



# Nadzor web aplikacija i middleware-a u T Mobile-u

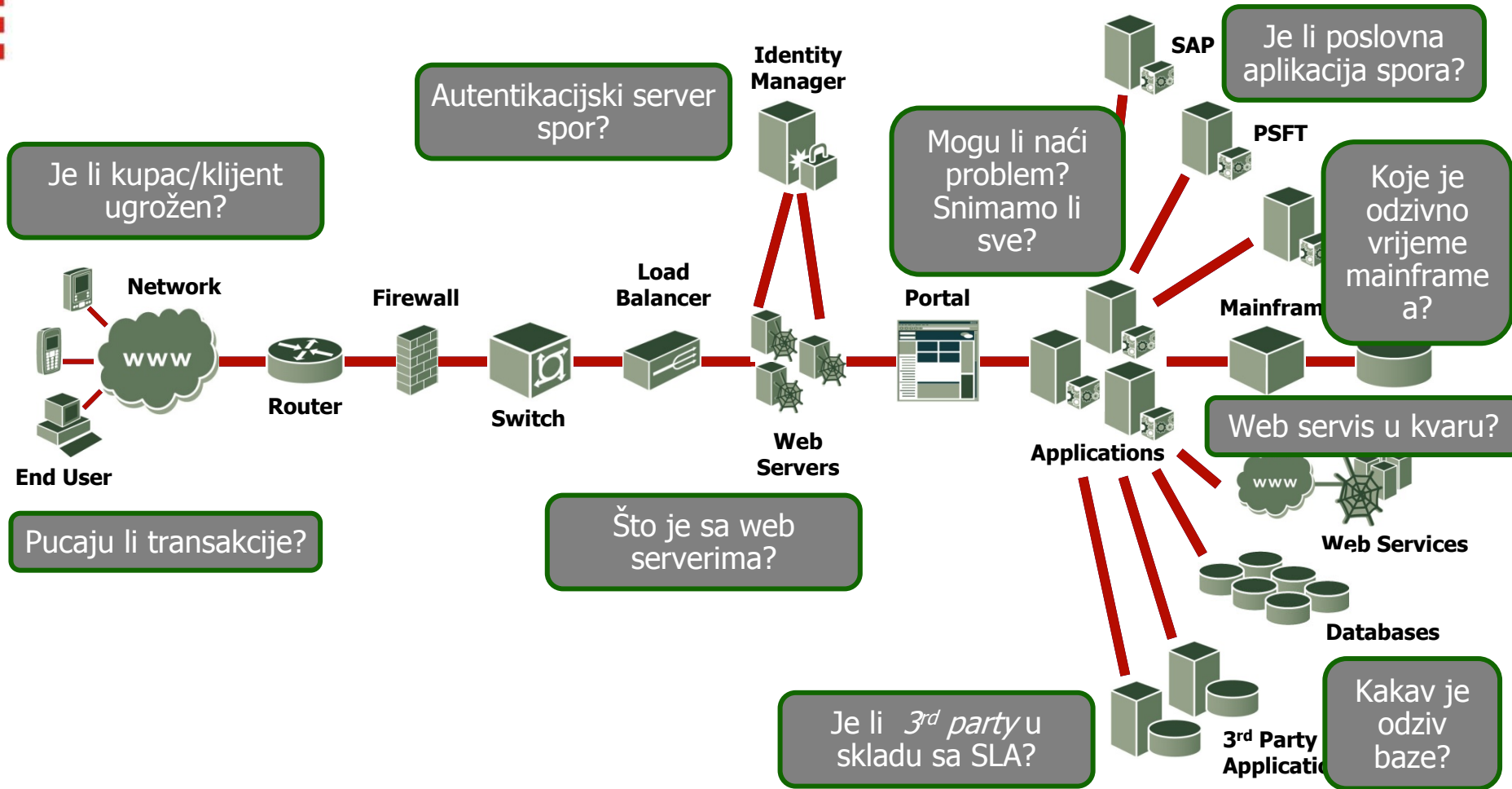
Albert Jurišić, dipl.ing.  
Damir Ban, ing.

- Općenito o nadzoru Web aplikacija
- CA Wily Introscope®
- T Mobile – nadzor web aplikacija i TIBCO middleware-a

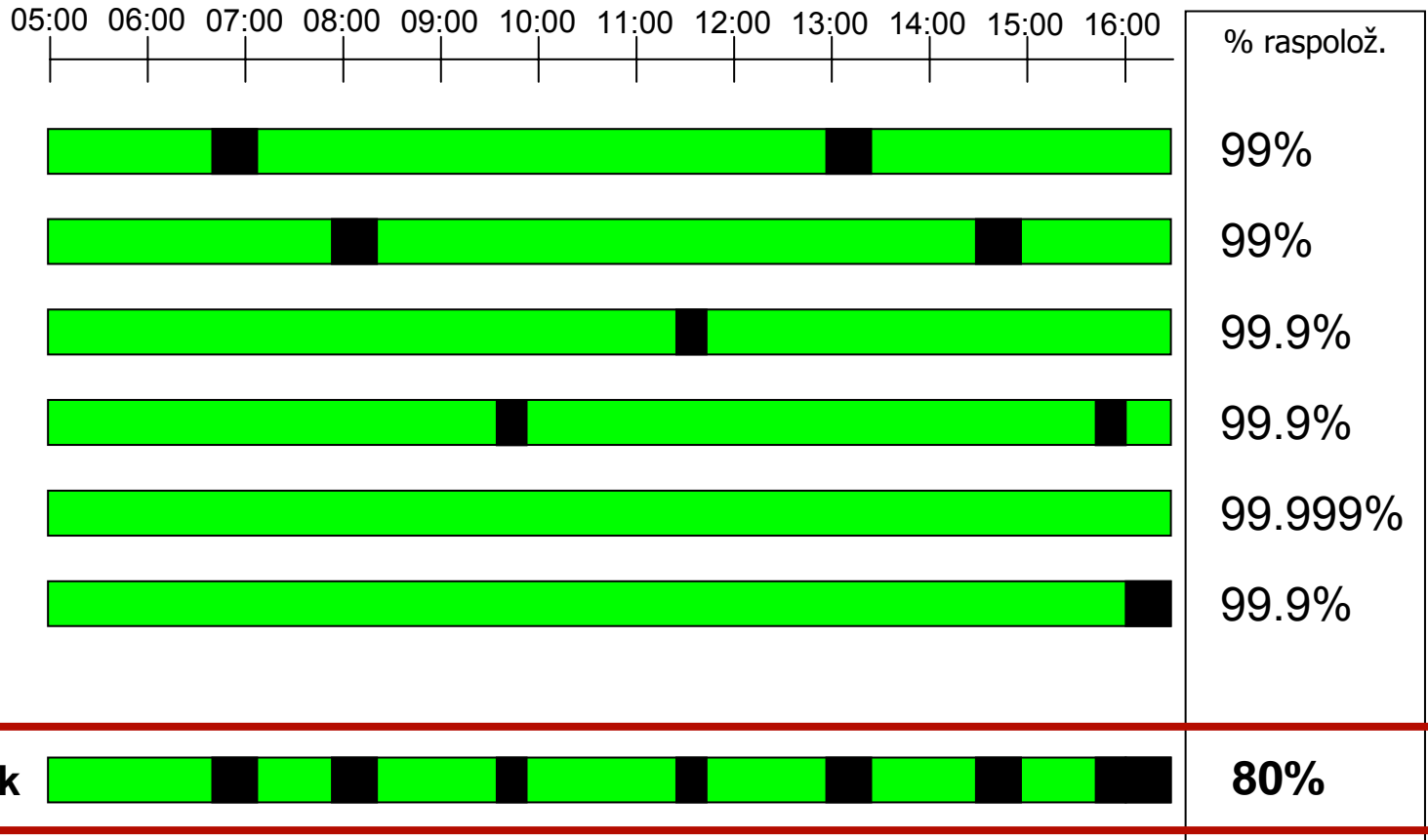
- **Tvrtke su uspješno prebacile poslovanje na web**
  - Prodaja i self-service
  - Opskrba
  - Interne poslovne aplikacije ERP, CRM, HR
- **Obećanje Interneta je uvelike ostvareno**
  - Niži troškovi prodaje i usluga
  - Brže napredovanje i veća agilnost tvrtki
- **Ali ova migracija na web imala je neplanirane posljedice...**

# Kad nastane problem, IT treba znati

Gdje je greška u transakciji



# U kompleksnim, heterogenim okolinama mali ispadi se zbrajaju

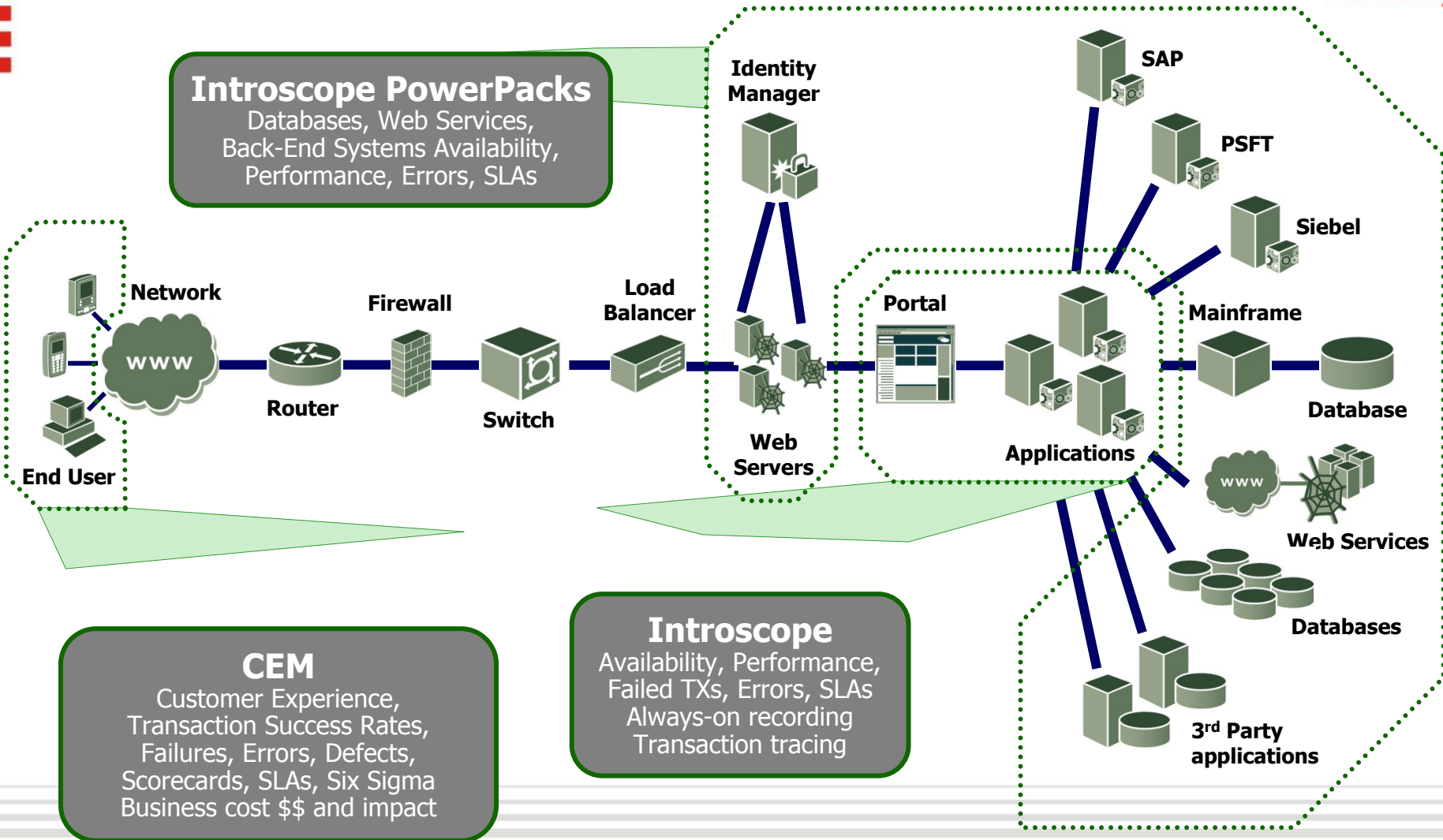


■ Neraspoloživa ili spora  
■ Raspoloživa i brza

- **Biznis**
  - Gubi se kontakt sa kupcima i partnerima
  - Nema mjerila uspjeha sa klijentima
  - Nema uvida u ROI i performanse aplikacija
  - Nedostaje jezik na kojem bi pričali sa IT-em
  
- **IT**
  - Sada je odgovoran za isporuku roba i usluga
  - Pokreće i održava operacije 24x7
  - Stalno rastući pritisak za održanjem performansi
  - Nepozna/pretpostavlja iskustva kupaca/korisnika
  - Mnogo više točaka potencijalnih grešaka u kompleksnom okruženju
  - Nedostaje jezik na kojem bi pričali sa Biznisom

# Jednino CA Wily vam daje dublji uvid u aplikacije kako bi predvidjeli, dijagnosticirali i spremili performanse u realnom vremenu

**Introscope PowerPacks**  
Databases, Web Services, Back-End Systems Availability, Performance, Errors, SLAs



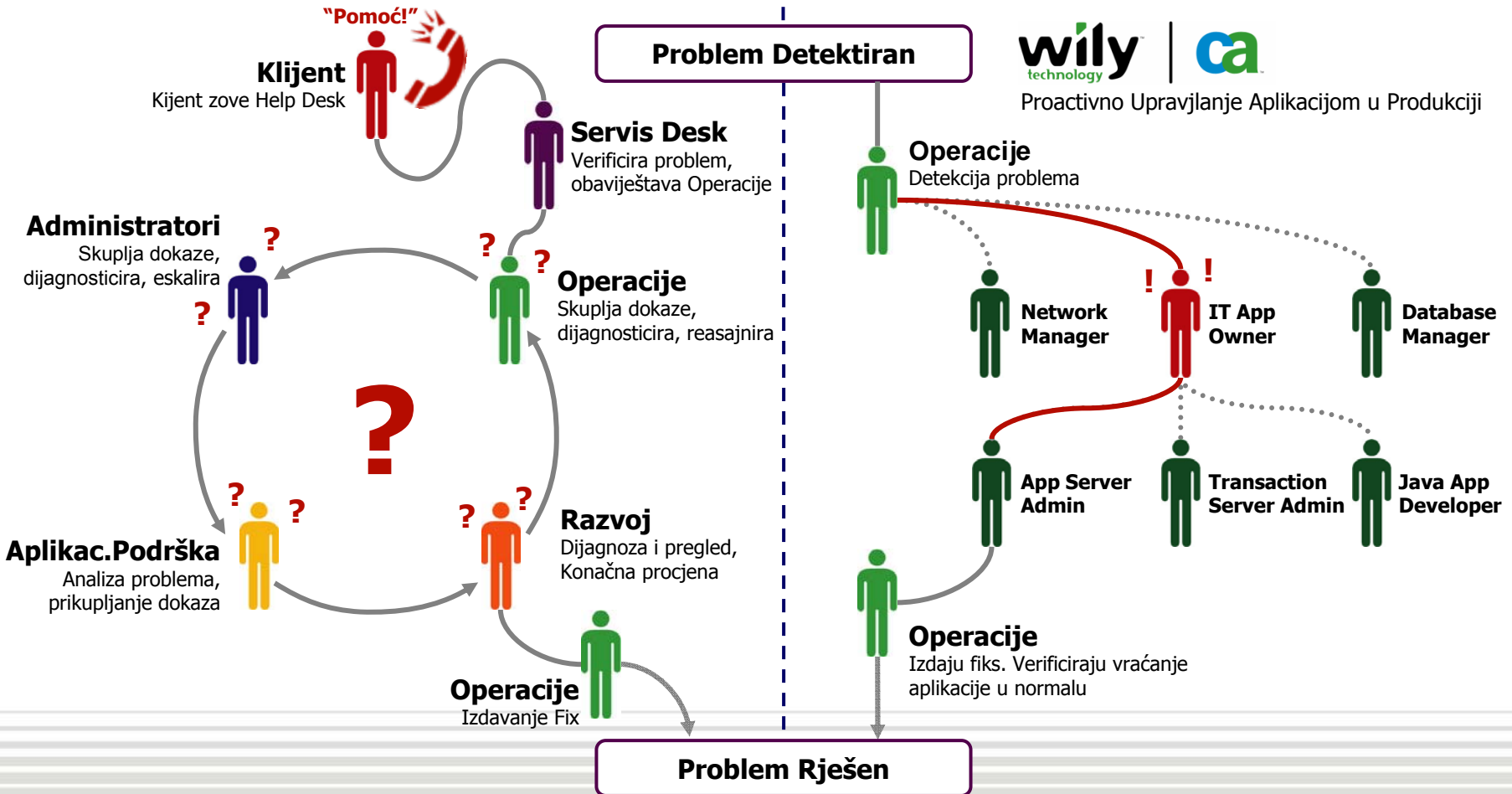
**CEM**  
Customer Experience, Transaction Success Rates, Failures, Errors, Defects, Scorecards, SLAs, Six Sigma Business cost \$\$ and impact

**Introscope**  
Availability, Performance, Failed TXs, Errors, SLAs Always-on recording Transaction tracing



## Reaktivno Upravljanje (Bez Wilya)

## Proaktivno Upravljanje (Sa Wilyjem)





- **Enterprise Application Management rješenje za *mission critical web* aplikacije u **produkciji** koje koriste **Global 3500** kompanije**
  - Monitorira **Java** aplikacije *iznutra*
  - Monitorira **Microsoft .NET** iznutra (Managed CLR okruženja)
  - Također monitorira **non-Java/.NET** sustave *izvana*

# Najčešći uzrok problema sa performansama aplikacije

Vrlo često to nije kod ...

Bugovi u kodu aplikacije	13.7%
Problemi konfiguriranja i ugađanja	11.9%
Arhitektura	10.4%
Konekcije na baze podataka	9.9%
Problemi dizajniranja	9.0%
Memory Leak-ovi	7.1%
Greške u planiranju kapaciteta	6.5%
JVM Problemi	5.3%
Out Of Memory Situacije	5.1%
Bandwidth na vatrozidu (Firewall)	3.6%
Zamrznute dretve	3.3%
Problemi sa konektorima (JCA / JDBC)	3.3%
Konekcije na mainframe sustave	3.0%
Konekcije na <i>Third Party</i> partnere	2.7%
Hardverske greške	2.1%
OS Bugovi	2.0%
Virusi, hakeri, nedopuštena ometanja	1.2%

Kod je uzrok problema u jednom od osam slučajeva

Sistemske konekcije i okolina su često izvor problema sa performansama

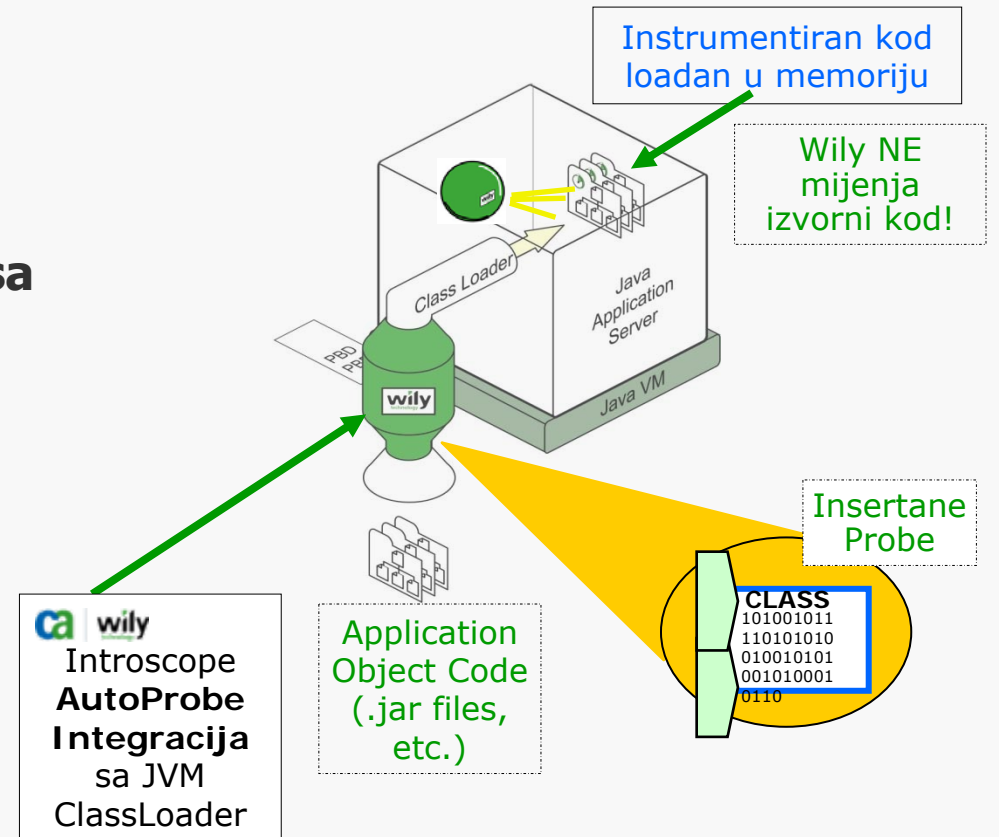
Copyright © 2003 Wily Technology, Inc.

- Monitorira aplikacije 24x7
- ***LOW OVERHEAD***
- Detekcija incidenta i notifikacija
- Brza triaža
- ***Root Cause*** dijagnostika
- Trend analiza / planiranje

# Industrijski standardizirana bajt-kod instrumentacija - BCI

Iznimna brzina monitoriranja

- **CA Wily BCI Pristup validiran od strane Java zajednice**
  - Prihvaćen u J2SE 1.5
- **Instrumentacija "on the fly"**
  - Ne zahtjeva dodatan kod
- **CA Wily Agent kompatibilan sa svakom JVM nakon JDK 1.2**
  - Sun, IBM, JRocket, etc.



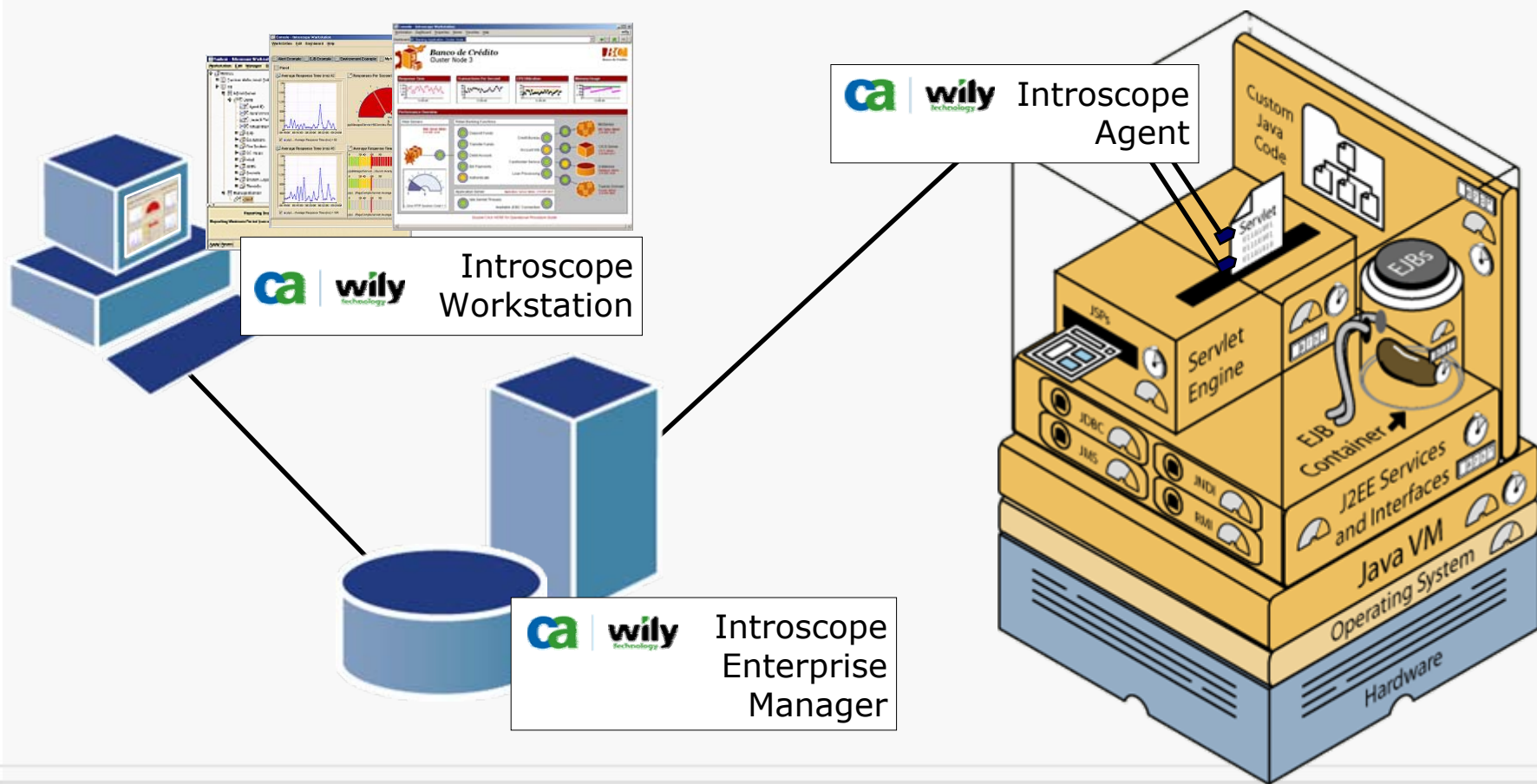
## Korak 1: Java bajt-kod instrumentacija

Tajmer i Brojač "Probe" ubacuju se u Java bajt-kod

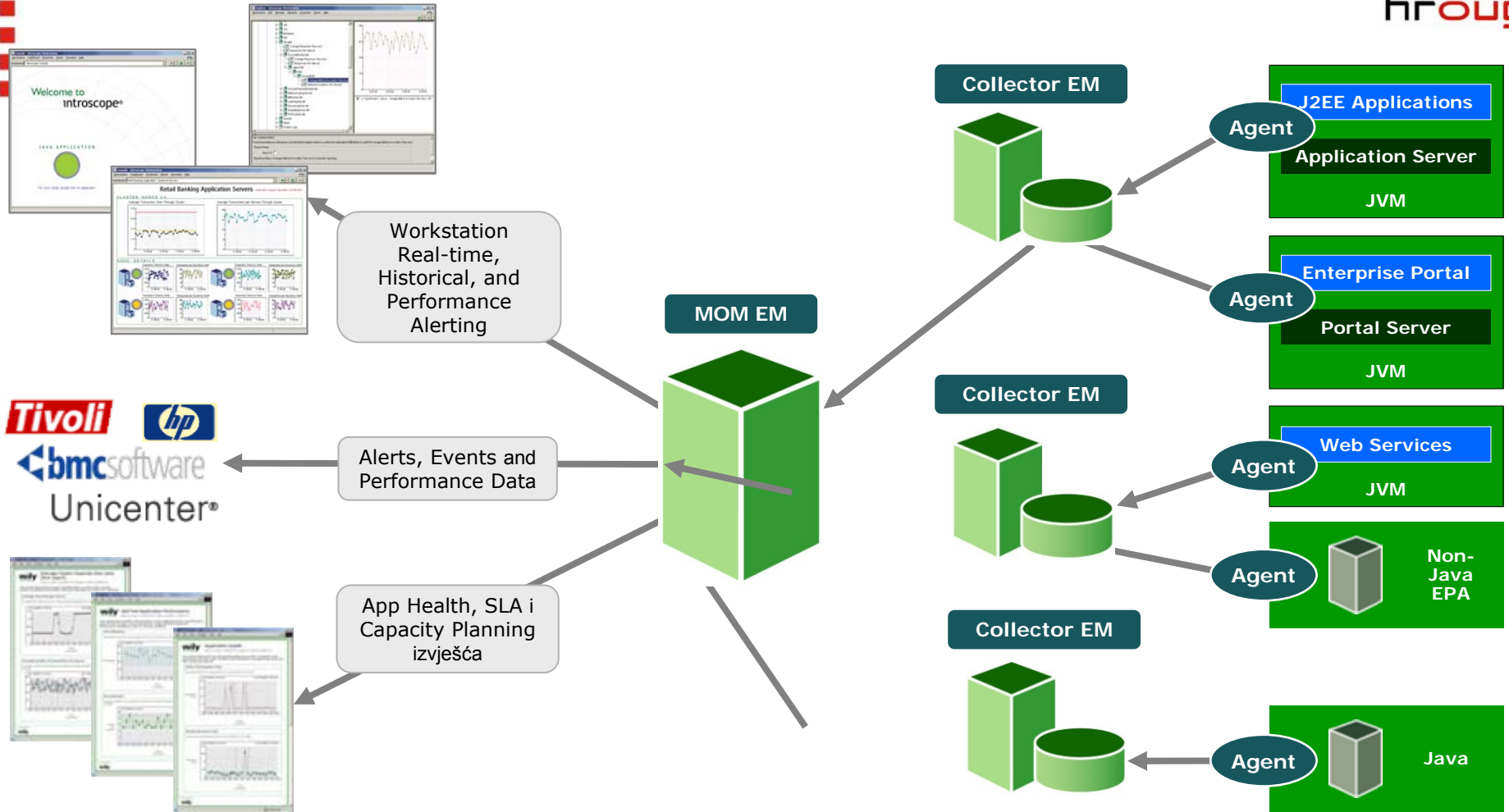
**Servlet**

```
10100101110101010010  
10001011011011110011  
01010100001000111101  
11011111010101010000  
00111101010100101000  
11111110101010100101  
00100101000010000011  
01111000010101000101  
10001000001111110101  
01110001110101010111
```

Korak 4: GUI Workstation daje intuitivne poglede trenutnog i povjesnog stanja performansi

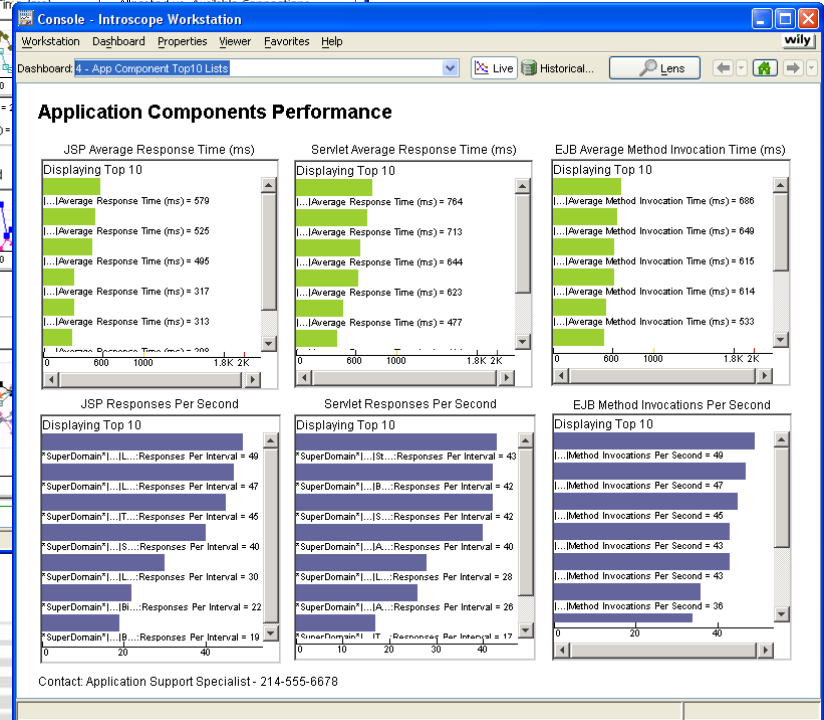
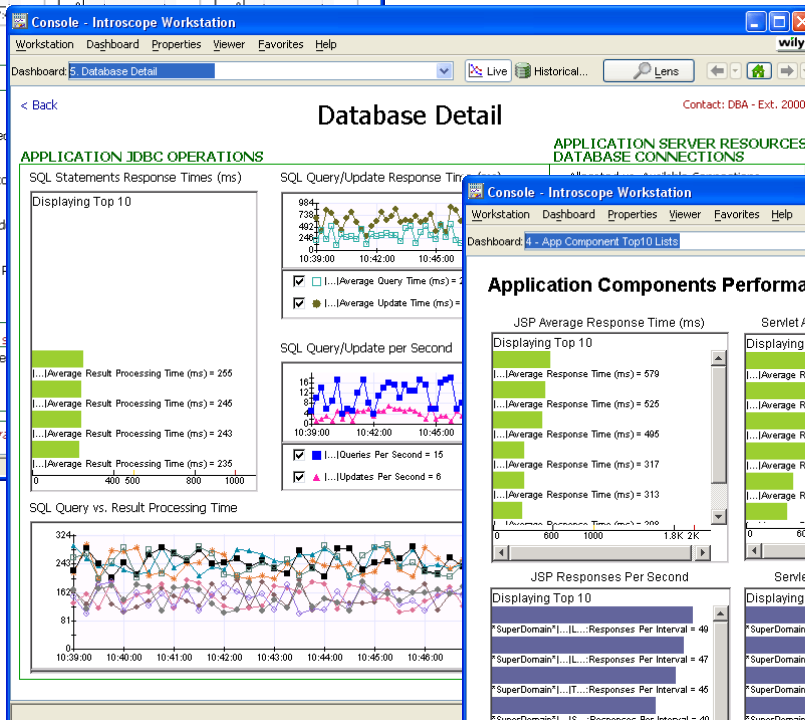
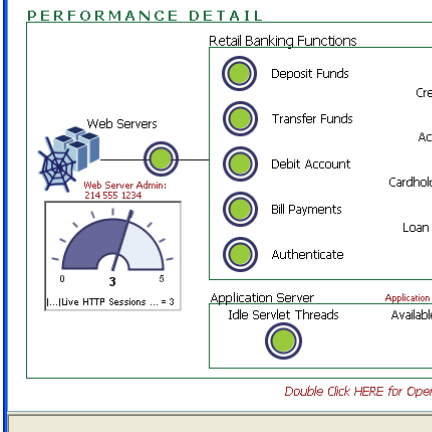
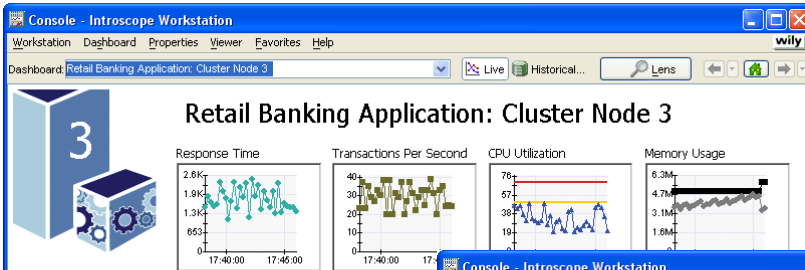


# Wily Introscope 3-slojna Arhitektura: Agent, Enterprise Manager, Workstation



**Prikaz opcionalnog klasteriranog rješenja**

# Individualni pogledi temeljeni na zajedničkom jeziku





Investigator - Introscope Workstation [Admin@localhost:5087]

Workstation Edit Manager Properties Viewer Help

Live Historical Last Hour

Overview Traces Errors Search

Application Name	User	VM	Backend Summary	gary gary--1521 (Ora...	piglet (DB-2 DB)
/bookstore-App					
/calendarA-PP					
/catalogApp					
/payrollApp					
/tradeApp					

Time...	Color	Appli...	Isolated To	What's Interesting
20:02:...	Red	All	VM	The Agent WebLogic_domain has disconnected
20:03:...	Red	/trade...	VM	The host's aggregate CPU utilization is unusual. The current value is 54, while ...
20:03:...	Red	/calend...	VM	The host's aggregate CPU utilization is unusual. The current value is 54, while ...
20:03:...	Red	/bookst...	VM	The host's aggregate CPU utilization is unusual. The current value is 54, while ...
20:03:...	Red	/payroll...	VM	The host's aggregate CPU utilization is unusual. The current value is 54, while ...
20:03:...	Red	/catalo...	VM	The host's aggregate CPU utilization is unusual. The current value is 54, while ...
20:04:...	Yellow	/trade...	User	The number of errors in /tradeApp's User tier is unusual. The current value is 9...
20:04:...	Yellow	/catalo...	User	The number of errors in /catalogApp's User tier is unusual. The current value is ...

The host's aggregate CPU utilization is unusual.  
The current value is 54, while the typical value is 5.

91 events found

# Laka navigacija kroz tisuće parametara za brzu *root-cause* analizu

Investigator - Introscope Workstation [Admin@localhost:5087]

Workstation Edit Manager Properties Viewer Help

Live Historical Last Hour

- \*SuperDomain\*
- Custom Metric Host (Virtual)
- HP88521308290
  - WebLogic
    - WebLogic\_domain (\*SuperDomain\*)
      - Java Version
      - Launch Time
      - ProcessID
      - Virtual Machine
      - Agent Stats
      - Backends
      - BlamedMethodTimer
      - CPU
        - Processor Count
        - Utilization % (process)
        - Processor 0
        - Processor 1
        - Processor 2
        - Processor 3
      - EJB
      - ExceptionHandler
      - File System
      - Frontends
        - Apps
          - /bookstoreApp
            - Average Response Time (ms)
            - Concurrent Invocations
            - Errors Per Interval
            - Responses Per Interval
            - Stalled Transaction Count
            - Heuristics
              - User
              - VM
            - Backends
              - gary gary-1521 (Oracle DB)
              - ninet (DR2 DR)

Overview Traces Errors Search

Timestamp	Duration (ms)	Description	UserID
20:03:55.363 (27 Mar 2006)	203032	/catalogApp/ExecutorServlet_2	
19:55:47.329 (27 Mar 2006)	204016	/calendarApp/ExecutorServlet_2	

Summary View Trace View Tree View

Agent: \*SuperDomain\*|HP88521308290|WebLogic|WebLogic\_domain  
Timestamp: 03/27/06 19:55:47 PST  
Duration: 204016 ms

Component Details

**Identification**

Type: JDBC

Name: CALL JAVASLEEP (?)

Path: JDBC | SQL | Dynamic | Query | CALL JAVASLEEP (?)

**Properties**

Dynamic SQL: CALL JAVASLEEP (?)

**Performance**

Duration: 201751 ms

Timestamp (relative): 2265 ms

99% of total transaction time

# Pregled grešaka po aplikaciji, komponenti ili URL-u

Investigator - Introscope Workstation [Admin@localhost:5087]

Workstation Edit Manager Properties Viewer Help

Live Historical

\*SuperDomain\*

- Custom Metric Host (Virtual)
- HP88521308290
  - WebLogic
    - WebLogic\_domain (\*SuperDomain\*)
      - Java Version
      - Launch Time
      - ProcessID
      - Virtual Machine
      - Agent Stats
      - Backends
      - BlamedMethodTimer
      - CPU
      - EJB
      - ExceptionReporter
      - File System
      - Frontends
        - Apps
          - /bookstoreApp
            - Average Response Time (ms)
            - Concurrent Invocations
            - Errors Per Interval
            - Responses Per Interval
            - Stalled Transaction Count
            - Heuristics
              - User
              - VM
            - Backends
              - gary gary-1521 (Oracle)
              - piglet (DB2 DB)
              - gary gary-1521 (Oracle)
                - piglet (DB2 DB)
                - User
                - VM
              - URLs
            - /calendarApp

Overview Traces Errors Search

Timestamp	Description	Error Message
20:10:36.928 (27 Mar 2006)	Frontends	ExceptionHandler[ExceptionHandler]doWork: java.sql.SQLEx...
20:10:36.928 (27 Mar 2006)	Frontends	ExceptionHandler[ExceptionHandler]doWork: java.sql.SQLEx...
20:10:36.928 (27 Mar 2006)	Frontends	Stalled Transaction
20:10:36.928 (27 Mar 2006)	Frontends	ExceptionHandler[ExceptionHandler]doWork: java.sql.SQLException: My custom sql exception!
20:10:36.928 (27 Mar 2006)	Frontends	Stalled Transaction
20:10:36.928 (27 Mar 2006)	Frontends	ExceptionHandler[ExceptionHandler]doWork: java.sql.SQLEx...
20:10:36.928 (27 Mar 2006)	Frontends	ExceptionHandler[ExceptionHandler]doWork: java.sql.SQLEx...
20:10:36.959 (27 Mar 2006)	Frontends	Stalled Transaction

Agent: \*SuperDomain\*|HP88521308290|WebLogic|WebLogic\_domain  
Timestamp: 03/27/06 20:10:36 PST  
Duration: 94 ms

**Error at 20:10:36.928 (27 Mar 2006)**

- Frontends | Apps | /catalogApp | URLs | Default (0 ms)
  - Application Name: /catalogApp
  - Context Path: /catalogApp
  - Method: service
  - Normalized URL: Default
  - Scheme: http
  - Server Name: localhost
  - Server Port: 7010
  - Thread Group Name: Thread Group for Queue: 'weblogic.kernel.Default'
  - Thread Name: ExecuteThread: '11' for queue: 'weblogic.kernel.Default'
  - Trace Type: ErrorSnapshot
  - URL: /catalogApp/ExecutorServlet\_2
  - URL Query: Workload=Av&app=po2
  - HttpRequest.header.User-Agent: Java/1.5.0\_06
- Servlets | ExecutorServlet\_2 (0 ms)
  - BlamedMethodTimer | ExceptionThrower | doWork (94 ms)
    - Error Message: ExceptionReporter[ExceptionHandler]doWork: java.sql.SQLException: My custom sql exception!
    - Exception: java.sql.SQLException: My custom sql exception!
    - Method: doWork

# Implementacija u T-Mobile okolini

- Tibco BusinessWorks
- Tibco EMS
- Tibco Hawk
- Oracle AS
- Apache Tomcat
  
- Sun Solaris
- MS Windows Server



ORACLE®



Apache Tomcat

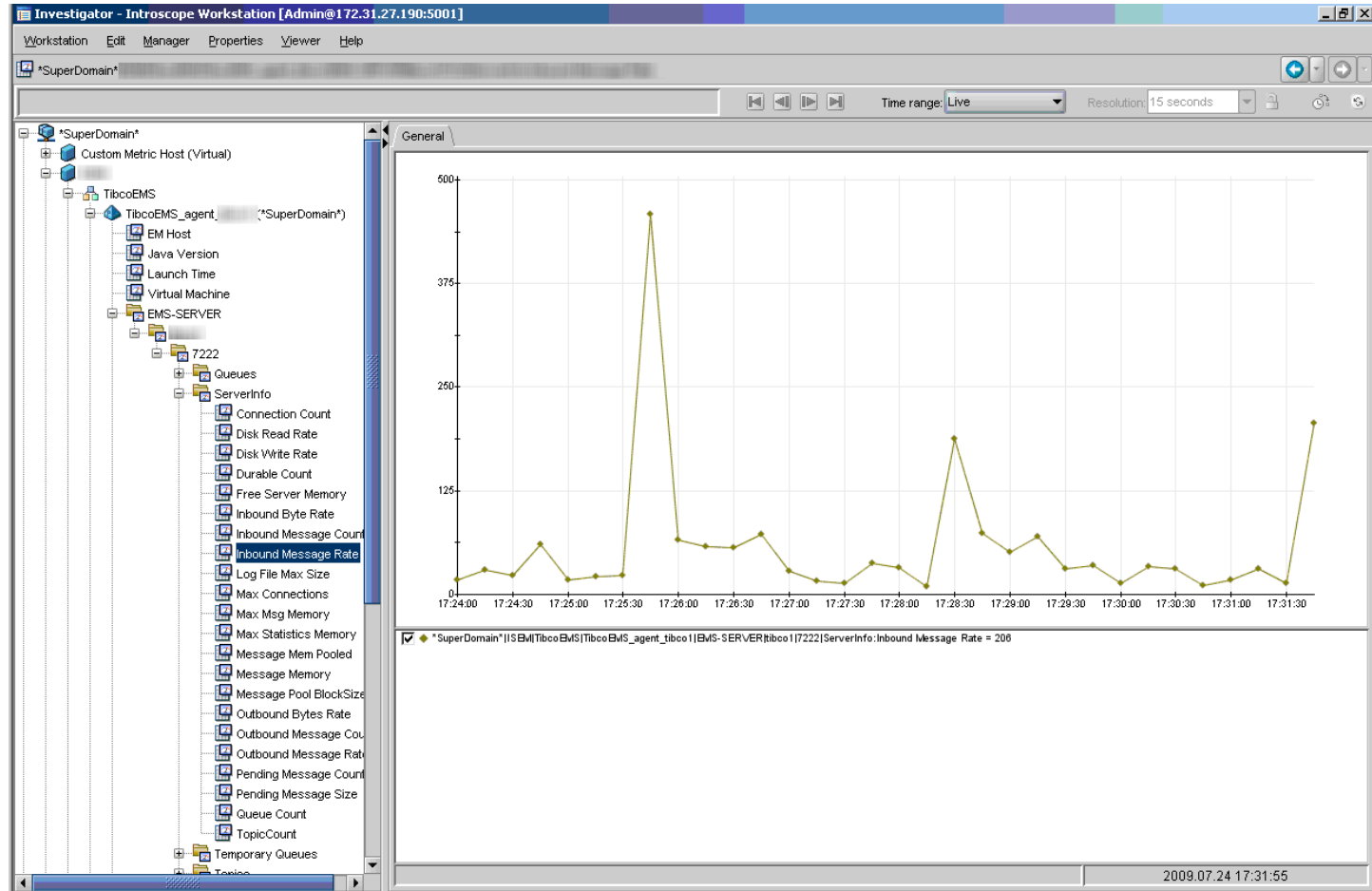


- **Praćenje stanja, alarmiranje u slučaju zastoja/pada performansi, *root-cause* dijagnostika, trend analiza za:**
  - kritične poruke u *redovima* na Tibco EMS-u
  - unutarnje komponente TibcoBW procesa u sklopu *workflow*-a pojedinih aplikacija
  - Web aplikacije na Oracle AS-u i Tomcatu pod zajedničkim nazivima WebPOS i MCOM

- **CA Wily Introscope**

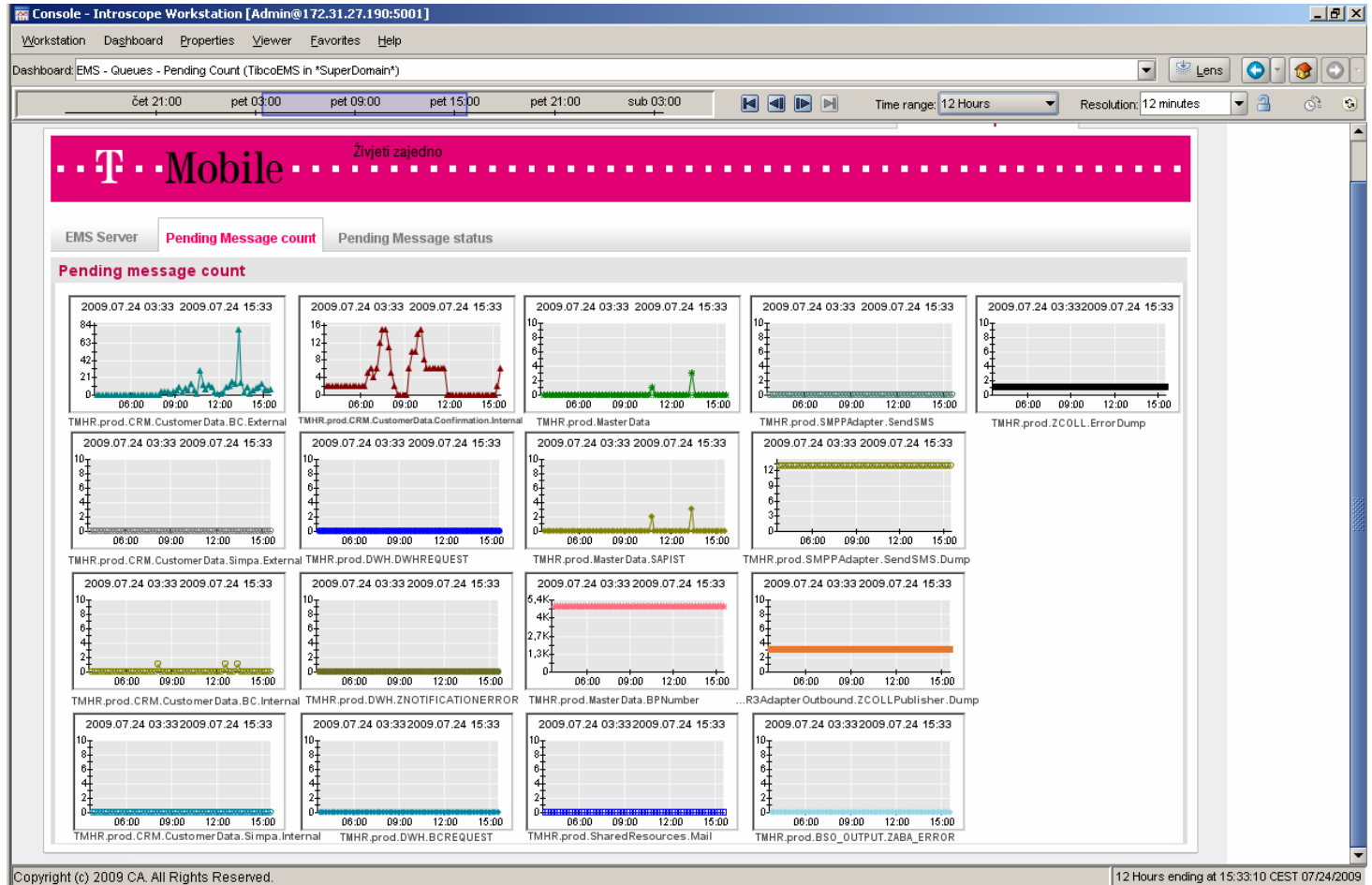
- TibcoEMS monitor – dohvaćanje metrika s EMS servera
- TibcoBW Power Pack – instrumentacija TibcoBW procesa, dohvaćanje metrika internih metoda, prikaz po TibcoBW objektima, prikaz i korelacija transakcije između procesa
- JavaAgent – instrumentacija aplikacija unutar JVM-a OracleAS-a i Tomcat-a, dohvaćanje internih metrika, vizualizacija upita kroz aplikaciju
- Zajednička korelacija svih metrika

# Stanje servera





# Pregled stanja poruka u kritičnim *redovima*



# Tibco objekti - metrike



The screenshot shows the Tibco Investigator - Introscope Workstation interface. The left pane displays a hierarchical tree view of objects under the domain '\*SuperDomain'. The right pane shows a table of metrics for the process '/ProcessesStarter/VADChangeCustomerStatus'.

**Tree View Structure:**

- SOAP
- Servlets
- Sockets
- Threads
- Tibco
  - Activities
    - AE
    - Error Handling
    - Flow
    - JMS
    - Processes
    - SOAP
  - Activity Groups
  - ProcessGroup
  - Events
    - ProcessesStarter.tmhrChangeCustomerStatus.process
    - ProcessesStarter.tmhrChangeVoucherStatus.process
    - ProcessesStarter.tmhrCustomerDetails.process
    - ProcessesStarter.tmhrRechargeVoucher.process
    - ProcessesStarter.tmhrVoucherDetails.process
  - Job
    - Active Jobs
    - Completed Jobs
    - Created Jobs
    - Inactive Jobs
    - Jobs Created Per Hour
    - Monitored Jobs
    - Running Jobs
    - Total Monitored Jobs
    - Creation
  - Execution
    - SuperDomain
    - Tibco-Bw
    - Tibco
    - Job: Total Monitored Jobs
  - Invocation
  - Job Pool
  - RV
  - SOAP-X
  - UDP
  - WebServices

**Metric Table:**

Operations	Avera...	Concurre...	Errors Pe...	Respons...	Stall Count
/ProcessesStarter/VADChangeCustomerStatus	1993	1	0	4	0

Time range: 2 Hours  
Resolution: 2 minutes  
2 Hours ending at 17:32:48 CEST 07/24/2009

# Korelacija transakcija kroz više procesa



The screenshot displays the Tibco Introscope Workstation interface. The left pane shows a hierarchical tree view of the system architecture, including SuperDomain, Custom Metric Host (Virtual), Tomcat, and Tibco-Bw. The right pane shows a list of events with columns for Timestamp, Duration (ms), Description, and UserID. A specific event is selected, and its details are shown in the Summary View, including a timeline of the transaction flow.

Timestamp	Duration (ms)	Description	UserID
Fri Jul 24 11:22:21 CEST 2...	292	Backends/WebServices at http-//sc...	
Fri Jul 24 11:22:21 CEST 2...	324	HTTP Communication Inbound	
Fri Jul 24 11:22:21 CEST 2...	16	Tibco Job Execution	
Fri Jul 24 11:22:21 CEST 2...	33	Tibco Job Execution	
Fri Jul 24 11:22:25 CEST 2...	11	Tibco Job Execution	
Fri Jul 24 11:22:25 CEST 2...	219	Backends/WebServices at http-//sc...	
Fri Jul 24 11:22:25 CEST 2...	252	HTTP Communication Inbound	
Fri Jul 24 11:22:25 CEST 2...	18	Tibco Job Execution	

Summary View: Trace View | Tree View  
Agent: \*SuperDomain\*  
Timestamp: 07/24/09 11:22:25 CEST  
Duration: 252 ms

Timeline: 0 ms to 250 ms. Key events include HTTP|Communication|Inbound and Backends|HTTP|Communication|Outbound|executeMethod.

Trace Type: Normal  
235 events found | 12 Hours ending at 17:32:48 CEST 07/24/2009

**Performanse BW procesa grupiranih po poslovnim procesima**



Console - Introscope Workstation [Admin@172.31.27.190:5001]

Workstation Dashboard Properties Viewer Favorites Help

Dashboard: Tibco Overview CRM (Tibco-Monitoring CRM in \*SuperDomain\*)

Time range: Live Resolution: 15 seconds

**TIBCO - Overview**

Živjeti zajedno **CRM**

TIBCO Overview TIBCO Flow TIBCO Jobs Web Services TIBCO Communication Resources

**TIBCO Frontend**

**System Utilization**

**Incoming Requests Response Time**

**Jobs**

Active Jobs: 132 / 148.2

Running Jobs: 0 / 5

**TIBCO Error Handling**

TIBCO Engine Errors:

SOAP Faults:

Activity Errors:

Communication Errors:

Error Count: 0 / 5

**Backend**

Average Backend Response Time

DB:

HTTP/SOAP:

JMS:

**Resources**

CPU:  Memory:  File System:

**Activities**

AE: <input checked="" type="radio"/>	FTP: <input type="radio"/>	Java Plugin: <input type="radio"/>
Command Execution: <input type="radio"/>	HTTP: <input type="radio"/>	JDBC: <input checked="" type="radio"/>
Context: <input type="radio"/>	Mail: <input type="radio"/>	JMS: <input checked="" type="radio"/>
Processes: <input checked="" type="radio"/>	Parse: <input type="radio"/>	Activity Groups: <input checked="" type="radio"/>
Error Handling: <input checked="" type="radio"/>	RV: <input type="radio"/>	Signal: <input type="radio"/>
File: <input type="radio"/>	TCP: <input type="radio"/>	SOAP: <input checked="" type="radio"/>
Flow: <input checked="" type="radio"/>	Inconcert: <input type="radio"/>	XML: <input checked="" type="radio"/>

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# Tibco Workflow prikaz



The screenshot displays the Tibco Investigator - Introscope Workstation interface. The main window is titled "Investigator - Introscope Workstation [Admin@172.31.27.190:5001]". The interface is divided into several panes:

- Left Pane:** A tree view showing the system hierarchy. Under "ISEM", there are folders for "Tomcat" and "Tibco-Bw". The "Tibco-Bw" folder is expanded, showing sub-items like "EM Host", "Java Version", "Launch Time", "ProcessID", "Virtual Machine", "Agent Stats", "CPU", "File System", "GC Heap", "Heuristics", "Host", "Threads", "Tibco", and "XML".
- Top Pane:** A timeline showing time intervals: "čet 21:00", "pet 03:00", "pet 09:00", "pet 15:00", "pet 21:00", and "sub 03:00". The "pet 15:00" interval is selected. The "Time range" is set to "12 Hours" and "Resolution" is "12 minutes".
- Table Pane:** A table with columns: "Trace...", "Domain", "Host", "Process", "Agent", "Timestamp", "Duration", "Request", and "User". It lists several manual traces from "SuperDomain\*" on host "Tibco-Bw".
- Workflow Diagram Pane:** A detailed workflow diagram titled "Workflow: HTTP|Communication|Inbound - HTTP|Communication|Inbound". It shows a sequence of steps represented by icons, connected by arrows. A blue box highlights a specific section of the workflow.
- Properties Pane:** Located at the bottom right, it shows details for the selected step: "Method: eval", "Duration: 257 ms", and "Timestamp: Fri Jul 24 11:22:33 CEST 2009".

# Različite verzije Tomcata i Java

Investigator - Introscope Workstation [Admin@172.31.27.190:5001]

Workstation Edit Manager Properties Viewer Help

SuperDomain [Tomcat]

14:00 14:30 15:00 15:30 16:00 16:30 17:00 17:30 18:00 18:30 19:00 19:30

Time range: 2 Hours Resolution: 2 minutes

Overview Traces Errors Search Metric Count

Application Name	User	VM	Backend Summary	...	...	...
...						
...						

Timestamp	State	Application	Isolated To	What's Interesting
16:14:45.271 (24...				The average response time (ms) in
16:25:45.281 (24...				The average response time (ms) in

2 events found

2 Hours ending at 17:32:48 CEST 07/24/2009

# Prikaz stanja - *dashboard*



Console - Introscope Workstation [Admin@172.31.27.190:5001]

Workstation Dashboard Properties Viewer Favorites Help

Dashboard: MCOM Overview (WebPos in \*SuperDomain\*)

Time range: Live Resolution: 15 seconds

### MCOM - overview

Živjeti zajedno

**MCOM overview** Frontend vs Backend Resources

**Frontend**

**Applications**

- Application 1
- Application 2
- Application 3
- Application 4
- Application 5
- Application 6

**Resources**

- CPU
- Memory

per JVMs

**Servers total CPU %**

**Average Response Time (ms)**

**Errors per interval**

**Backends**

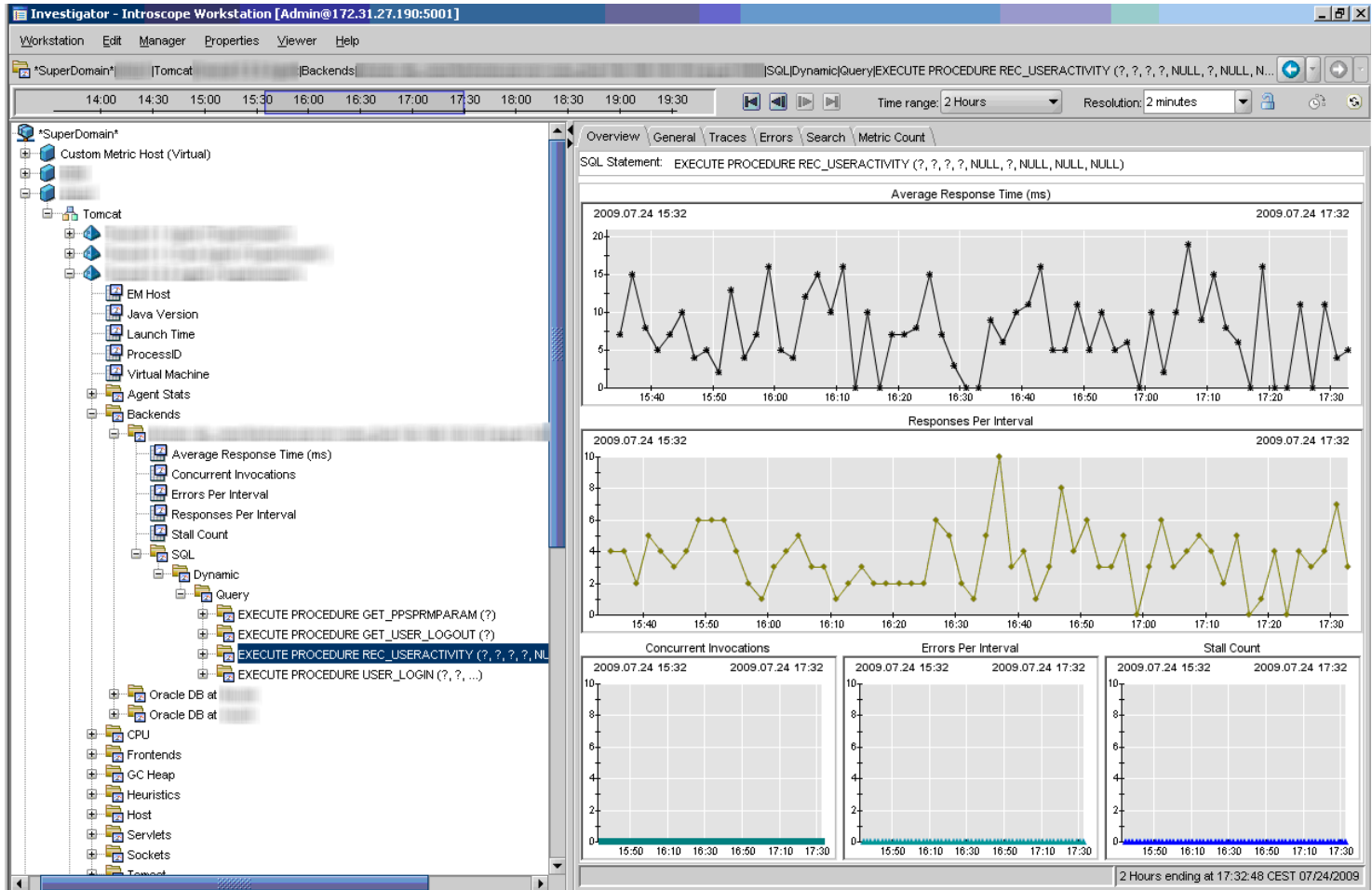
**Average Response Time (ms)**

**Utilization (responses per interval)**

**Stall count**

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# Performanse poziva procedure





# Prikaz stanja - *dashboard*



Console - Introscope Workstation [Admin@172.31.27.190:5001]

Workstation Dashboard Properties Viewer Favorites Help

Dashboard: WebPOS Overview (WebPos in \*SuperDomain\*)

Time range: Live Resolution: 15 seconds

**T-Mobile** Živjeti zajedno

WebPOS overview Internal External Resources

### Frontend - Internal

Applications

- WebPos
- Scoring@SuperDomain
- Scoring@SuperDomain
- Logoff@T-Mobile

Average Response Time (ms)

Utilization (responses per interval)

### Frontend - External

Applications

- WebPos
- WebCT\_Web
- WebCT\_Web
- WebCT\_Web

Average Response Time (ms)

Utilization (responses per interval)

### Resources

CPU

Memory

per JVMs

Servers total CPU %

### Backends

Average Response Time (ms)

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- optimiziranje konfiguracije aplikacijskog servera
- provjera pojedinih sporijih SQL upita, postavljanje indexa i provjera optimizacije
- praćenje JVM heap potrošnje po pojedinim dijelovima (permanent, old & new generation)



# Q/A