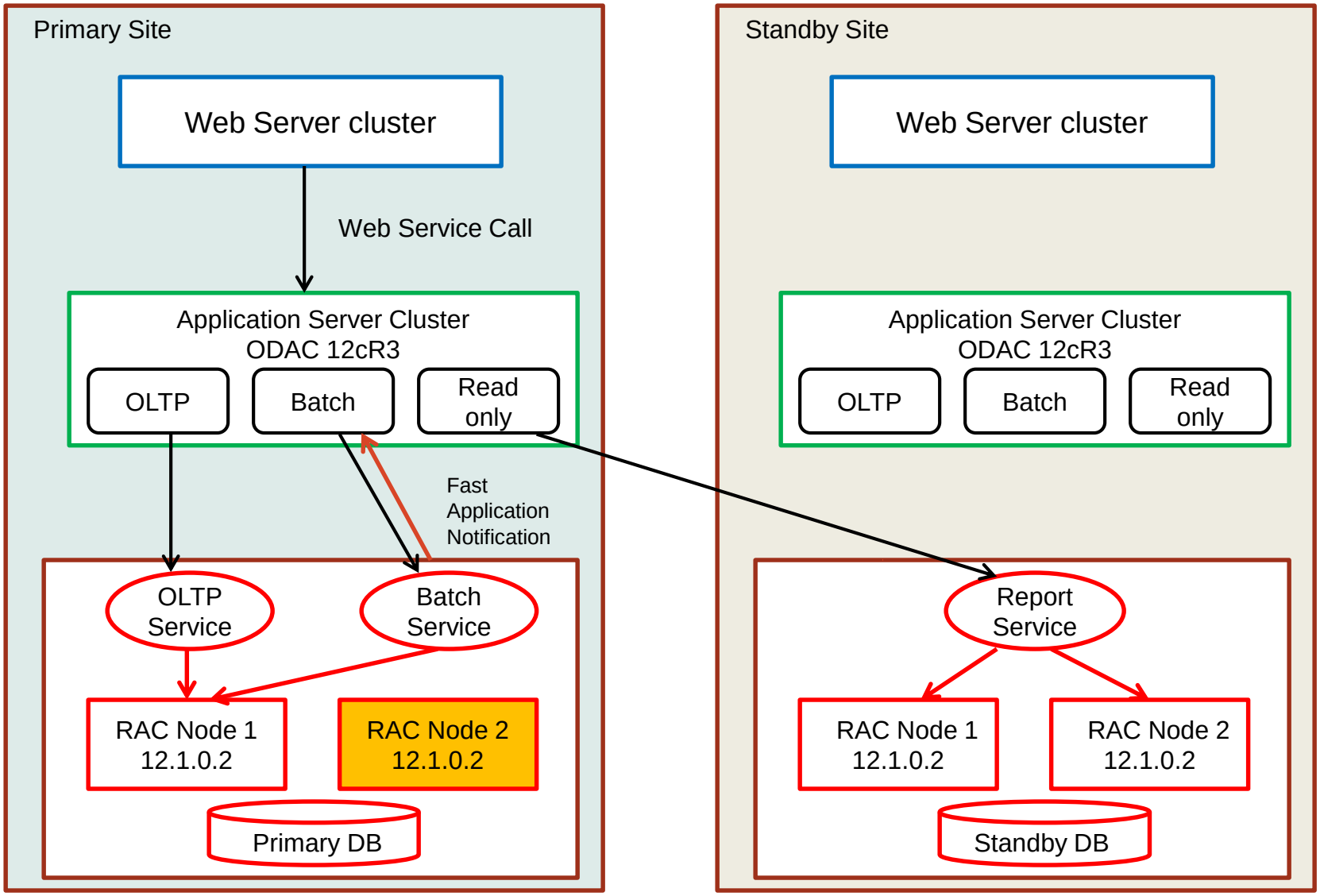


Scheduled maintenance: Application service placement



Scheduled maintenance: Application service placement

EPSILON



EPSILON

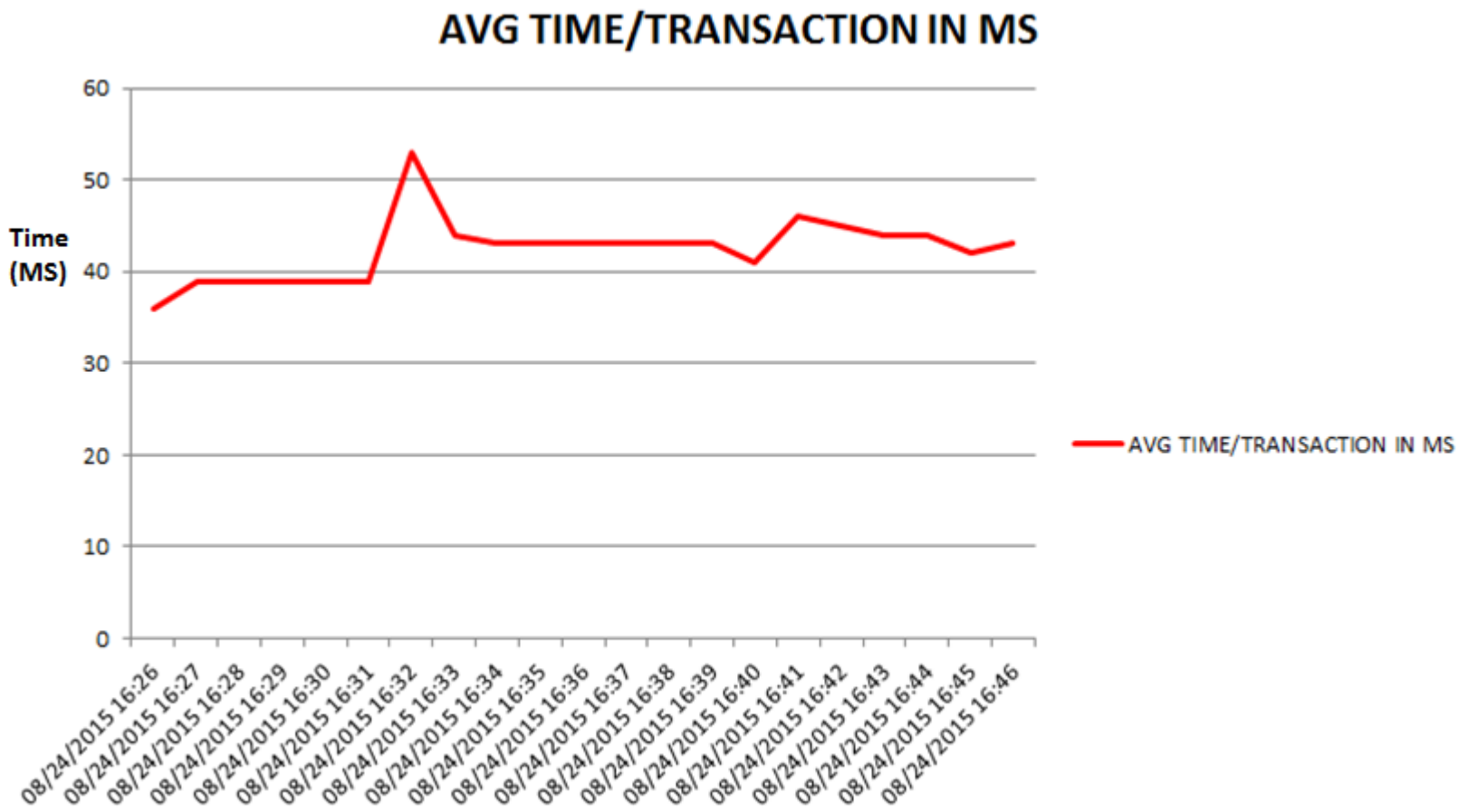
Case study – summary

Execution Summary

Start time	8/24/2015 4:26:29 PM
End time	8/24/2015 4:46:29 PM
Duration	00:20:00
Overall Results	
Max User Load	900
API Failed	0
Transactions/Sec	2,501
Avg. Transaction Time (sec)	0.09
Requests/Sec	2,501
Requests Failed	0
Avg. Response Time (sec)	0.09

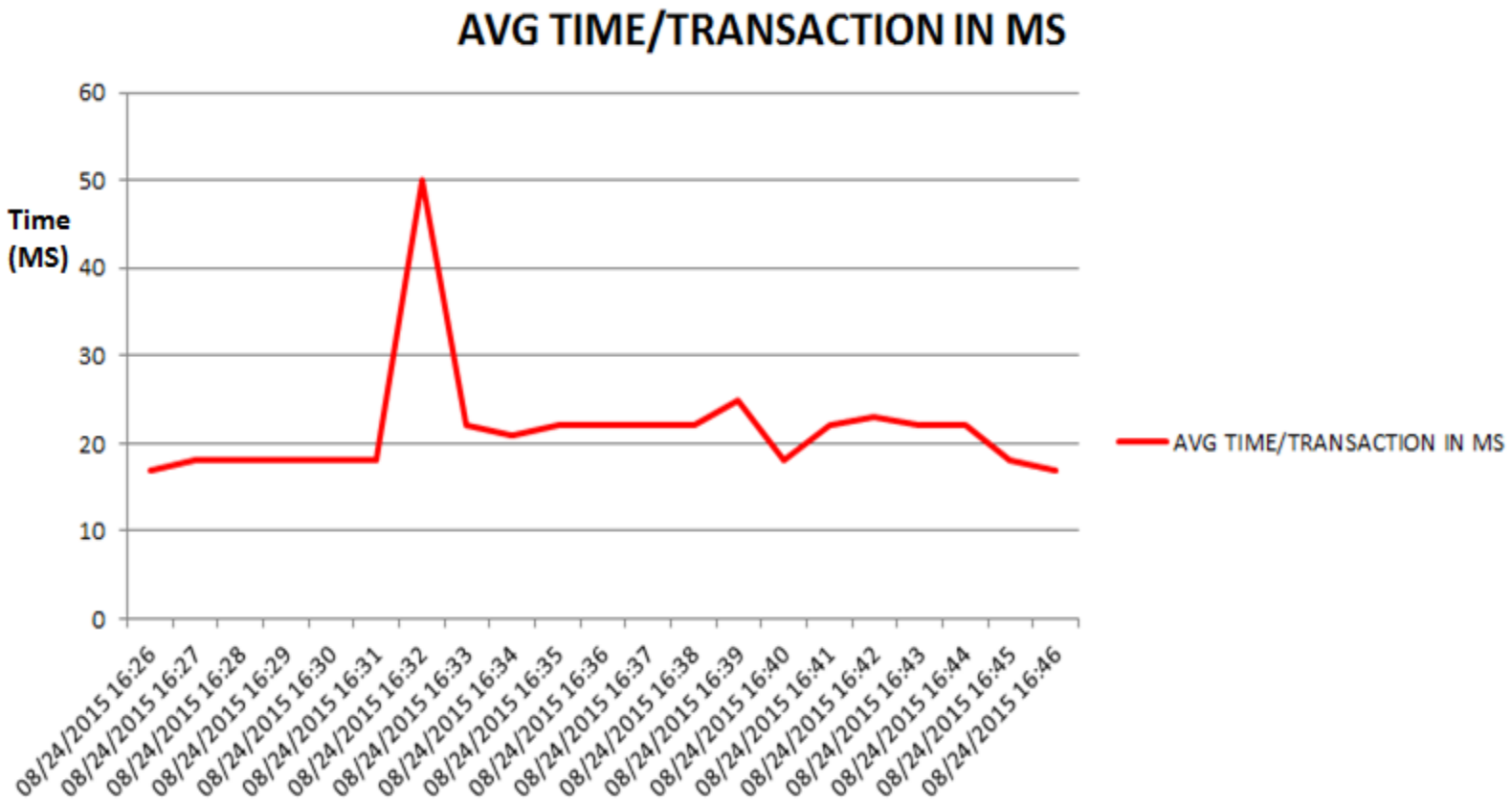
EPSILON

Case study – Transaction response time



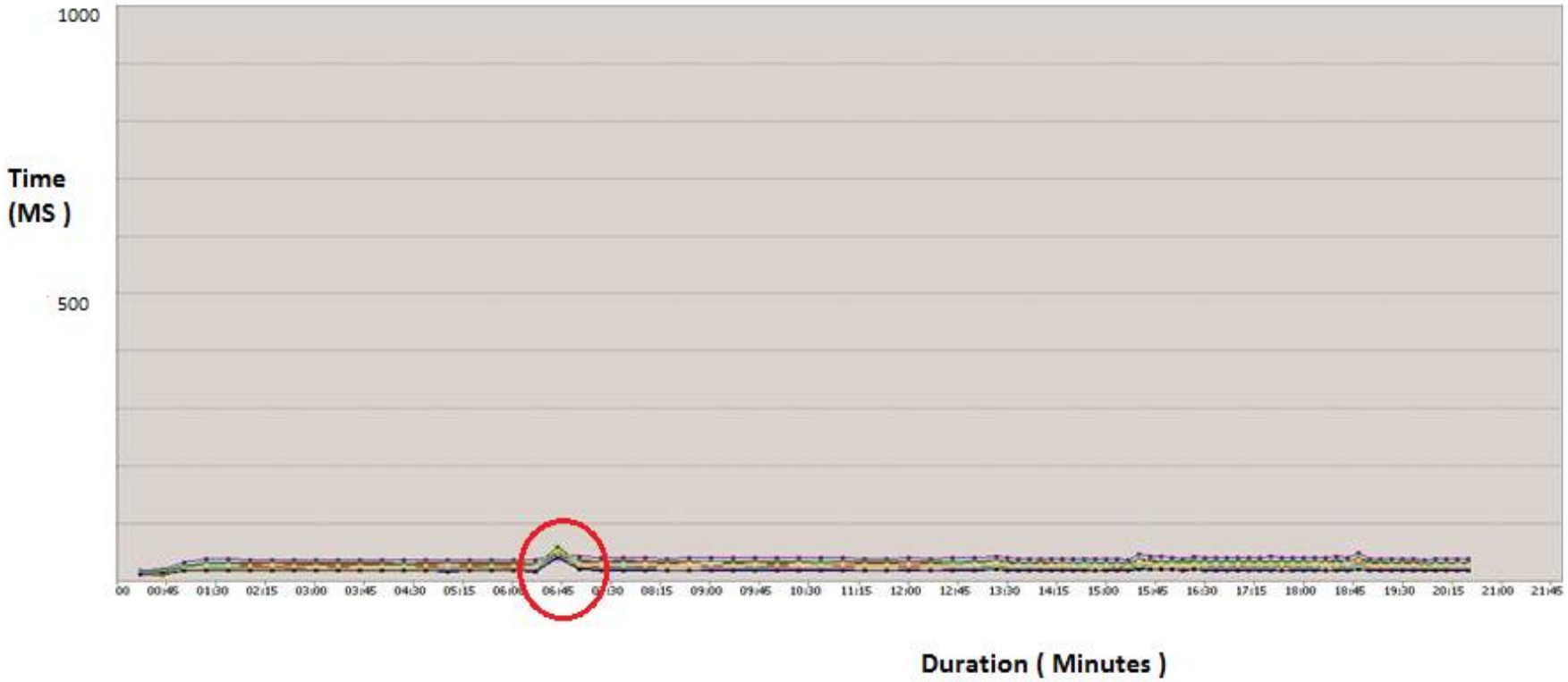
EPSILON

Case study – Transaction response time



EPSILON

Case study – Overall transaction response time



EPSILON

Business Benefits

- Scheduled maintenance of Oracle technology stack can be done **without disrupting business user experience.**
- Application restart is no longer required for scheduled maintenance which is a **major relief**.
- Usage of connection pool reduces CPU utilization of middle tier servers by 40%
- **Database and operating system can be patched periodically without taking any system downtime** (meet security compliance as well as uptime SLA)
- We have similar success for Java based applications using WebLogic Server Active Gridlink to hide scheduled maintenance operation **without any application code change**

EPSILON

Next Steps

- Use Application Continuity for ODP.NET to hide unplanned outages and scheduled maintenance without any application code change
- Use Application Continuity for Java with WebLogic Server Active Gridlink to hide unplanned outages and scheduled maintenance without any application code change

EPSILON

Lessons learned

- Separate handler required to integrate transaction guard and TAF.

Transaction Guard (TG) Integration with Transparent Application Failover (TAF) - MOS ID 2011697.1

- Configuration parameter adjusted for transaction history table to reduce contention

http://www.oracle.com/technetwork/database/database-cloud/private/transaction-guard-wp-12c-1966209.pdf

- We update TNS entry to use new parameters to hide outages

http://www.oracle.com/technetwork/database/options/clustering/overview/fastapplicationnotification12c-2538999.pdf

- Ensure RAC service definition setting uses disconnect=false

EPSILON

Q&A?