

CA APM - Topics for Discussion (Focus Area – CEM)

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July 2011

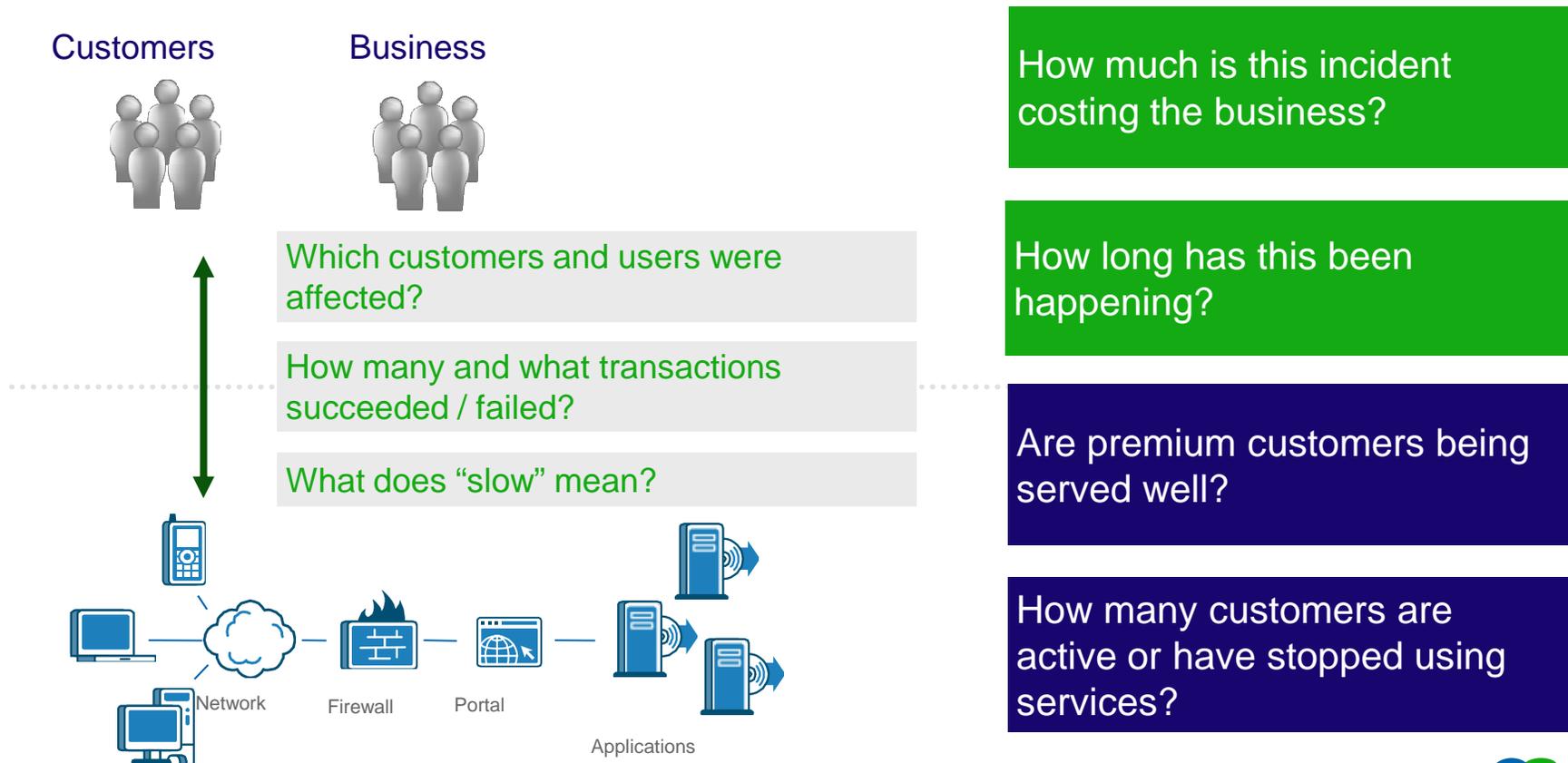


agenda

- CEM Deep-Dive and its value to business in context of APM
- Business Dashboards using RTTM
- Enterprise Deployment Best Practices
 - Sizing and HA
 - Networking
 - System Specifications
 - Advanced Business Transaction Definitions
 - Understanding of Impact levels and advanced Incident creation techniques
- Integrations
 - HTTP Plug-ins and extensions
 - Understanding the CEM-Introscope integration and linkage
 - Integration with various management systems
- Ensuring integrity of CEM data and statistics
 - Packet loss problems
 - Overload scenarios and NIC issues
 - Missing/Partial Response problems

application performance management - the challenge

When there's a problem, the Business needs to know which customers, users and applications are being impacted



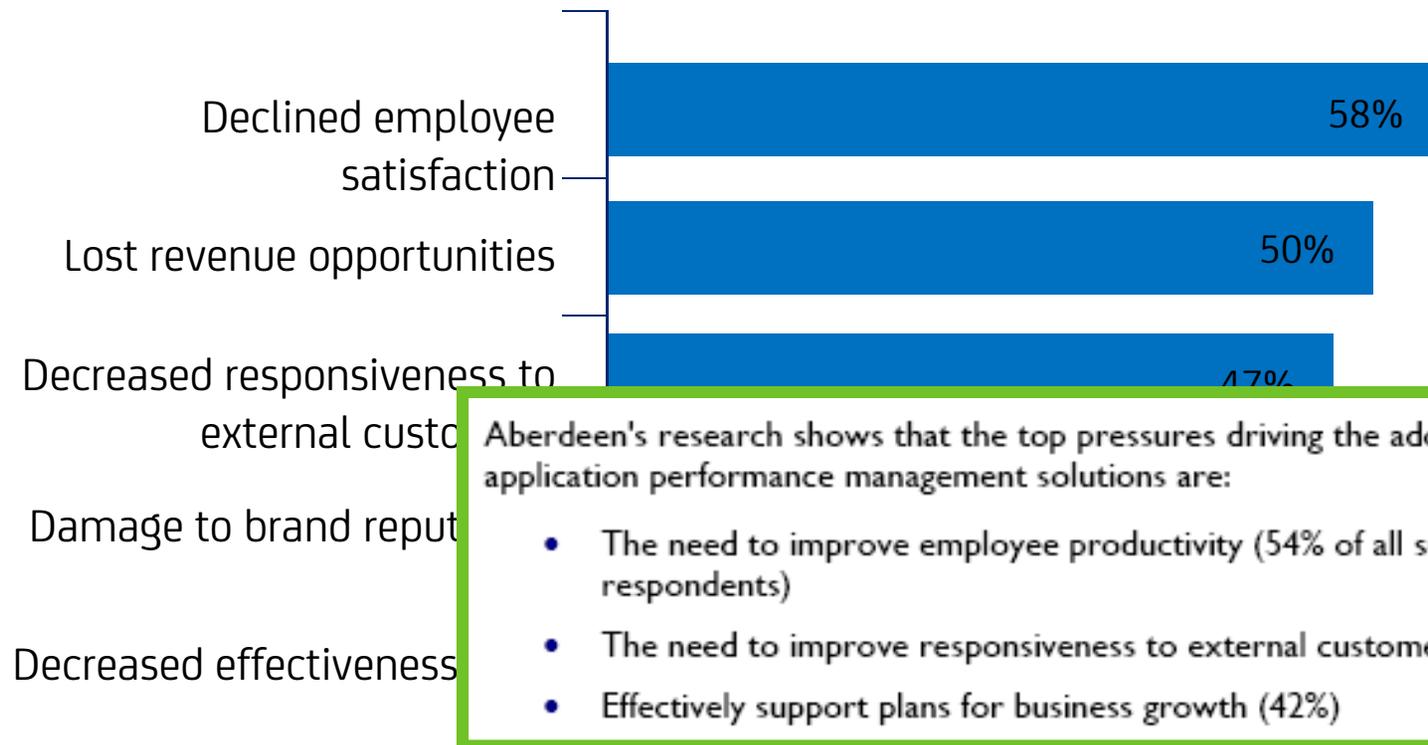
complex heterogeneous environments

little issues add up



why worry about application and transaction performance?

Aberdeen Group Survey: Business Impact of Issues with Application Performance



Source: Network World, "Poor Application Performance Translates to Lost Revenue," August 2008. Recap story from Aberdeen Research Survey of 200 companies, June 2008.

information to support all stakeholders

LOB Manager



- I need visibility into the customer experience
- What's the number of orders that are processed daily?

Development



- I need to see exactly what the problem is
- I want to find problems in Dev & QA before they hit Production



QA



- I need to be confident the application will perform well in production
- I need data to reproduce problems and identify the likely cause

VP Operations



- I must ensure SLAs are acceptable
- Is my team working efficiently and are costs under control

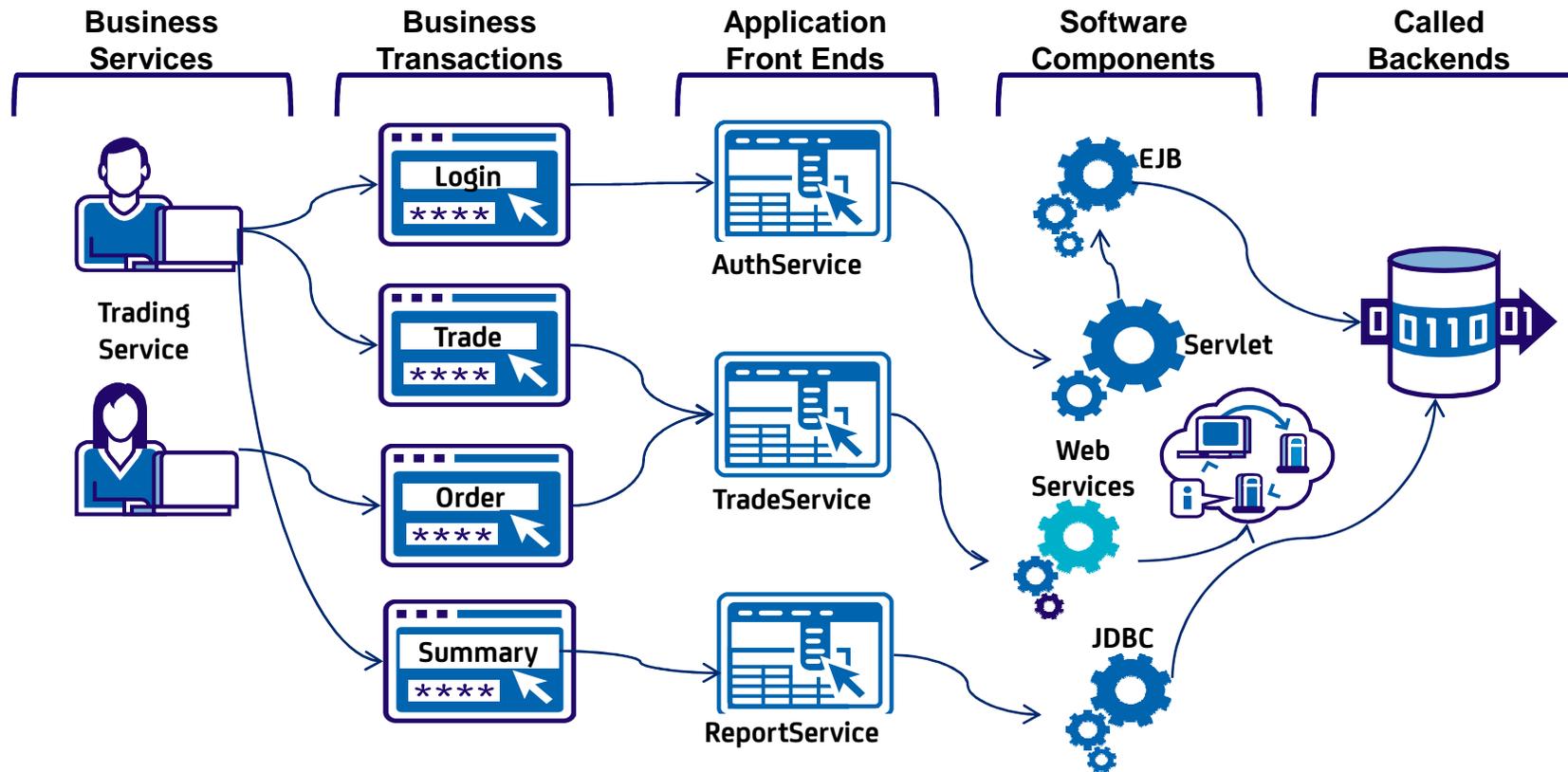
Operations



- I want to see problems before customers do
- I want a constant pulse on customer success rate
- I need to know who to contact when alerted

transaction model

capture end-to-end execution path



- Unified and simple Transaction Model serves as the foundation for application performance management
- Component relationships are updated dynamically as transaction paths change

Business Dashboards using RTTM

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What is RTTM ?

Real Time Transaction Metrics

- Developed as "btstats" on CEM 4.2
 - Direct metrics from TIMs to EM
 - Converted "hourly" transactional statistics to "15 seconds"
- Productized as "RTTM" on CEM 4.5.x
 - TESS aggregated real time metrics from TIM and sent them to EM
 - Added "defect rate"
 - Switch/LB time (CEM Agent) vs. Application server times (from "Customer Experience Node" under each agent)
- Fully integrated as core component on CEM 5.x/APM 9
 - Available for Dashboarding
 - Switch/LB time (CEM Agent) vs. Application server times (from Triage Map)

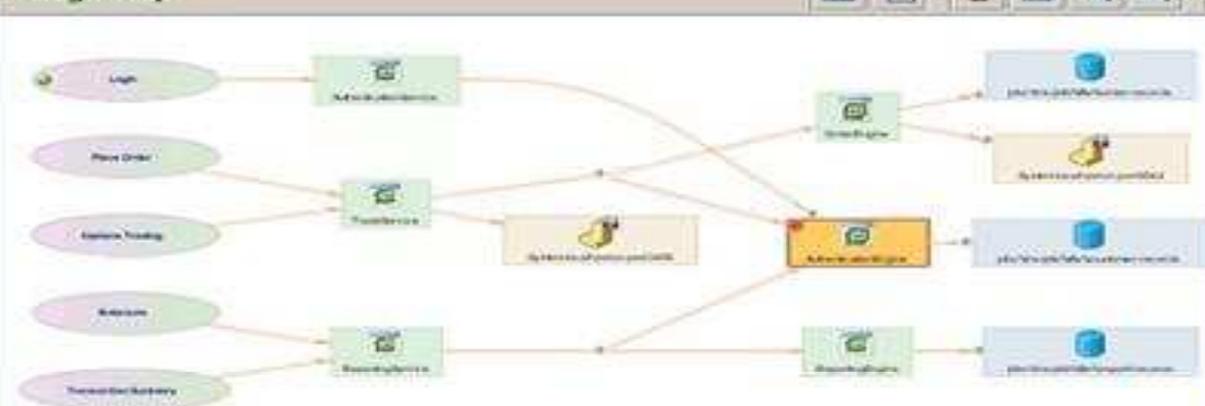


Time range: Live

Resolution: 15 seconds

Trade Service

Triage Map



Locations for AuthenticationEngine:

Double-click row to jump to Browse tree.

Agent	Host	R/T	Concurrent	Errors	Responses	Stalls
Tomcat	girer02-t7400	363	0	0	8	0

2:35:26 PM PDT 15 Sep 2010

Key Transaction Execution Count

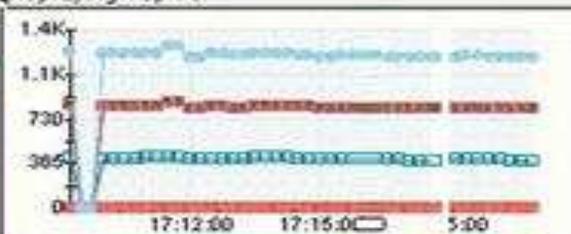
Displaying Top 10



- I...Executed Transaction Count (L/L>Last Interval) = 60
- ▲ I...Executed Transaction Count (L/L>Last Interval) = 60
- I...Executed Transaction Count (L/L>Last Interval) = 30

CPU Utilization

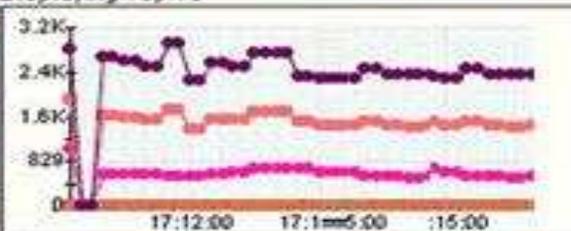
Displaying Top 10



- I...Average CPU Time ... = 1.2K ... = 1.2K
- I...Average CPU Time U... = 812 / ... = 812
- I...Average CPU Time U... = 812 / ... = 812
- I...Average CPU Time U... = 303 / ... = 303

GC Heap

Displaying Top 10



- I...Average Lifetime (µs) = 2.4K (s) = 2.4K
- I...Average Lifetime (µs) = 1.5K (s) = 1.5K
- I...Average Lifetime (µs) = 1.5K (s) = 1.5K
- I...Average Lifetime (µs) = 550 (s) = 550

Client Time



Server Time



Business Dashboards leveraging CEM RTTM Metrics

First Data **EXECUTIVE VIEW** powered by **ca wily**

Top Tier

Debit Auth. Tx/sec: 2

Credit Auth. Tx/sec: 1

Average Trans. Time (ms)

Debit Auth. Tx/sec: 33

Credit Auth. Tx/sec: 46

Average Trans. Time (ms)

Middle Tier

Debit Auth. Tx/sec: 33

Credit Auth. Tx/sec: 46

Average Trans. Time (ms)

Lower Tier

Debit Auth. Tx/sec: 42

Credit Auth. Tx/sec: 60

Average Trans. Time (ms)

Debit Auth. Tx/sec: 33

Credit Auth. Tx/sec: 60

Average Trans. Time (ms)

Internal Systems

- SOA Services
- Transaction Routing Engine
- Back-Office Systems

Current Critical Issues:

A database storage problem is causing real-time transaction latency. See Ticket #12345.

!! End of Message: 6:24pm !!

First Data **Client Business View** **Walmart** Save money. Live better.

Debit Authorizations

Average Trans. Time (ms)

tx/sec: 2 errors: 1

Credit Authorizations

Average Trans. Time (ms)

Tx/sec: 2 Errors: 33

Customer Experience

Displaying Top 5

Slow Time	Small Size	Missing Transaction
Fast Time	Unauthorized Access	Content Error
Low Throughput	Client Request Error	Response
High Throughput	Server Response Error	Partial Response
Large Size	Missing Component	

Top 5 Business transactions with highest Total Defect to Transaction Ratio (%)

Other Transactions

Errors	Avg Trans Time	Transaction /sec
1	1	1
1	26	26
1	11	11
1	11	11
1	26	26
1	1	1

usbank **Customer Experience View**

Personal

Customer Incidents

Service Level Mgmt

Reports & Trends

Response Time - Biz Trans	Busiest Biz Trans	Defects and Types	# of Biz Trans
<p>Average Response Time (ms) = 0</p>	<p>Average Response Time (ms) = 0</p>	<p>Average Response Time (ms) = 0</p>	<p>ISP Frontend - Responses Per Interval = 1</p>
<p>Average Response Time (ms) = 0</p>	<p>Average Response Time (ms) = 0</p>	<p>Average Response Time (ms) = 0</p>	<p>AccessOnline Frontend - Responses = 107</p>
<p>Average Response Time (ms) = 0</p>	<p>Average Response Time (ms) = 0</p>	<p>Average Response Time (ms) = 0</p>	<p>IRIB Frontend - Responses Per Interval = 0</p>

Forward inc. **Executive Overview**

Business Monitoring

- Z-Connect UK: Success Rate % / hour: 81
- Z-Connect UK Fast Flow: Success Rate % / hour: 100
- Z-Connect Germany: Success Rate % / hour: 94
- Z-Connect Spain Q & B: Success Rate % / hour: 99

Enterprise Deployment Best Practices

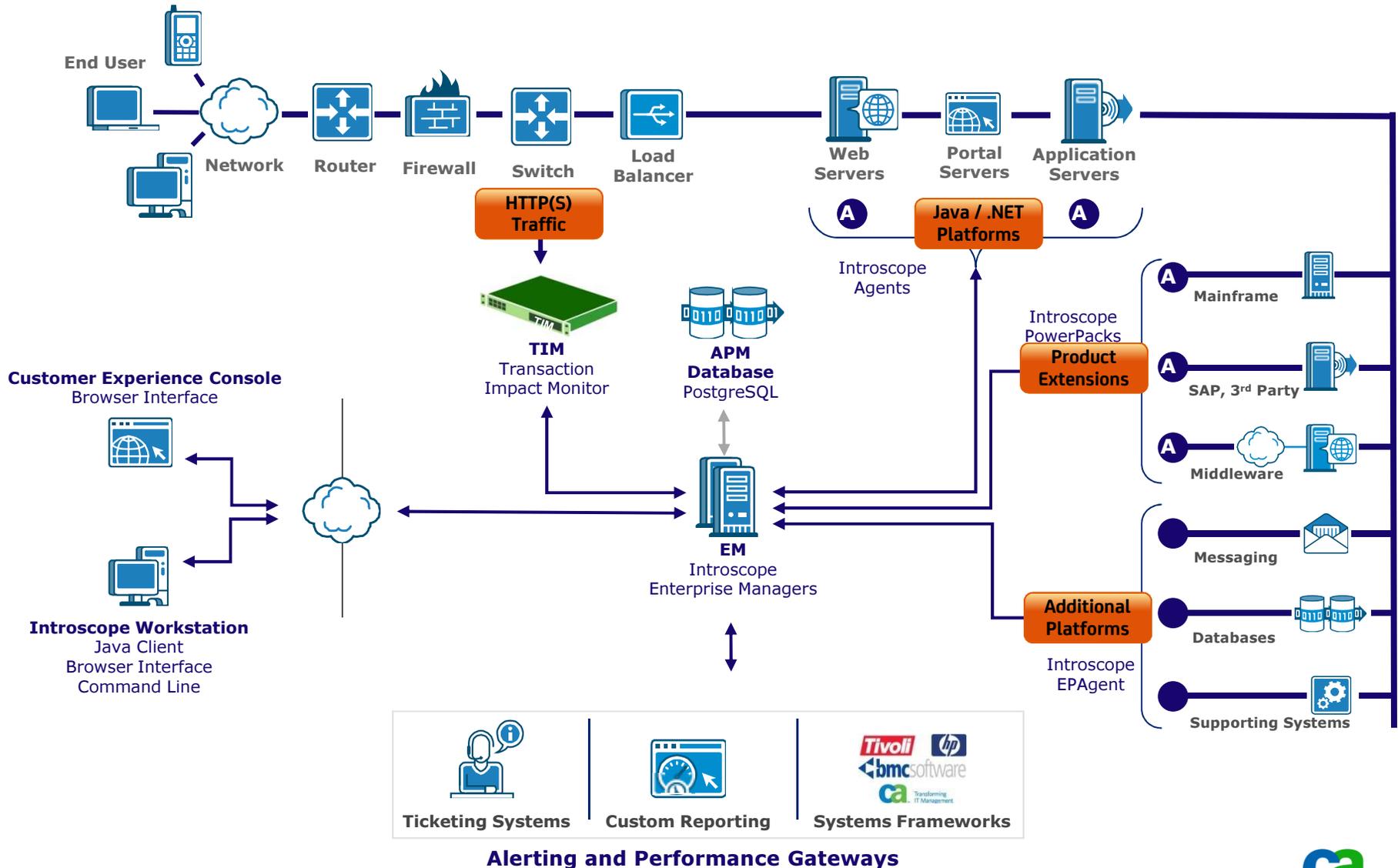
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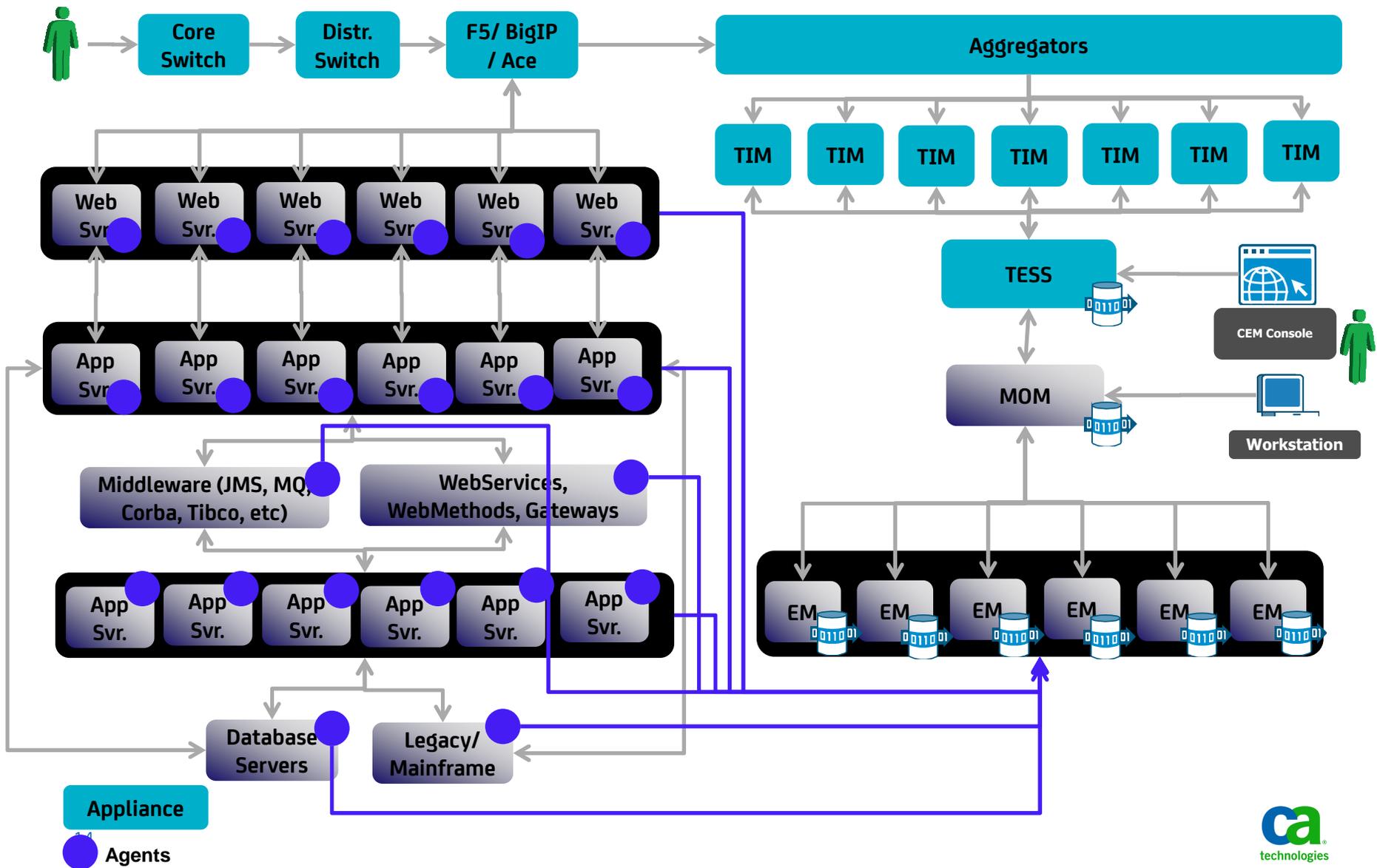
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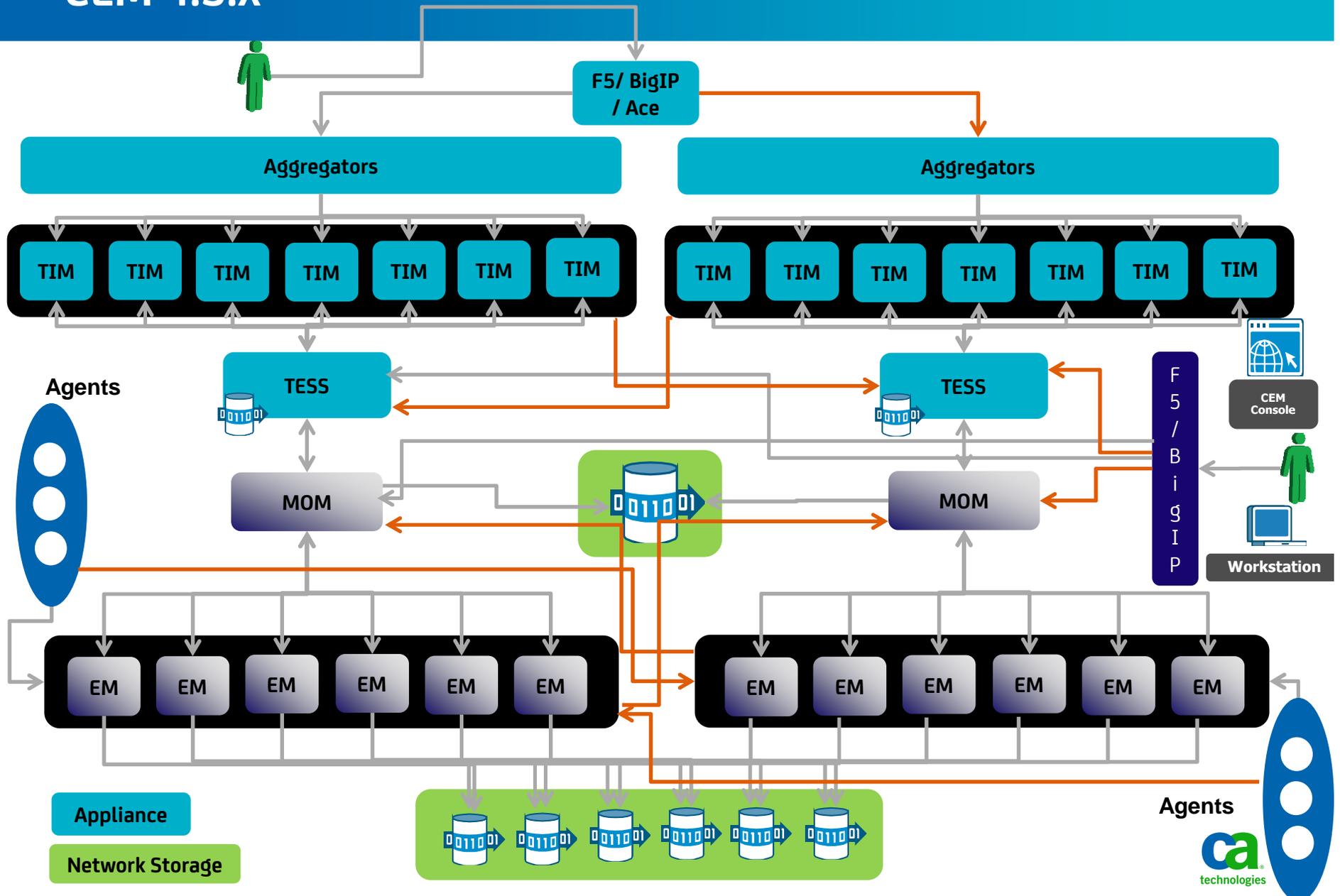
the CA APM solution architecture – how we do it



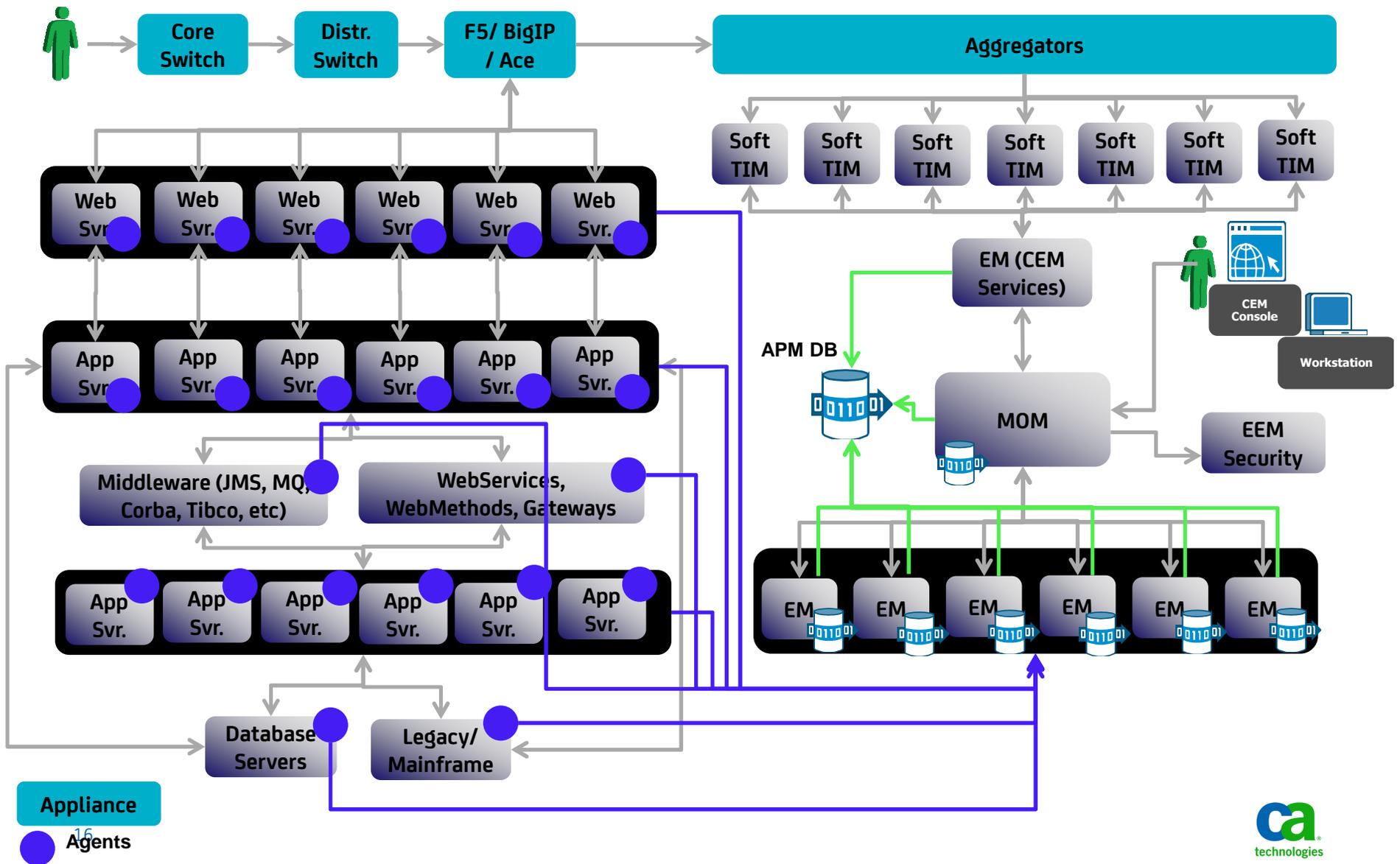
APM Cluster Architecture – Introscope 8.x, CEM 4.5.x



High Availability APM Cluster Architecture – Introscope 8.x, CEM 4.5.x



APM Cluster Architecture – APM 9.x



Cluster Sizing Guidelines

See the [Sizing Calculator](#) for explicit number of TIMs, TESS, Agents, EM, MOM and Storage

Active - Active (No DR)																		
Complexity	Total # of JVM / App instances	Metrics / Agent	# of Agents including EPA	Total Metrics	# of EM	EM Failover	Storage / EM	CPU / EM	Heap / EM	# of MOM	MOM Failover	Storage / MOM	CPU / MOM	Heap / MOM	Total HTTP Traffic	# of Biz Txns	# of TIMs	# of TESS
Simple	40-50	3K-5K	60	< 300K	1	No	150G	4 to 6	6G - 8 G	NA	NA	NA	NA	NA	250 Mbps -350 Mbps	< = 80	2 to 3	1
Medium	65-250		80 - 300	> 400K and < 1.5M	2 to 5	Yes		4	4 G	1	No	150 G	8+	12G - 14G	350 Mbps -700 Mbps	< = 120	3 to 5	1
Complex	250-500		300 - 600	> 1.5M and < 3 M	6 to 10	Yes		4		1	1	200 G	8+	16G - 20G	700 Mbps - 1.5 Gbps	< = 150	6 to 12	1 to 2

Active - Passive (No DR)																		
Complexity	Total # of JVM / App instances	Metrics / Agent	# of Agents including EPA	Total Metrics	# of EM	EM Failover	Storage / EM	CPU / EM	Heap / EM	# of MOM	MOM Failover	Storage / MOM	CPU / MOM	Heap / MOM	Total HTTP Traffic	# of Biz Txns	# of TIMs	# of TESS
Simple	60-70	3K-5K	90	< 450K	1	No	150G	4	6 G - 8 G	NA	NA	NA	NA	NA	250 Mbps -350 Mbps	< = 80	2 to 3	1
Medium	80-350		100 - 400	> 450K and < 2.25M	2 to 5	Yes		4	4 G	1	No	150 G	8+	12G - 14G	350 Mbps -700 Mbps	< = 120	3 to 5	1
Complex	350-800		400 - 900	> 2.25M and < 4.5M	6 to 10	Yes		4		1	1	200 G	8+	16G - 20G	700 Mbps - 1.5 Gbps	< = 150	6 to 12	1 to 2

Virtualization Sizing Guidelines (Introscope 8.x)						
Complexity	Total # of JVM/App instances	Metrics / Agent	# of Agents including EPA	Total Metrics	# of EM	# of MOM
Simple	30 - 40	2k -3k	50	<250K	1	1
Medium	40 - 200	2k -3k	50-200	>250K and < 1M	2 to 5	1
Complex	200 - 400	2k -3k	200-450	>1M and < 2M	6 to 10	2

System Specifications – Introscope 8.x, CEM 4.5.x

VMWare							
Introscope H/W Requirements							
	OS	Hardware	RAM	JVM	Heap Size	Reservations	Storage
Collector / EM	64-bit RHEL 4/5	4 VCPU / Dual Core Xeon / Opteron @ 4 GHz	8 GB	64 bit	4 GB per Collector	Memory: 8 GB VCPU: 8 CPU Frequency: 4GHz Disk R/W: 350/seconds	See sizing calculator
MOM	64-bit RHEL 4/5	4 VCPU / Dual Core Xeon / Opteron @ 4 GHz	14Gb	64 bit	12 Gb	Memory: 14 GB VCPU: 8 CPU Frequency: 4GHz Disk R/W: 250/seconds	See sizing calculator

Physical Hardware							
Introscope H/W Requirements							
	OS	Hardware	RAM	JVM	Heap Size	Storage	
Collector / EM	64-bit RHEL 4/5	4 CPU / Dual Core Xeon / Opteron @ 4 GHz	8 GB	64 bit	4 GB per Collector	See sizing calculator	
MOM	64-bit RHEL 4/5	4 CPU / Dual Core Xeon / Opteron @ 4 GHz	14Gb	64 bit	12 Gb	See sizing calculator	

System Specifications– APM 9.x

VMWare							
APM 9.x H/W Requirements							
	OS	Hardware	RAM	JVM	Heap Size	Reservations	Storage
Collector / EM	64-bit RHEL 4/5	4 VCPU / Dual Core Xeon / Opteron @ 4 GHz	8 GB	64 bit	4 GB per Collector	Memory: 8 GB VCPU: 8 CPU Frequency: 4GHz Disk R/W: 350/seconds	See sizing calculator
	OS	Hardware	RAM	JVM	Heap	Reservations	Storage
MOM	64-bit RHEL 4/5	4 VCPU / Dual Core Xeon / Opteron @ 4 GHz	24G	64 bit	20G	Memory: 24 GB VCPU: 8 CPU Frequency: 4GHz Disk R/W: 250/seconds	See sizing calculator
	OS	Hardware	RAM	JVM	Heap	Reservations	Storage
TIM	32-bit RHEL 4, Nihant 8 (CA shipped)	4 VCPU / Dual Core Xeon / Opteron @ 4 GHz	8G	32 bit	6G	Memory: 8 GB VCPU: 8 CPU Frequency: 4GHz Disk R/W: 250/seconds disk size : 146 GB	See sizing calculator or 146 G
	OS	Hardware	RAM	JVM	Heap	Reservations	Storage
APM DB	64-bit RHEL 4/5	4 VCPU / Dual Core Xeon / Opteron @ 4 GHz	8G	64 bit	6G	Memory: 8 GB VCPU: 8 CPU Frequency: 4GHz Disk R/W: 350/seconds	See sizing calculator or 200 G

Physical						
APM 9.x H/W Requirements						
	OS	Hardware	RAM	JVM	Heap Size	Storage
Collector / EM	64-bit RHEL 4/5	4 CPU / Dual Core Xeon / Opteron @ 4 GHz	8 GB	64 bit	4 GB per Collector	See sizing calculator
	OS	Hardware	RAM	JVM	Heap	Storage
MOM	64-bit RHEL 4/5	4 CPU / Dual Core Xeon / Opteron @ 4 GHz	14Gb	64 bit	12 Gb	See sizing calculator
	OS	Hardware	RAM	JVM	Heap	Storage
TIM	32-bit RHEL 4, Nihant 8 (CA shipped)	4 CPU / Dual Core Xeon / Opteron @ 4 GHz	8G	32 bit	6G	See sizing calculator or 146 G
	OS	Hardware	RAM	JVM	Heap	Storage
APM DB	64-bit RHEL 4/5	4 CPU / Dual Core Xeon / Opteron @ 4 GHz	8G	64 bit	6G	See sizing calculator or 200 G

Virtualization Considerations

See the System Specifications for explicit reservation numbers

- **Networking Reservations**

- Dedicated NIC card and physical/virtual NIC binding for TIM monitoring interface

- **System Reservations**

- CPU
- Memory / RAM and Heap Size
- Dedicated Disk or I/O Controllers
- CPU clock speed

- **Storage Reservations**

- I/Os / Disk read/writes
- Dedicated LUNs if using SAN
- High speed SAN/NAS

Advanced Business Transaction Definitions

- Web-Services based
- Flex based
- Plug-in based

Integrations

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HTTP Analyzer Plug-ins

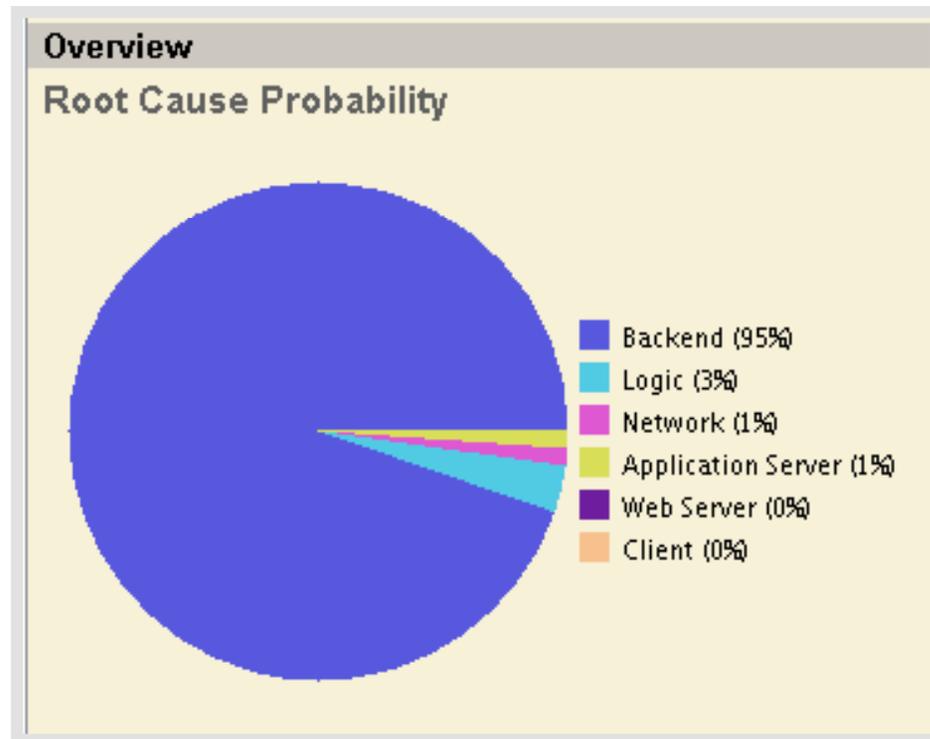
- Used to process custom http request/header/query/post data which :
 - Is not processed by the TIM (example: AMF in pre 9.1)
 - We want the TIM to process in a special way (example: extract a certain parameter from an XML body)
- Based on TIM SDK
- Written as simple java class
- Uploaded from and maintained on the CEM console
- Deployed to the TIM
- Case Study

CEM – Introscope : Understanding the linkage

Typical process

- Check Network
- Check Web Server
- Check App Server
- Check Database
- Check Application Code

APM does the work for you



diagnosis example #1: slow DB query

Transaction Tracer shows details of J2EE or .Net Transactions.

A 25 Second WebSphere x-action

Transaction Time

Call Stack Depth

20 Seconds spent in the Database. This Query is the culprit!

SQL: UPDATE MT16SZ.UNITASGN SET LU_TS = ?, RENM_UNIT = ? WHERE OCD = ? AND STRZ_UNIT = ?

Timestamp	Duration (ms)	Description	UserID
17:38.741 (29 Aug 2007)	38047	SSTNG ServletFilters gov...	
17:40.103 (29 Aug 2007)	36683	SSTNG ServletFilters gov...	
17:45.191 (29 Aug 2007)	36598	SSTNG ServletFilters gov...	
17:49.410 (29 Aug 2007)	36377	SSTNG ServletFilters gov...	
17:41.663 (29 Aug 2007)			
17:55:42.665 (29 Aug 2007)			
18:13:17.813 (29 Aug 2007)			
18:48:07.905 (29 Aug 2007)			
18:48:07.906 (29 Aug 2007)	30235	/SSTNG/SendLetters.do	
18:07:28.937 (29 Aug 2007)	24944	/SSTNG/Main.do	
18:14:16.742 (29 Aug 2007)			
18:00:12.279 (29 Aug 2007)	22774	/SSTNG/Main.do	
18:07:29.676 (29 Aug 2007)	22205	/SSTNG/Main.do	

Summary View | Trace View | Tree View

Transaction Time: 0 ms to 25000 ms

Call Stack Depth:

- SSTNG|ServletFilters|gov.ssa.sstng.filters.BatchStatusFilter|doFilter
- SSTNG|ServletFilters|gov.ssa.sstng.filters.AuthenticationFilter|doFilter
- SSTNG|ServletFilters|gov.ssa.sstng.filters.AuthorizationFilter|doFilter
- Frontends|Apps|SSTNG|URLs|Default
- Servlets|ActionServlet
- SSTNG|Services|gov.ssa.sstng.service.spring.GeneralService|setCurrentOffice
- SSTNG|DAO|gov.ssa.sstng.dao.hibernate.UnitAssignmentDAO|getUnitAssignments
- Hibernate|Sessions|flush
- Backends|dsndsg11 (DB2 DB)
- Backends|dsndsg11
- Hibernate|Sessions|flush (Duration: 20654 ms, Timestamp: 4181 ms, 82% of total transaction time)
- JDBC|IBM DB2 JDBC Universal Driver Architecture
- UPDATE MT16SZ.UNITASGN SET LU_TS = ?, RENM_UNIT = ? WHERE OCD = ? AND STRZ_UNIT = ?

Component Details

Identification

Type: Backends

Name: UPDATE MT16SZ.UNITASGN SET LU_TS = ?, RENM_UNIT = ? WHERE OCD = ? AND STRZ_UNIT = ?

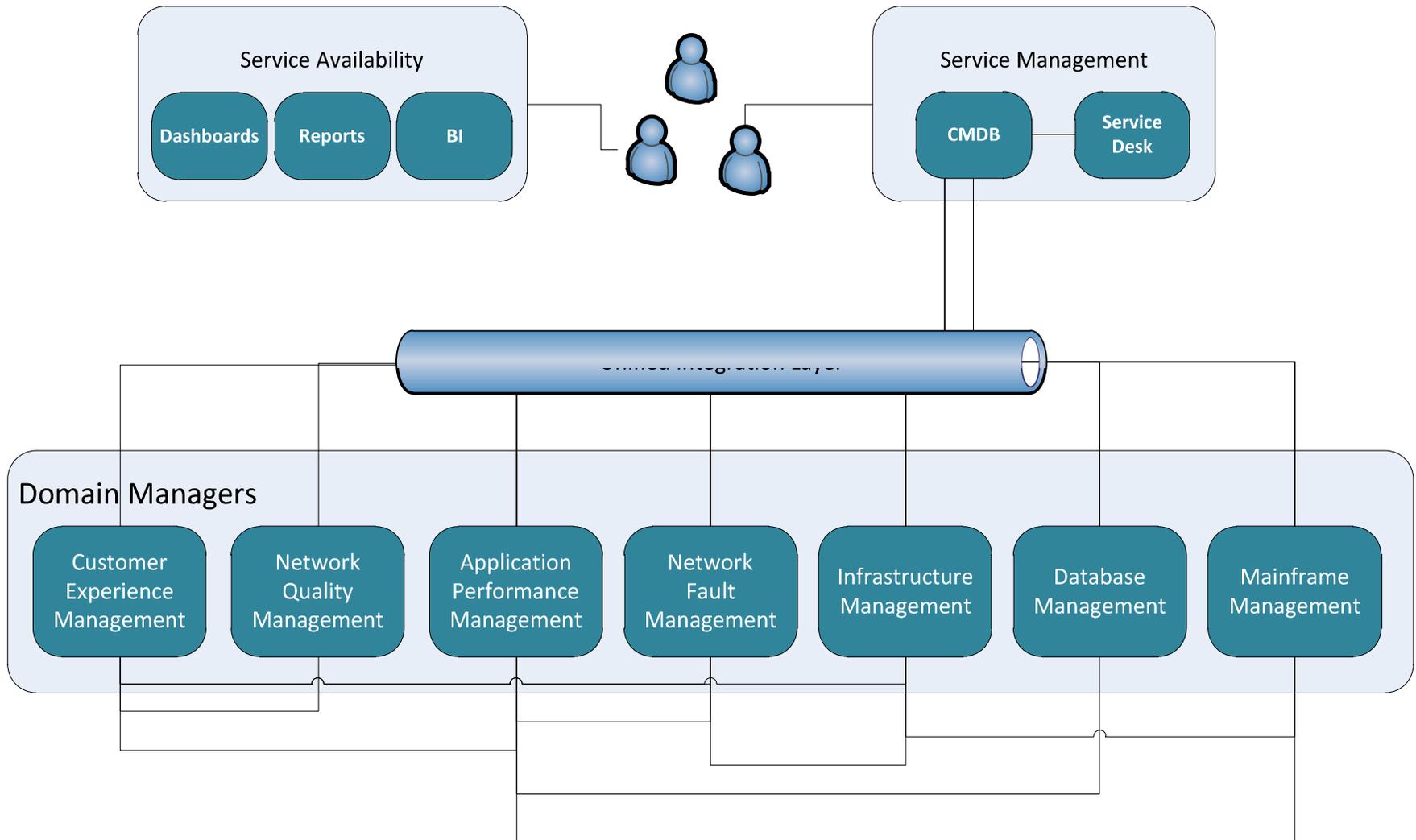
Path: Backends|dsndsg11 (DB2 DB)|SQL|Prepared|Update|UPDATE MT16SZ.UNITASGN SET LU_TS = ?, RENM_UNIT = ? WHERE OCD = ? AND STRZ_UNIT = ?

SQL: UPDATE MT16SZ.UNITASGN SET LU_TS = ?, RENM_UNIT = ? WHERE OCD = ? AND STRZ_UNIT = ?

122 events found

Custom Range ending at 19:00:00 EDT 08/29/2007

CA Service Operations Integrations



Ensuring integrity of CEM data and statistics

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Packet Loss and Overload problems

Symptoms

- Defect storms of Missing/Partial responses defects
- CEM almost unusable

Causes

- TIM CPU Overload
- TIM faulty NICs
- TIM NIC overload

Solution

- Capacity Planning
- Triaging Discards/Errors source

Missing or Partial Response false positives

- See Case Study

Questions ?

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