3tier Oracle Applications monitoring and diagnostics

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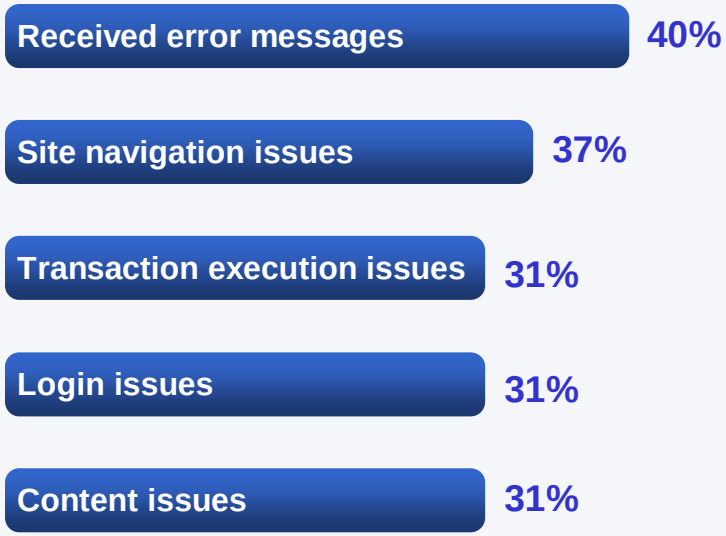
Challenges Supporting User Experience

- Discovering problems ***after*** being notified by the end user, help desk, or executives.
- Limited ability to understand declining end user conversion / adoption / usability
- Inability to reproduce or diagnose the end user's problem as reported by the help desk.
- Interrogating users as a means of diagnosis

The Negative End-User Experience

From a customer perspective, the site is “down” whenever it does not work as expected.

Top online transactions troubles

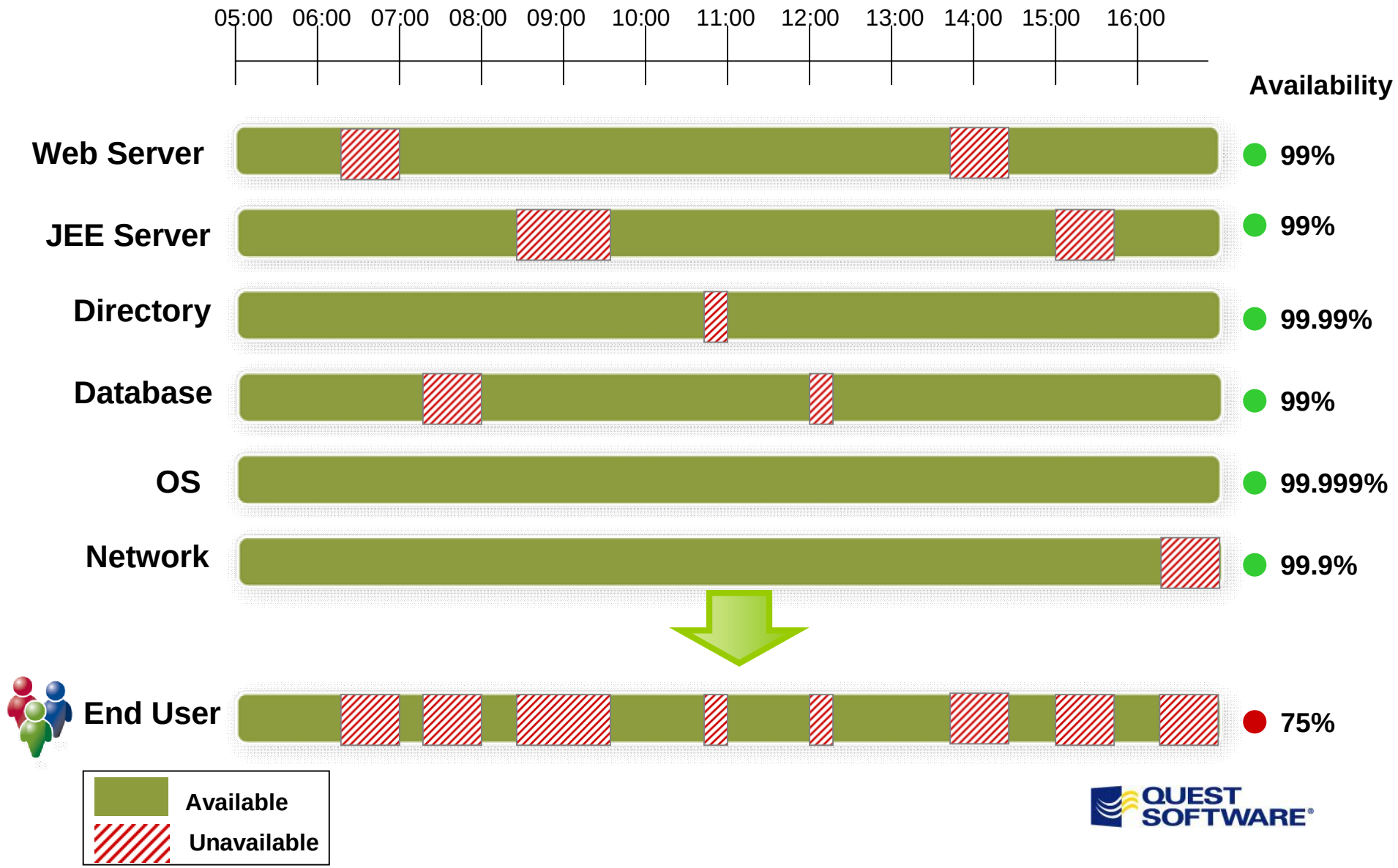


89% of those surveyed had problems with online transactions

Source: USA Today Snapshot, 2006

- It’s more than just performance:
  - Content effectiveness
  - Site Navigation
  - Business process & transactions

Holistic View of Performance



Capabilities

Application Analysis
- Which application is having a problem?
- What are the usage trends of an application?
- What is the root cause of an application issue?

User Behavior
- Where are my users coming from?
- Which users are having problems?
- What did the user do during their session?

User Experience Management

Transaction Diagnostics
- Which transactions are the slowest?
- What is causing the problem?
- What does a transaction path look like?

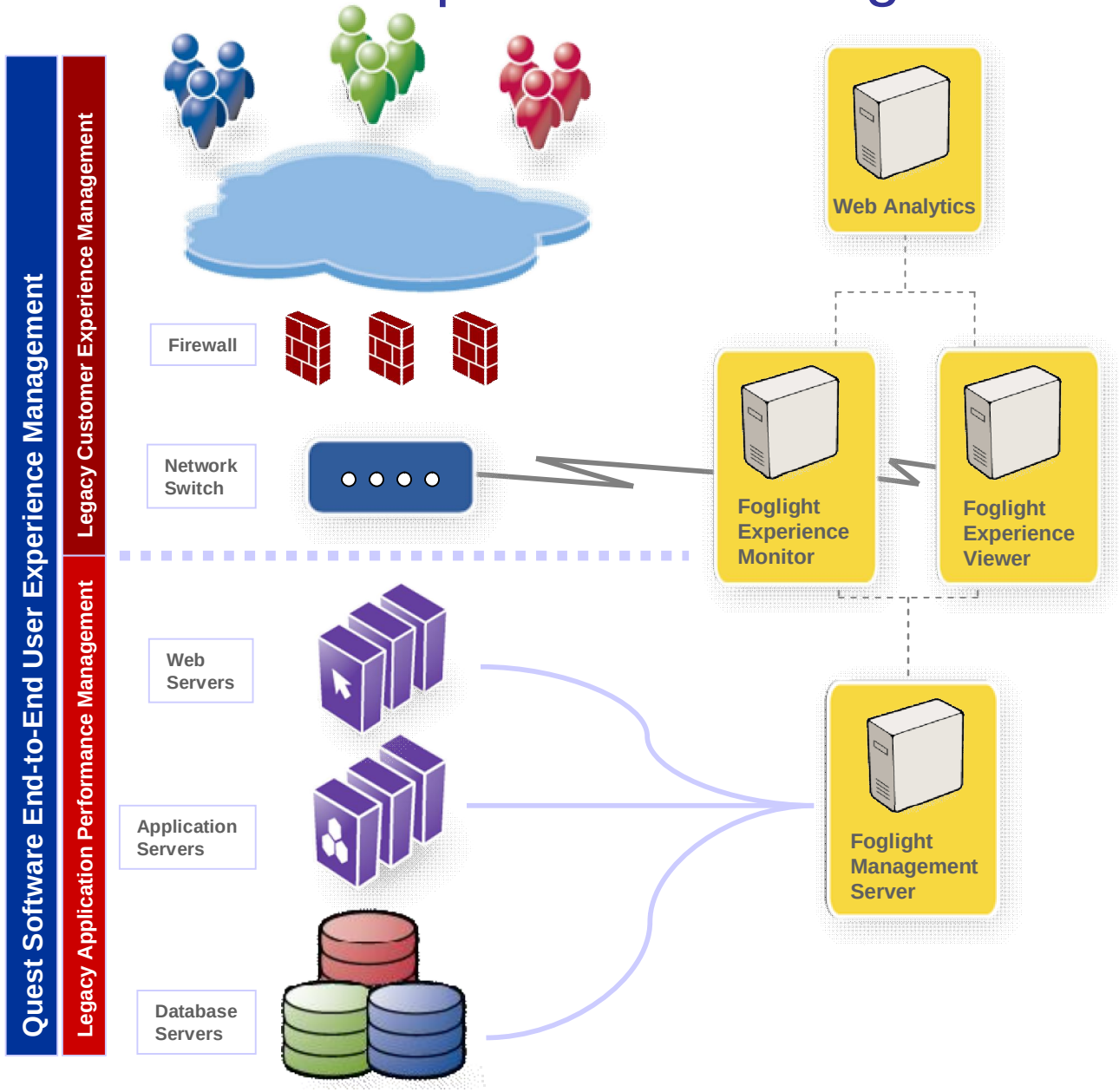
Content Analysis
- What are the slowest content types?
- What are the typical navigation paths?
- What did my users actually see?

Web Site Diagnostics
- How much time do users spend on the site?
- What volume of traffic is generated?
- What is the page performance of the site?

Web Services Performance
- What is the performance of a Web service?
- What was the success rate for Web service calls?
- What volume of traffic is generated by the Web service?

Infrastructure Analysis
- What is the performance by protocol?
- What is the volume of traffic across the protocol?
- How is the HTTP server performing?

User Experience Management Workflow



Web Analytics

- Path analysis and usage ***at an aggregate level***
- Conversion rates, abandonment, cost per click
- How effective are marketing campaigns
- How effective are design changes

Deeper Analysis

User Experience Management

- Individual ***session analysis and replay***
- Content analysis vs. URL analysis
- Detailed application-centric analysis
- Integration into IT Operational Data
- Plug-and-play, no scripting or page-tagging

Deeper Analysis

App Performance Management

- Detailed ***IT operational data*** providing for SLAs and capacity planning reporting
- Monitor the availability of each component of application stack providing service
- Ability to instrument application for further diagnosis at code or SQL level
- Performance focused monitoring

2 types of application, 2 types of approaches

- Web (http, https, soap)
  - Session capture
- J2EE
  - Transaction tracing

Web type

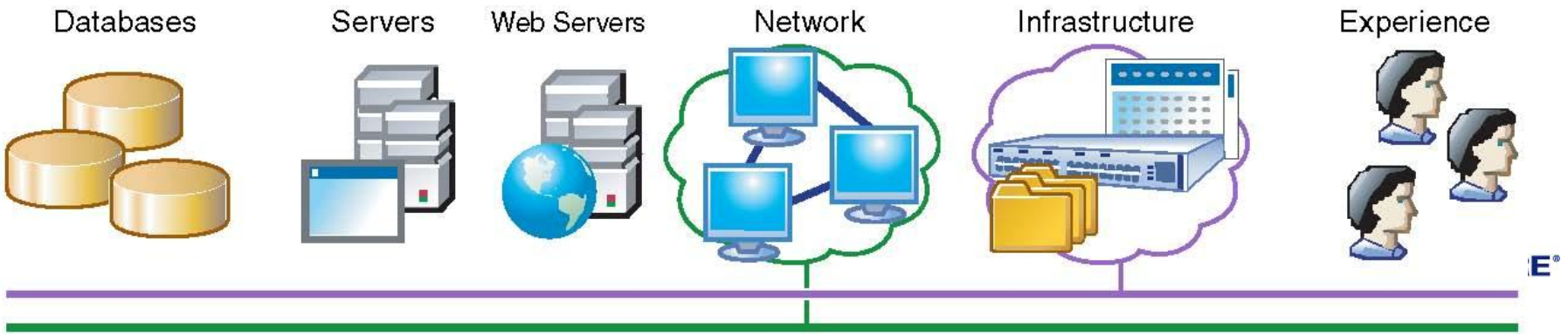
Problems supporting End Users

- Administrators are notified of web problems by the end user, help desk, or executives
- Web application usage: conversion and adoption rates fluctuate with limited ability to understand the reason
- The help desk cannot reproduce the end user's problem
- Users are being **interviewed** as a means of diagnosis

- The result is a *negative* end-user experience with real business impact:
  - Lost revenues/productivity
  - Increased support costs
  - Damaged brand/reputation

Identify the four “Ws”

When there is a problem—as indicated by poor end user response times
Where the problem occurs—as indicated by end user response times for client, network and backend processing as well as the application infrastructure tiers monitoring
What is causing the problem—by mapping it to the metrics collected for the end users as well as those collected within the application infrastructure tiers
Who is causing (or affected by) the problem—investigating specific end user (locations) activities when needed



Initiatives to Solve These Problems – first part

- Administrators are notified of web problems by the end user, help desk, or executives
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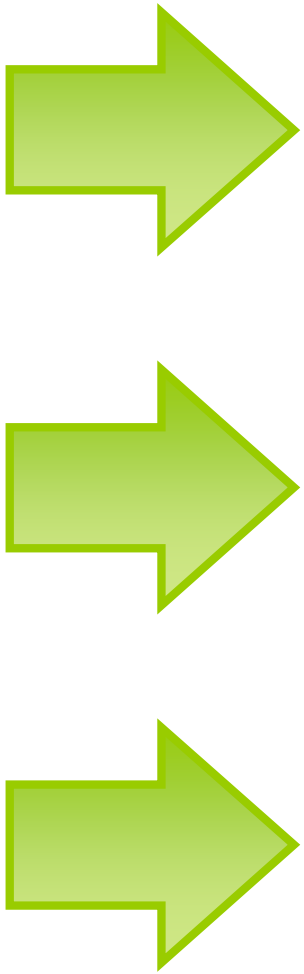


Transaction Simulation

Real User Experience

Real User Content Capture

E2E - technical transaction…

"Transaction" is taking longer than 3 seconds

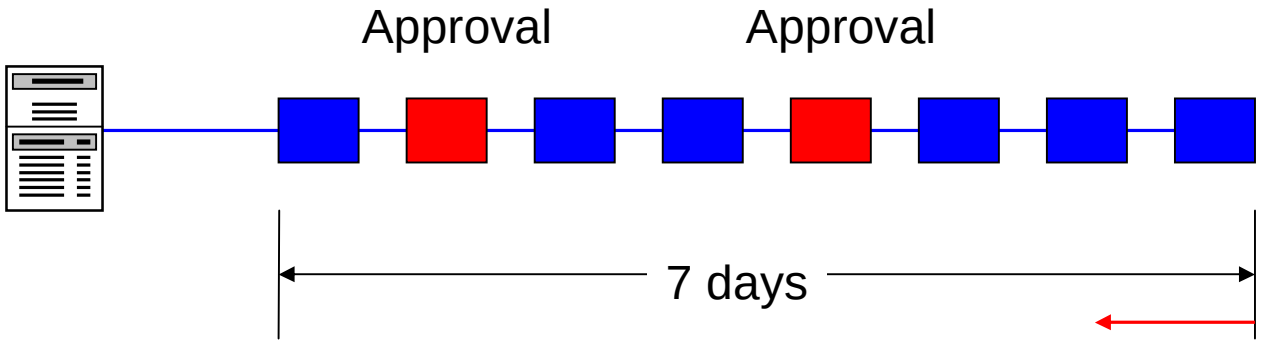
Time Line
1 Second
1 Minute
1 Hour
1 Week
1 Month

```
SELECT id_flex_code,
       id_flex_num,
       application_column_name,
       segment_name,
       segment_num,
       decode(application_column_index_flag,
              'Y', 'Indexed',
              'N', 'No Index',
              application_column_index_flag)
  FROM fnd_id_flex_segments
 WHERE application_id = :B1
   and id_flex_num = :B2
   and enabled_flag = :B3
 ORDER by id_flex_num, segment_num;
```

Bind	Type	Value
B1	Number	101
B2	Number	101
B3	Varchar(2)	Y

- Code tuning in production fixes symptom not cause
- User behaviour – huge reports

E2E - business transaction…

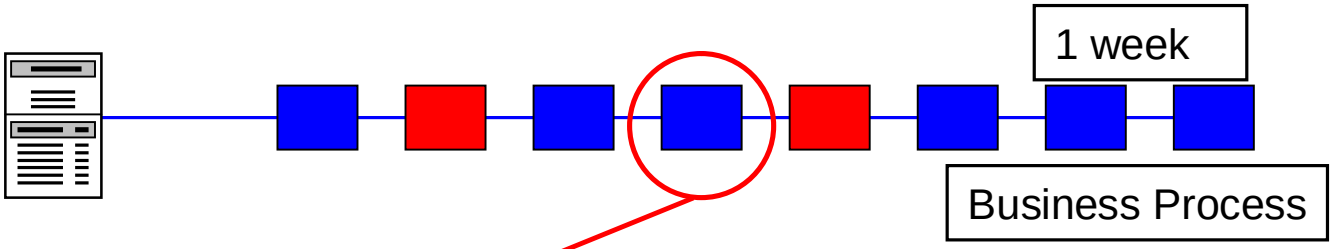


Time Line
1 Second
1 Minute
1 Hour
1 Week
1 Month

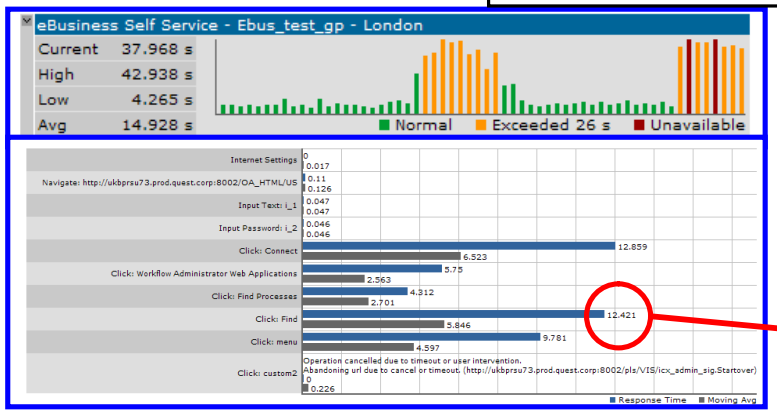
Business Activity:
User “A” approves all orders over £x and all expense claims over £y (approval bottleneck)

Deferred Processes:
Item Z is deferred based on a “guessed” resource usage where as its actual usage is very small

E2E – a complete perspective



1 minute/1 hour

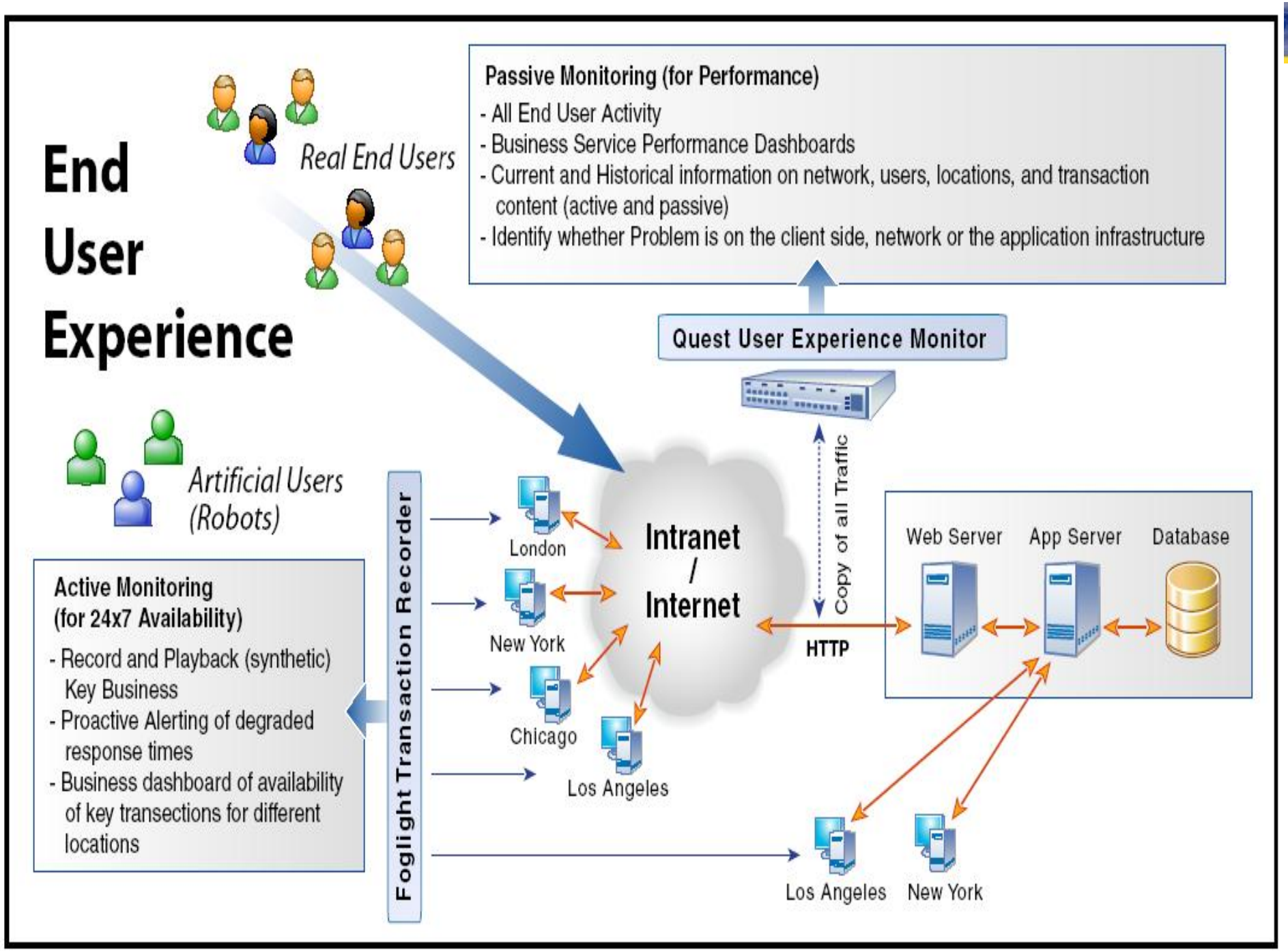


End User – SLA / Diagnostic

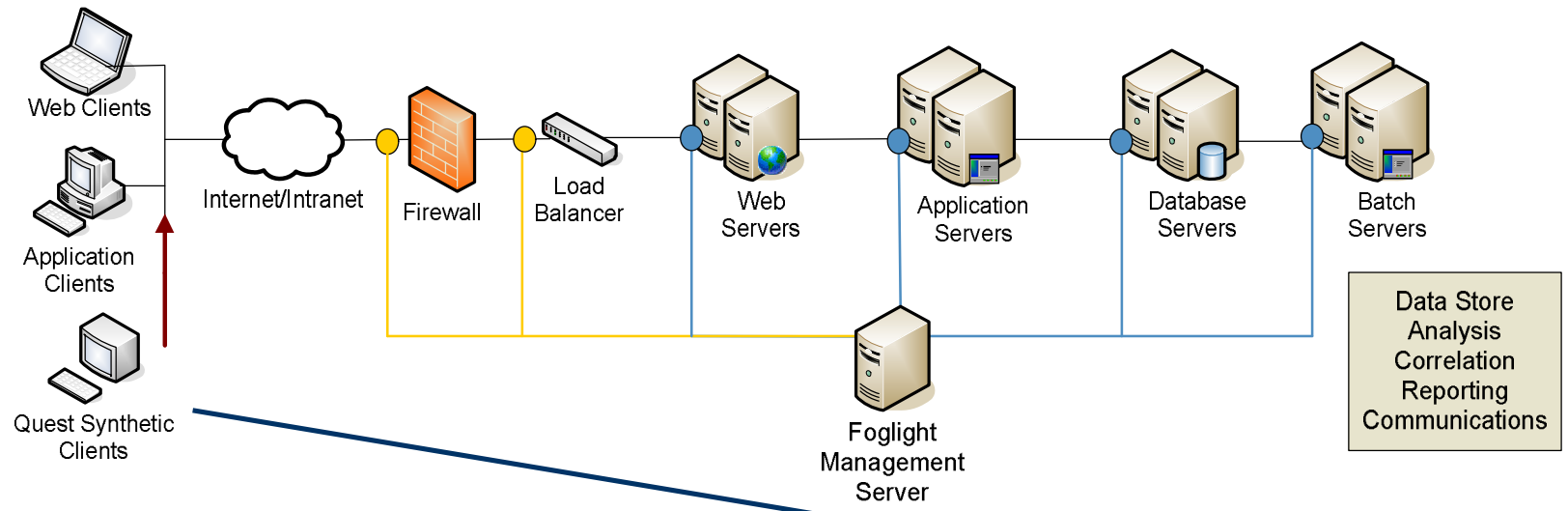
1 second

```
SELECT id_flex_code,
       id_flex_num,
       application_column_name,
       segment_name,
       segment_num,
       decode(application_column_index_flag,
                    'Y', 'Indexed',
                    'N', 'No Index',
                    application_column_index_flag)
  FROM fnd_id_flex_segments
 WHERE application_id = :B1
   and id_flex_num = :B2
   and enabled_flag = :B3
 ORDER by id_flex_num, segment_num;
```

Technical - Resolution


End User Experience
Real End Users
Artificial Users (Robots)
Passive Monitoring (for Performance)
- All End User Activity
- Business Service Performance Dashboards
- Current and Historical information on network, users, locations, and transaction content (active and passive)
- Identify whether Problem is on the client side, network or the application infrastructure
Quest User Experience Monitor
Copy of all Traffic
Active Monitoring (for 24x7 Availability)
- Record and Playback (synthetic) Key Business
- Proactive Alerting of degraded response times
- Business dashboard of availability of key transections for different locations
Foglight Transaction Recorder
London
New York
Chicago
Los Angeles
Intranet / Internet
HTTP
Web Server
App Server
Database
Los Angeles
New York

Quest EUM: User Simulation



What It Is

- Foglight Transaction Recorder

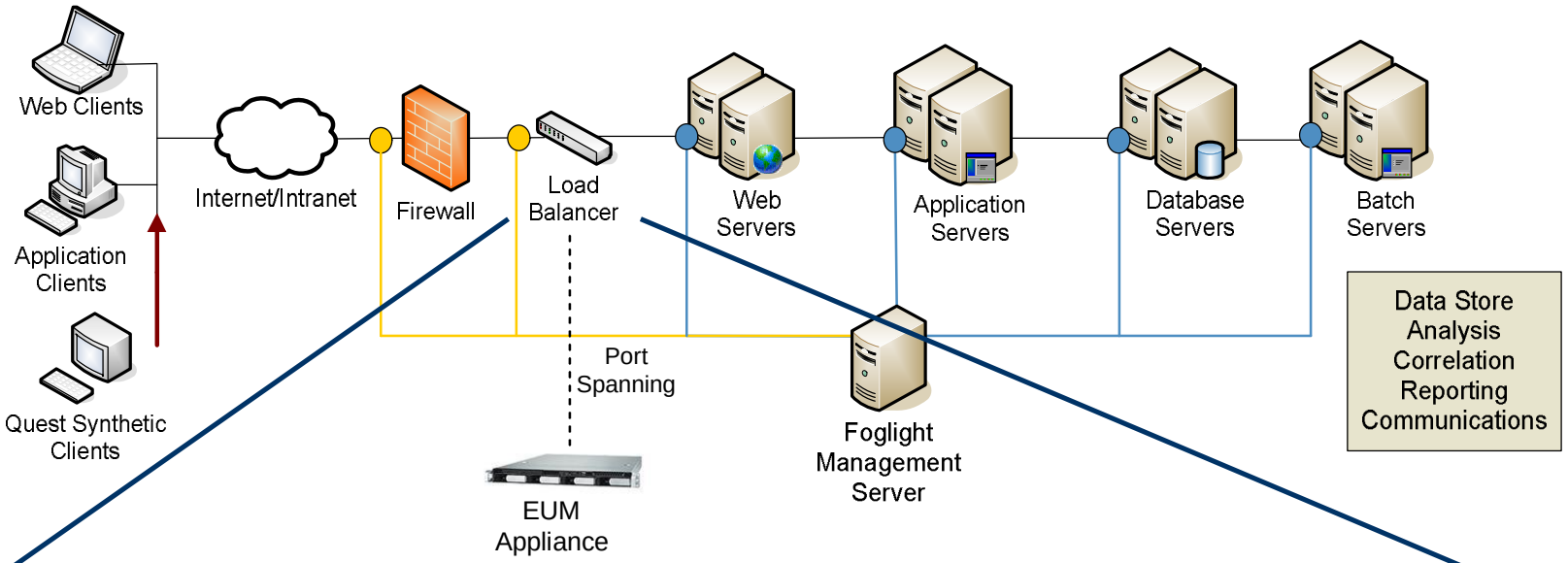
How It Works

- Robots that generate synthetic transactions run at various intervals and geographic locations
- Availability information is captured by Foglight Management Server

Capabilities

- Web and Rich clients
- Performance timings for each transaction step
- Visualize real transactions next to synthetics
- Compare CPU, Memory, Perf.

Quest EUM: Real User Monitoring



What It Is

- Foglight Experience Monitor
- Foglight Web Services Monitor

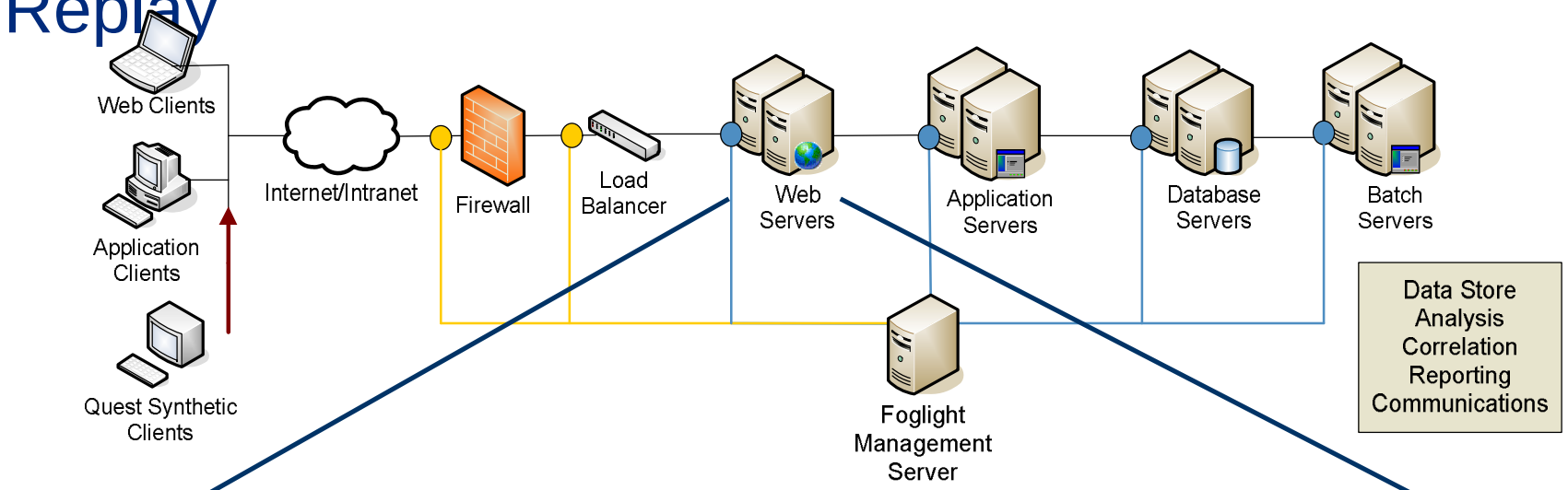
How It Works

- A Quest appliance monitors real Web end user response times
- Measures browser-switch and round trip data center times

Capabilities

- Web and Web Services traffic
- Track transaction timings for each end user in sequence
- Break down transaction times to each hit element
- Detailed metrics by user

Quest EUM: HTML Session Capture & Replay



What It Is

- Foglight Experience Viewer

How It Works

- Quest plug-ins and appliance store the HTML views for every HTML end user in real time for immediate playback
- Foglight Experience Monitor timings correlated with session replay in management server

Capabilities

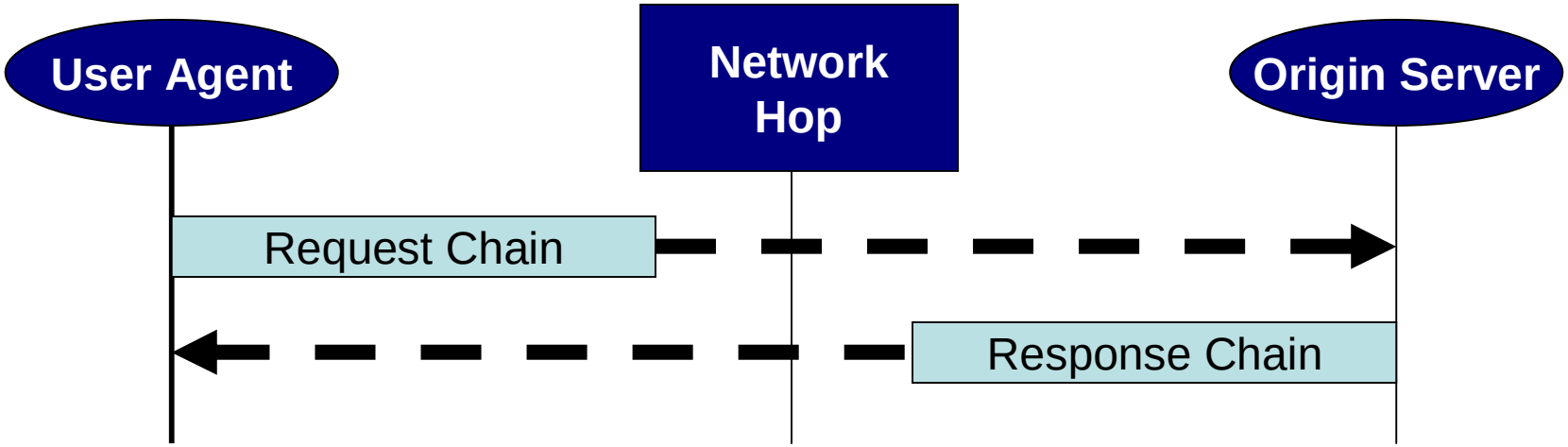
- HTML session replay, Tivo for the Web
- Real time, do not have to wait for end user transactions to complete before replay

How we do it?
HTTP defined

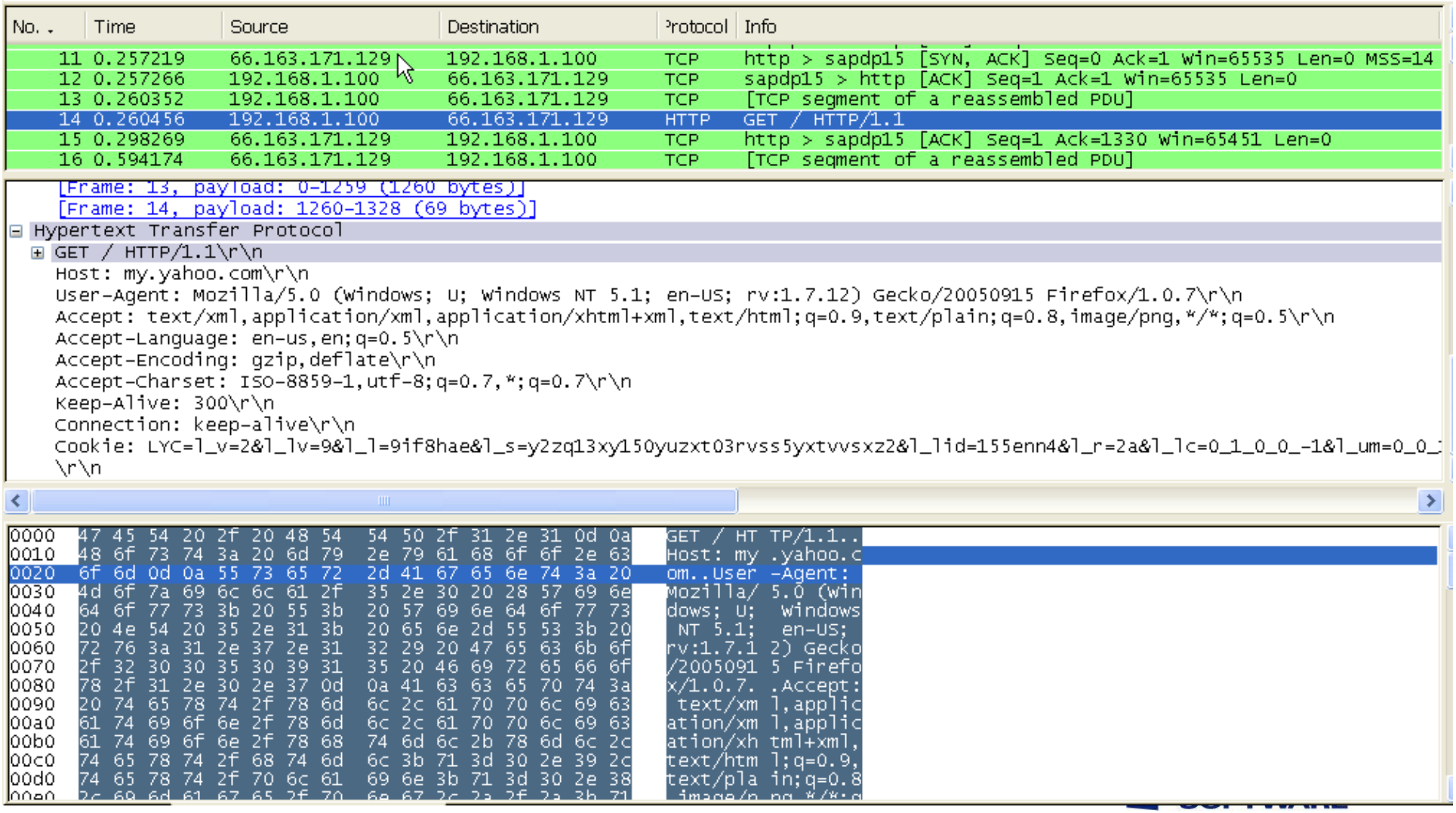
- Standard protocol used by the World-Wide Web initiative since 1990
- HTTP stands for Hypertext Transfer Protocol
- The current version of the HTTP/1.1
- The full definition for HTTP/1.1 is published as: http://www.w3.org/Protocols/HTTP/1.1/rfc2616.pdf
- Overall Operation (Request response protocol)
  - Client sends a request in the form of a URI (Uniform Resource MIME-like message and response code for the corresponding Identifier) followed by message and content
  - Server responds with a similar request

HTTP Request/Response Chain

Basic Request



Typical HTTP Request

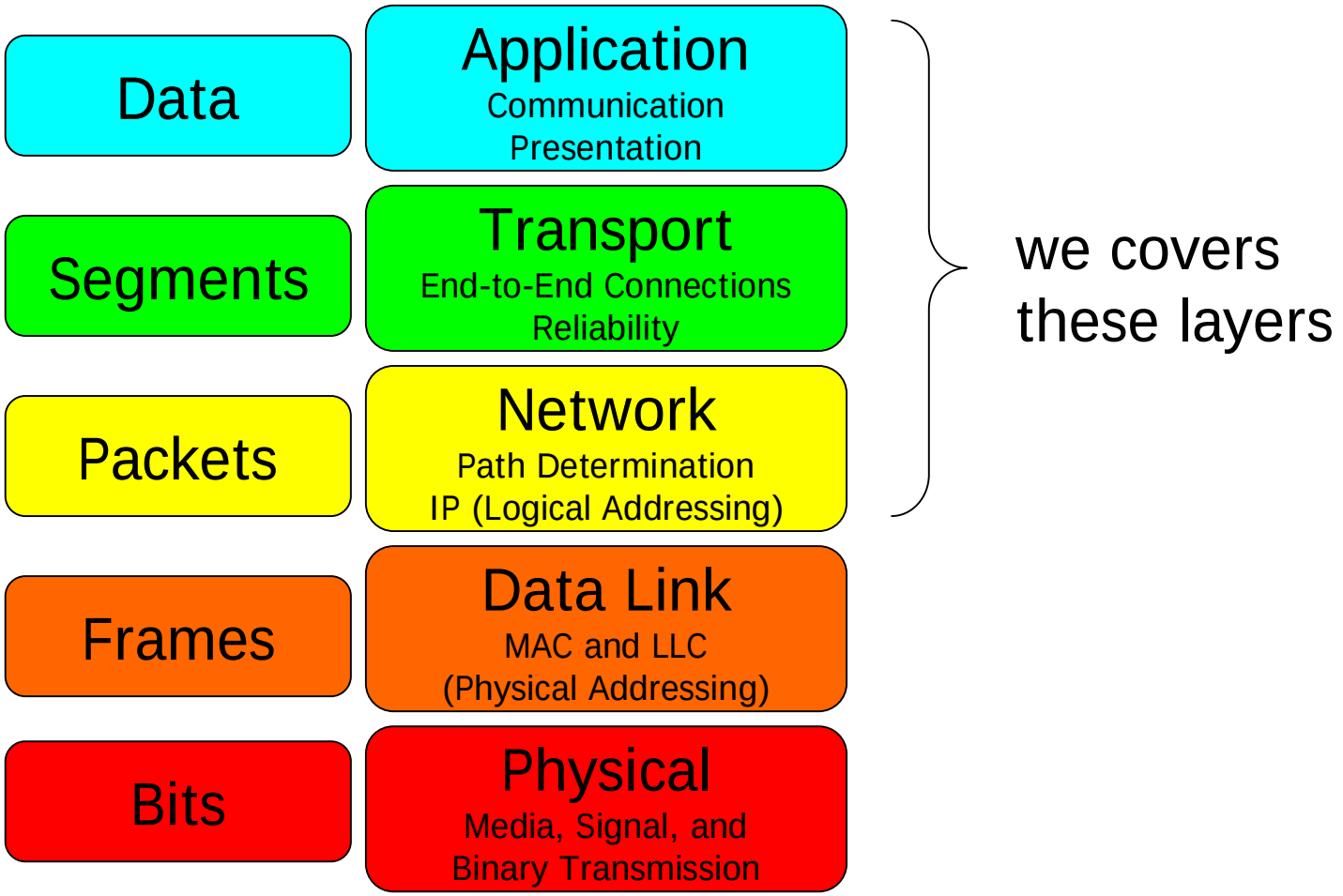


No.	Time	Source	Destination	Protocol	Info
11	0.257219	66.163.171.129	192.168.1.100	TCP	http > sapdp15 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=14
12	0.257266	192.168.1.100	66.163.171.129	TCP	sapdp15 > http [ACK] Seq=1 Ack=1 Win=65535 Len=0
13	0.260352	192.168.1.100	66.163.171.129	TCP	[TCP segment of a reassembled PDU]
14	0.260456	192.168.1.100	66.163.171.129	HTTP	GET / HTTP/1.1
15	0.298269	66.163.171.129	192.168.1.100	TCP	http > sapdp15 [ACK] Seq=1 Ack=1330 Win=65451 Len=0
16	0.594174	66.163.171.129	192.168.1.100	TCP	[TCP segment of a reassembled PDU]

```
[Frame: 13, payload: 0-1259 (1260 bytes)]
[Frame: 14, payload: 1260-1328 (69 bytes)]
Hypertext Transfer Protocol
  GET / HTTP/1.1\r\n
  Host: my.yahoo.com\r\n
  User-Agent: Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.7.12) Gecko/20050915 Firefox/1.0.7\r\n
  Accept: text/xml,application/xml,application/xhtml+xml,text/html;q=0.9,text/plain;q=0.8,image/png,*/*;q=0.5\r\n
  Accept-Language: en-us,en;q=0.5\r\n
  Accept-Encoding: gzip,deflate\r\n
  Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7\r\n
  Keep-Alive: 300\r\n
  Connection: keep-alive\r\n
  Cookie: LYC=l_v=2&l_lv=9&l_l=9if8hae&l_s=y2zq13xy150yuzxt03rvss5yxtvvsxz2&l_lid=155enn4&l_r=2a&l_lc=0_1_0_0_-1&l_um=0_0_
  \r\n
```

```
0000  47 45 54 20 2f 20 48 54  54 50 2f 31 2e 31 0d 0a   GET / HT TP/1.1..
0010  48 6f 73 74 3a 20 6d 79  2e 79 61 68 6f 6f 2e 63   Host: my .yahoo.c
0020  6f 6d 0d 0a 55 73 65 72  2d 41 67 65 6e 74 3a 20   om..User -Agent:
0030  4d 6f 7a 69 6c 6c 61 2f  35 2e 30 20 28 57 69 6e   Mozilla/ 5.0 (Win
0040  64 6f 77 73 3b 20 55 3b  20 57 69 6e 64 6f 77 73   dows; U;  Windows
0050  20 4e 54 20 35 2e 31 3b  20 65 6e 2d 55 53 3b 20    NT 5.1;  en-US;
0060  72 76 3a 31 2e 37 2e 31  32 29 20 47 65 63 6b 6f   rv:1.7.1 2) Gecko
0070  2f 32 30 30 35 30 39 31  35 20 46 69 72 65 66 6f   /2005091 5 Firefo
0080  78 2f 31 2e 30 2e 37 0d  0a 41 63 63 65 70 74 3a   x/1.0.7. .Accept:
0090  20 74 65 78 74 2f 78 6d  6c 2c 61 70 70 6c 69 63    text/xm l,applic
00a0  61 74 69 6f 6e 2f 78 6d  6c 2c 61 70 70 6c 69 63   ation/xm l,applic
00b0  61 74 69 6f 6e 2f 78 68  74 6d 6c 2b 78 6d 6c 2c   ation/xh tml+xml,
00c0  74 65 78 74 2f 68 74 6d  6c 3b 71 3d 30 2e 39 2c   text/htm l;q=0.9,
00d0  74 65 78 74 2f 70 6c 61  69 6e 3b 71 3d 30 2e 38   text/pla in;q=0.8
00e0  2c 69 6d 61 67 65 2f 70  6e 67 2c 2a 2f 2a 3b 71   ,image/p ng,*/*;q
```

Protocol Stack



Protocol Stack Examples

Layer	Example
Application	HTTP, HTTPS, PeopleSoft, Siebel, SOAP
Transport	TCP
Network	IP
Data Link	Ethernet
Physical	10Base-T, 100Base-TX

= UEM provides metrics

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TCP

- Transmission Control Protocol
- Allows hosts to communicate using pipe-like “connections”
- Guarantees **reliable** and **in-order** delivery
- 3 phases:
  - Establish connection (3-way handshake)
  - Data transfer
  - Connection termination

SSL

- Cryptographic protocol that provides secure communications
- HTTP + SSL = HTTPS
- SSL “handshake” establishes secure HTTP session
- Public key certificates identify the servers

HTTP

- Conveys information on WWW
- Request-Response protocol between clients and servers
- Client typically a web browser establishes TCP connection on port 80
- Client requests: “GET / HTTP/1.1”
- Server responds: “200 OK”

SOAP

- Protocol for exchange XML messages over a network
- Typically implemented on top of HTTP
- Foundation of “web services”

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <getProductDetails xmlns="http://warehouse.example.com/ws">
      <productID>827635</productID>
    </getProductDetails>
  </soap:Body>
</soap:Envelope>
```

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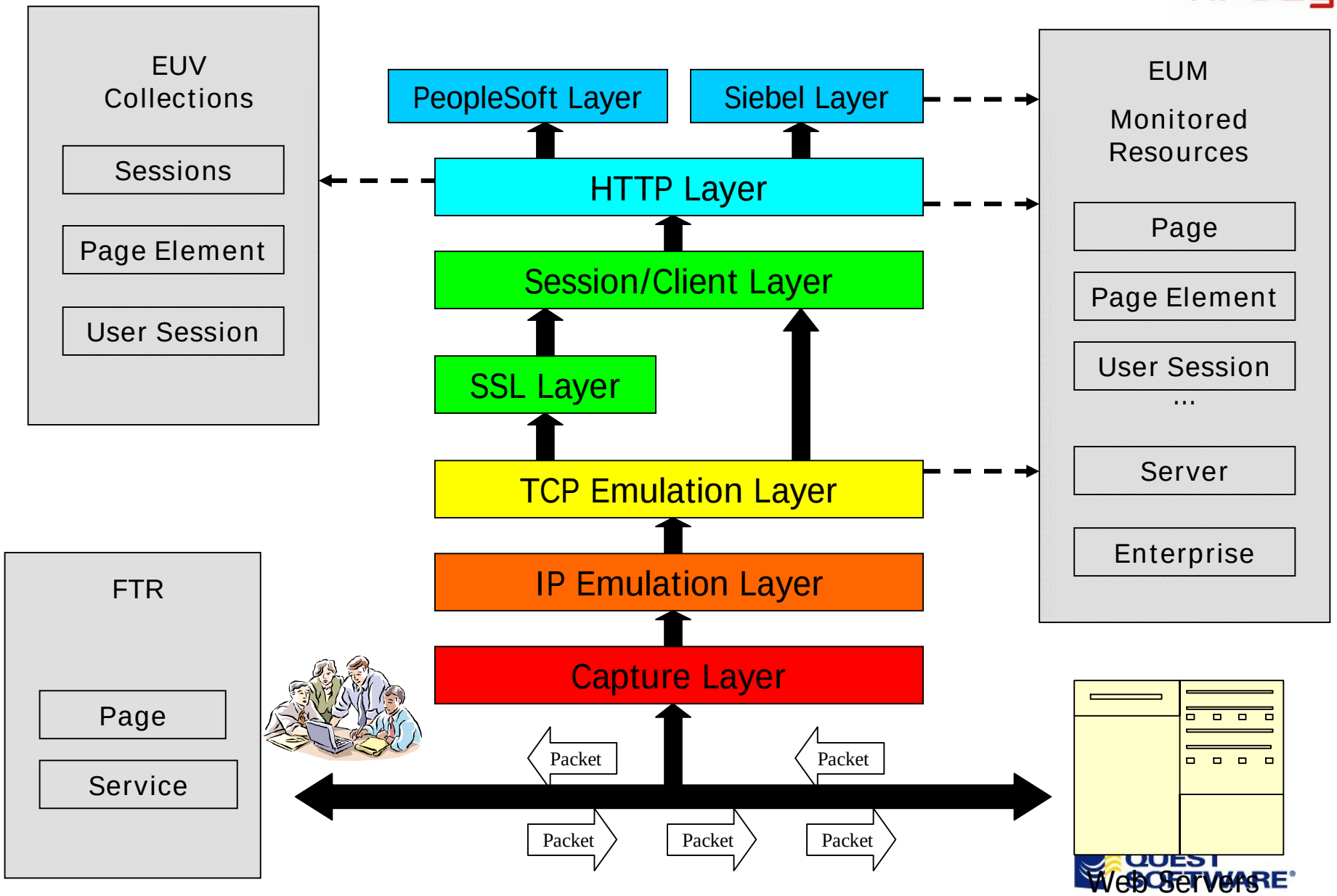
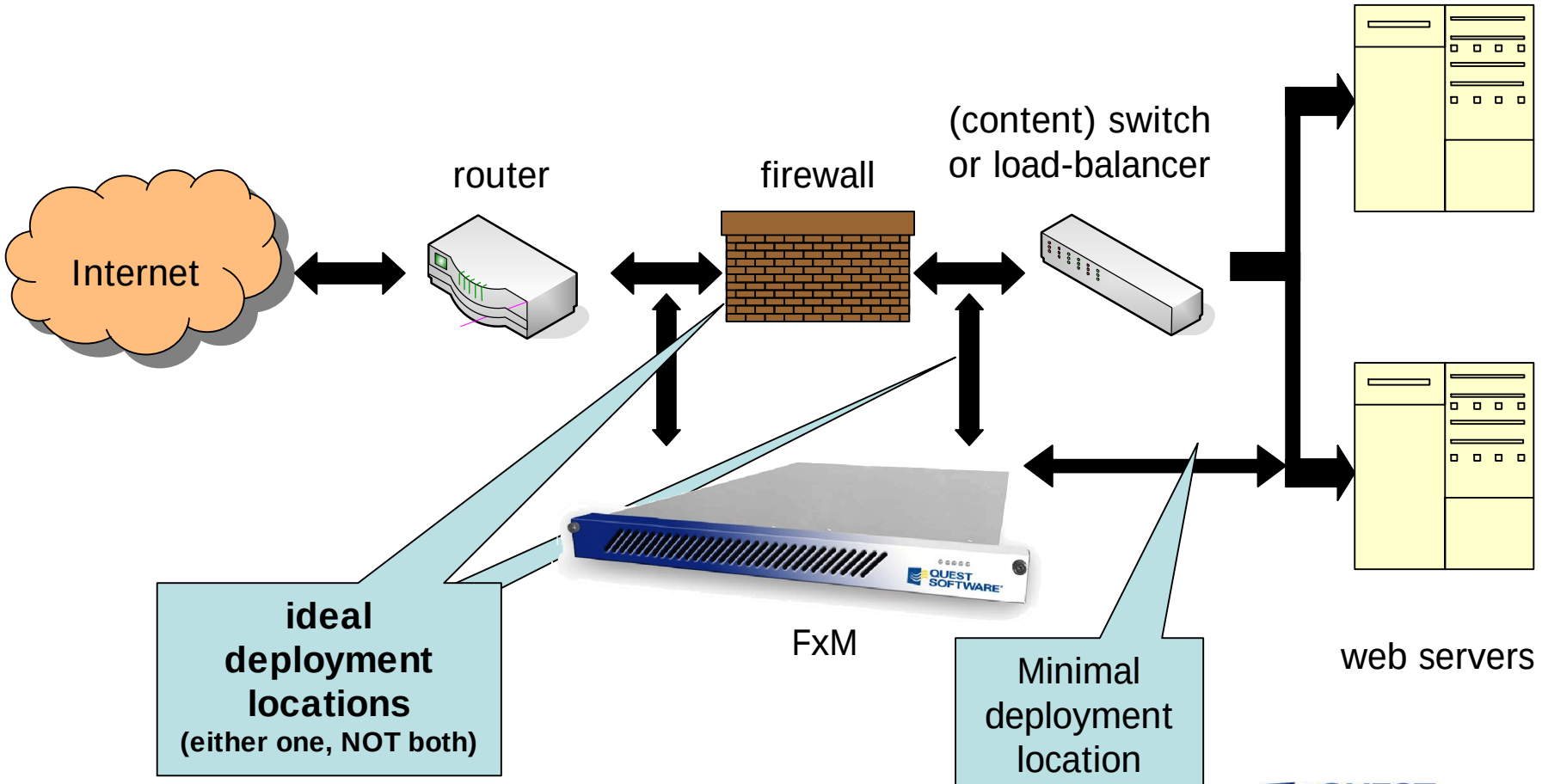

EUV
Collections
Sessions
Page Element
User Session
PeopleSoft Layer
Siebel Layer
HTTP Layer
Session/Client Layer
SSL Layer
TCP Emulation Layer
IP Emulation Layer
Capture Layer
EUM
Monitored
Resources
Page
Page Element
User Session
...
Server
Enterprise
FTR
Page
Service
Packet
Packet
Packet
Packet
Packet
Web Servers

Deployment – Logical placement



Server compliance monitoring simplifies “bottleneck” identification

Service Level Compliance

Edit

3/21/05

Server	Service Level Compliance	Response Time	Processing Load %	Commands	TCP Connections	Success %	TCP Timeouts	Server Bytes	User Bytes
216.239.51.104	0.07 %	2.358 secs	7.22 %	1399	1405	100.00 %	0	0.011 gb	1.245 mb
192.168.1.195	11.02 %	1.194 secs	4.21 %	1733	1732	100.00 %	0	0.007 gb	0.280 mb
192.77.210.18	98.07 %	0.063 secs	41.06 %	100417	33661	100.00 %	20	4.689 gb	44.466 mb
192.77.210.19	98.34 %	0.060 secs	33.64 %	88150	30049	99.97 %	8	2.107 gb	38.018 mb
ispatches.quest.com (12.106.87.32)	99.29 %	0.152 secs	13.84 %	38946	1087	100.00 %	0	0.133 gb	21.440 mb
10.4.128.54	100.00 %	0.000 secs	0.00 %	0	5759	0.00 %	0	0.000 gb	0.000 mb
192.77.210.55	100.00 %	0.000 secs	0.00 %	286	1141	0.00 %	0	0.000 gb	0.489 mb
192.77.210.25	100.00 %	0.011 secs	0.02 %	858	859	100.00 %	0	0.001 gb	0.087 mb
192.77.210.54	100.00 %	0.006 secs	0.01 %	925	925	0.00 %	0	0.000 gb	0.057 mb

Prioritize tuning efforts and dedicate resources to where they are needed the most. e.g. Some servers/apps may always be more problematic than the others.

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Proactively optimize applications

Diagnosis: Content							Delete
What are the slowest Web Pages?	View	Edit	Copy	Distribute		↓	☐
Which Web Pages cause the most user-triggered page stops?	View	Edit	Copy	Distribute	↑	↓	☐
What are the slowest Content Types?	View	Edit	Copy	Distribute	↑	↓	☐
What are the slowest Page Components?	View	Edit	Copy	Distribute	↑	↓	☐
Secure Web Page Design	View	Edit	Copy	Distribute	↑	↓	☐
What are the slowest Secure Web Pages?	View	Edit	Copy	Distribute	↑	↓	☐
What are the slowest Secure Content Types?	View	Edit	Copy	Distribute	↑	↓	☐
What are the slowest Secure Page Components?	View	Edit	Copy	Distribute	↑		☐

Diagnosis: Transactions							Delete
Which paths might be candidates for Web Transactions?	View	Edit	Copy	Distribute		↓	☐
What are the slowest Web Transactions?	View	Edit	Copy	Distribute	↑		☐

Diagnosis: User Experience							Delete
What kind of access speed do End Users have?	View	Edit	Copy	Distribute		↓	☐
What is the quality of the User's Experience with the site?	View	Edit	Copy	Distribute	↑	↓	☐
How does time-of-day affect the End User experience?	View	Edit	Copy	Distribute	↑		☐

Concentrate on those end-user activities that have the most negative impact on the business operation

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J2EE

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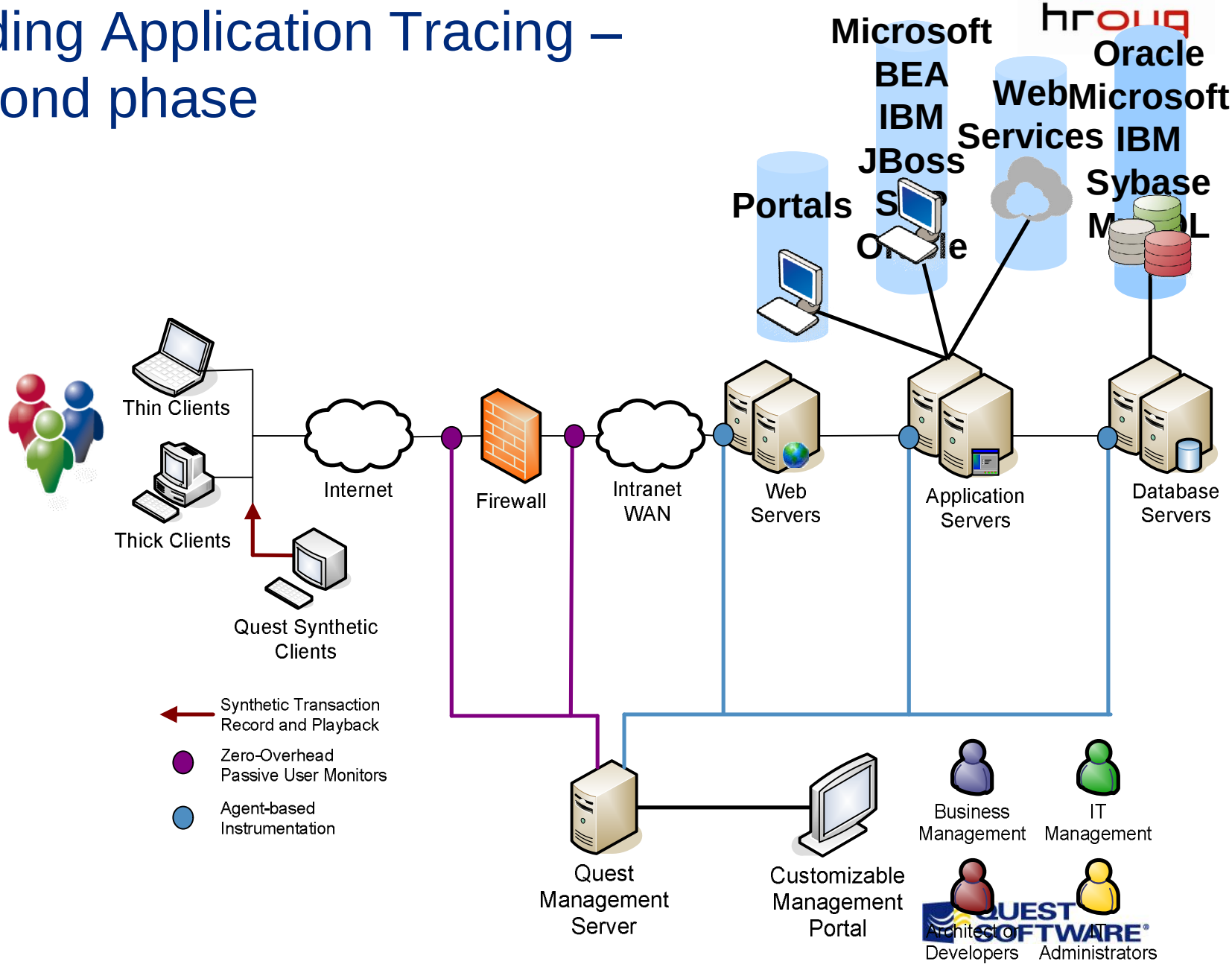
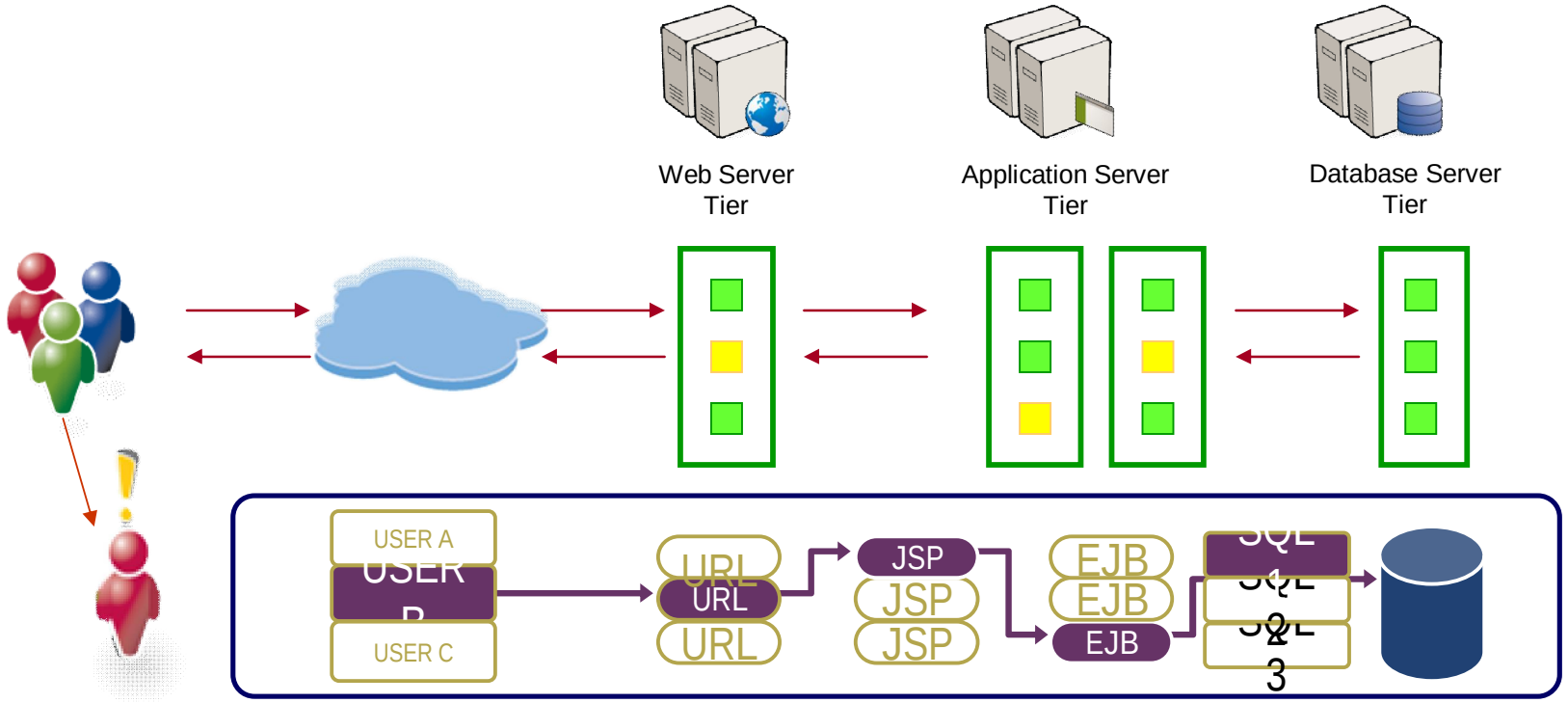
Adding Application Tracing – second phase



Single User Transaction Tracing



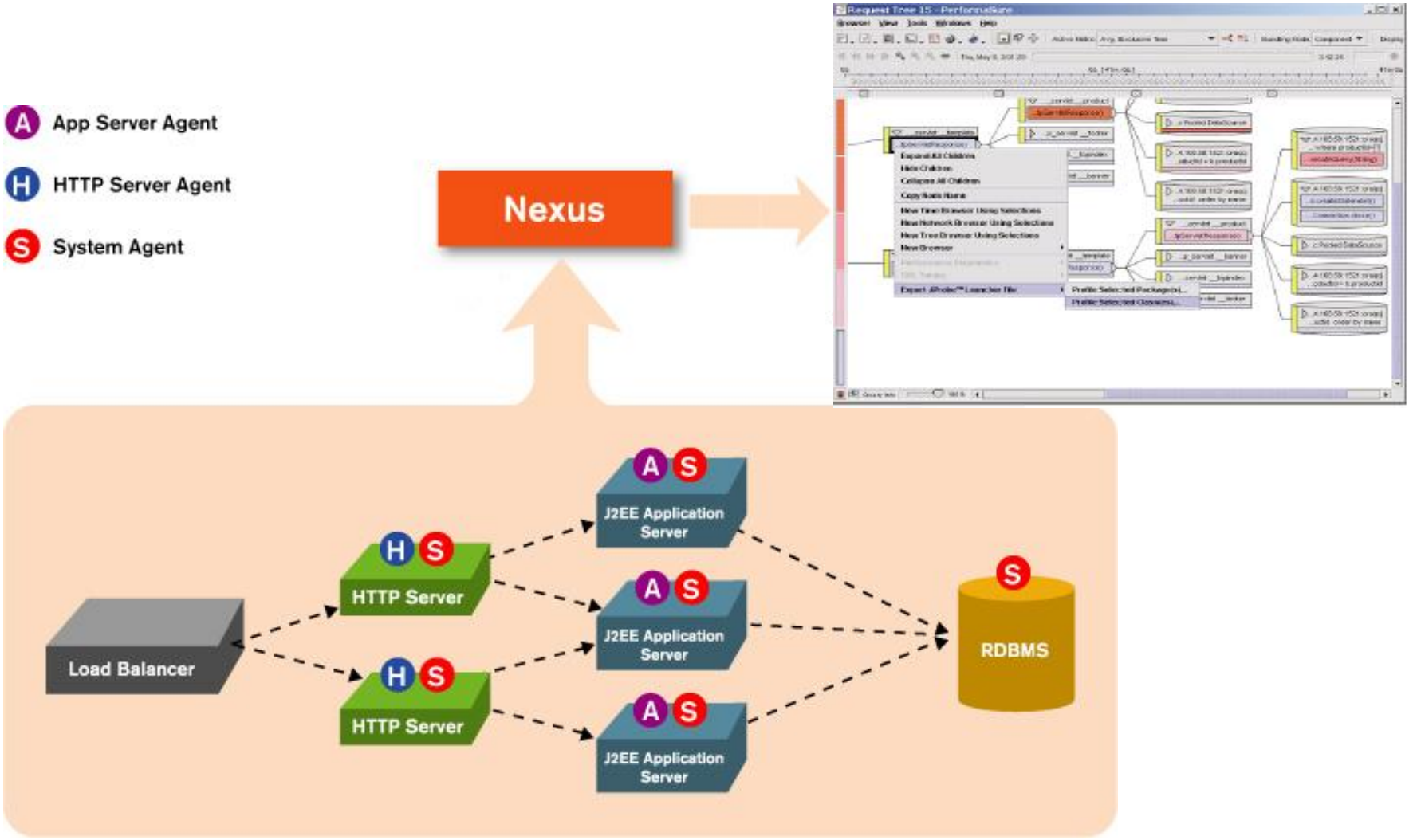
Capabilities

- Single user transaction tracing mapping all services used in context to the end user request
- Transaction component decomposition and performance measurement analysis
- User transaction record and playback can visualize the content experienced by the user

Value

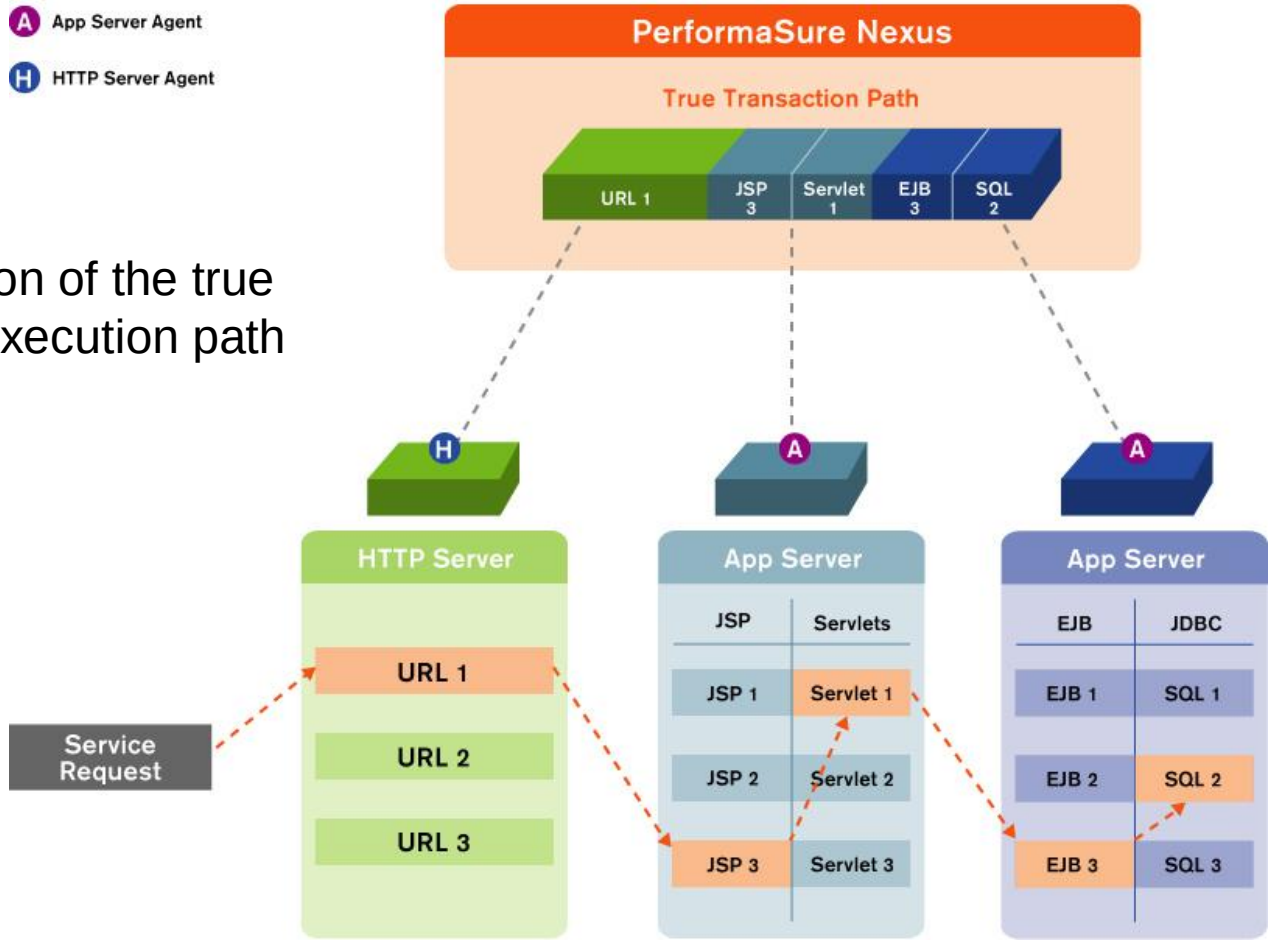
- Isolate the individual user and the user request with a complete map of the transaction's execution path
- Pinpoint root cause with deep component level diagnostics such as SQL Bind Variable or method level detail
- See the actual error messages or content the user experienced for quicker problem resolution

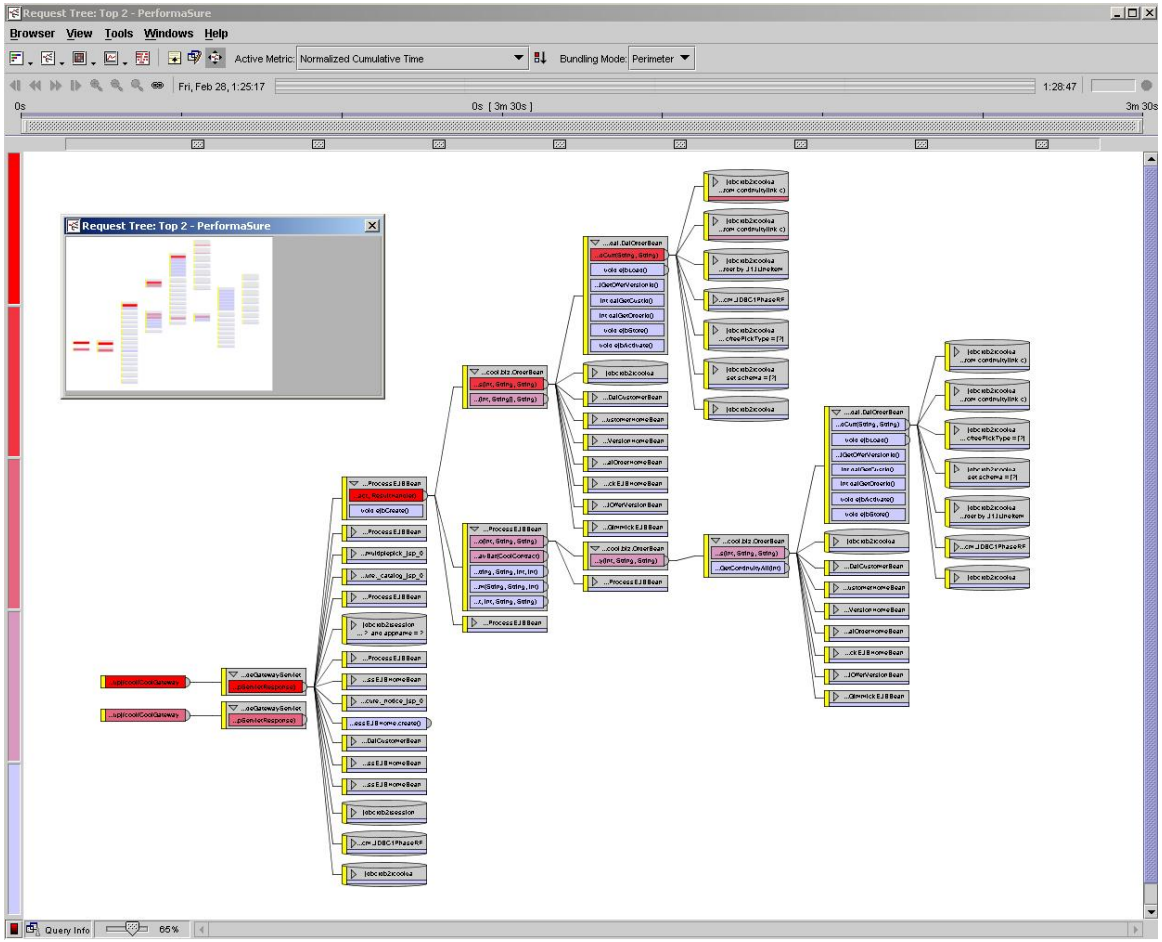
Architecture



Tag and Follow™ Technology

Reconstruction of the true transaction execution path





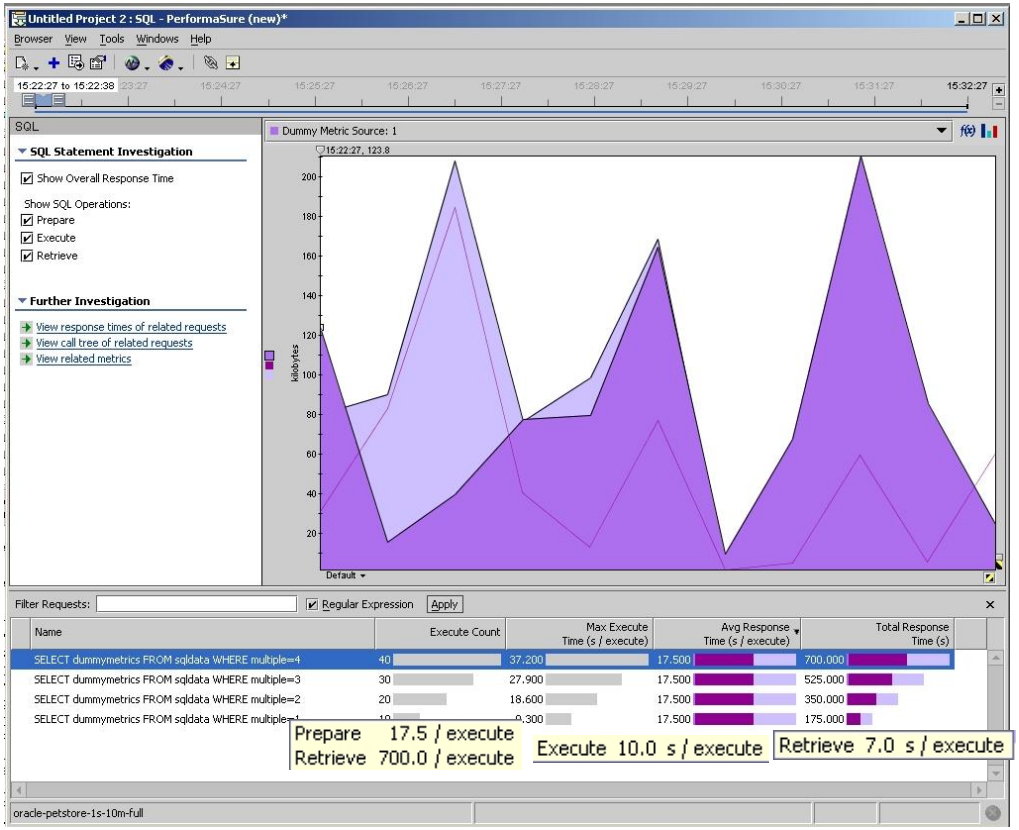
"Tag-and-Follow" technology reconstructs physical and logical execution path of transaction

Color-coded, method-level timing information immediately identifies slow running components

QUEST SOFTWARE®

SQL Browser

- View the most expensive SQL call from the Java app by:
  - Execute
  - Prepare
  - Retrieve
- Correlated with the end-user transaction



Thank You for Attending