



YOUR INDEPENDENT HPE SOFTWARE COMMUNITY



Performance Engineering Education

11 October 2016

Brought to you by Vivit's Performance Engineering SIG Leaders



Todd DeCapua



Petar Puskarich



Paul Shovlin



Chris Trimper



Panelists



Wilson Mar
DevOps Superhero
JetBloom



Jonathon Wright
Chief Data Therapist
CA Technologies



Eric Proegler
Product Manager
CloudTest - SOASTA



Todd DeCapua
Director: Technology
& Product Innovation
CSC Global



Housekeeping

- This “LIVE” session is being recorded
Recordings are available to all Vivit members
- Session Q&A:
Please type questions in the Questions Pane



Webinar Control Panel

Toggle View Window between Full screen/window mode.

Questions



POLL



Agenda

- Performance Engineering Education
- Wilson
- Jonathon
- Eric
- Todd
- Q&A
- Thanks



Performance Engineering Education

- Relevant
- Important
- Timely
- Who
- What
- Where
- How



POLL



Wilson



Learning techniques

- 1. Meticulously sequenced learning**
- 2. Animated diagrams (visual cheat sheets)**
- 3. Narrated videos reveal animations**
- 4. Runnable scripts of commands in sequence**
- 5. Step-by-step hands-on commentary**
- 6. Quizzes**
- 7. Social sites**
- 8. References to other training**

2-Day Agenda

Before

1-Getting Started
(Install LR, VTS, Web Tours)

Sunday

2-Analysis
Correlation
3-Controller

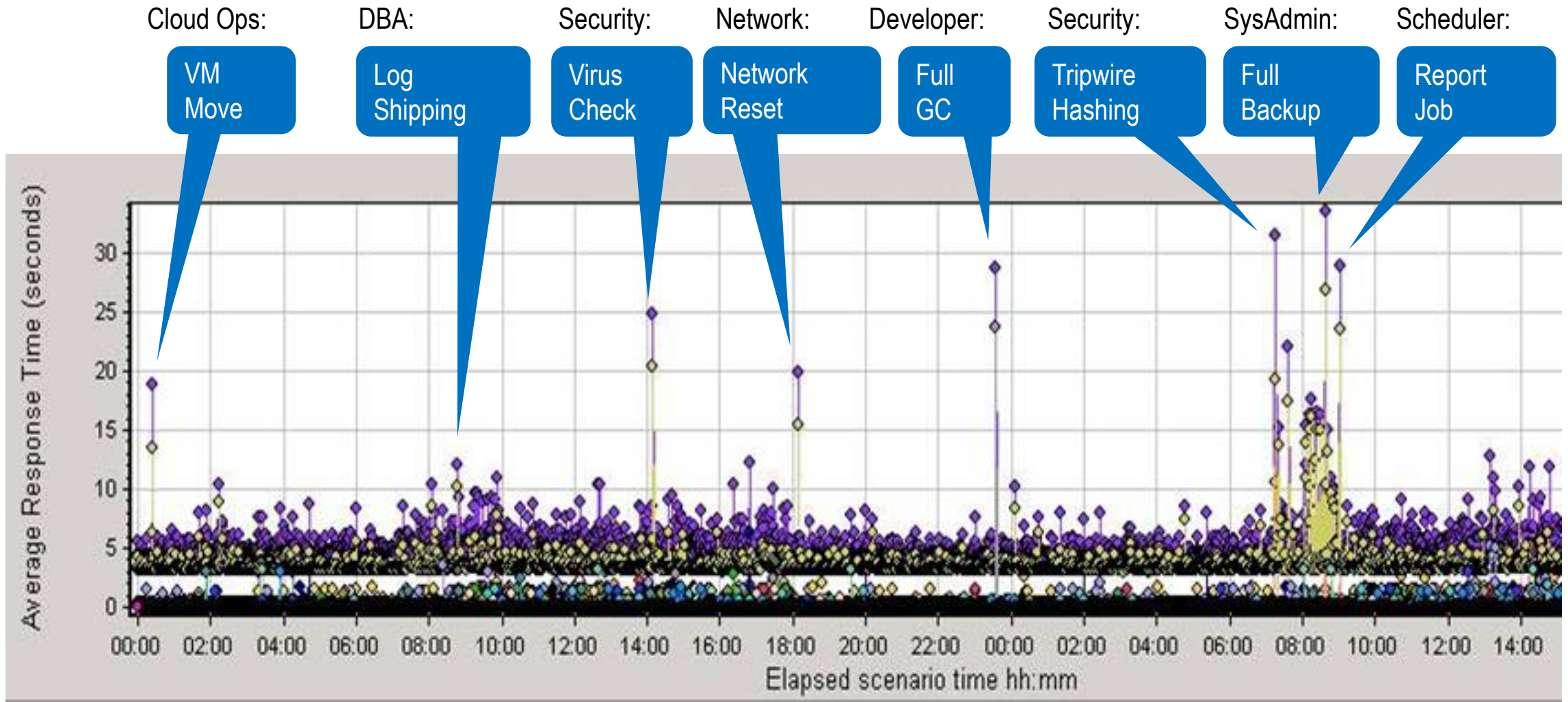
Monday

4-C Web Tours
6-C API OAuth
Evaluations

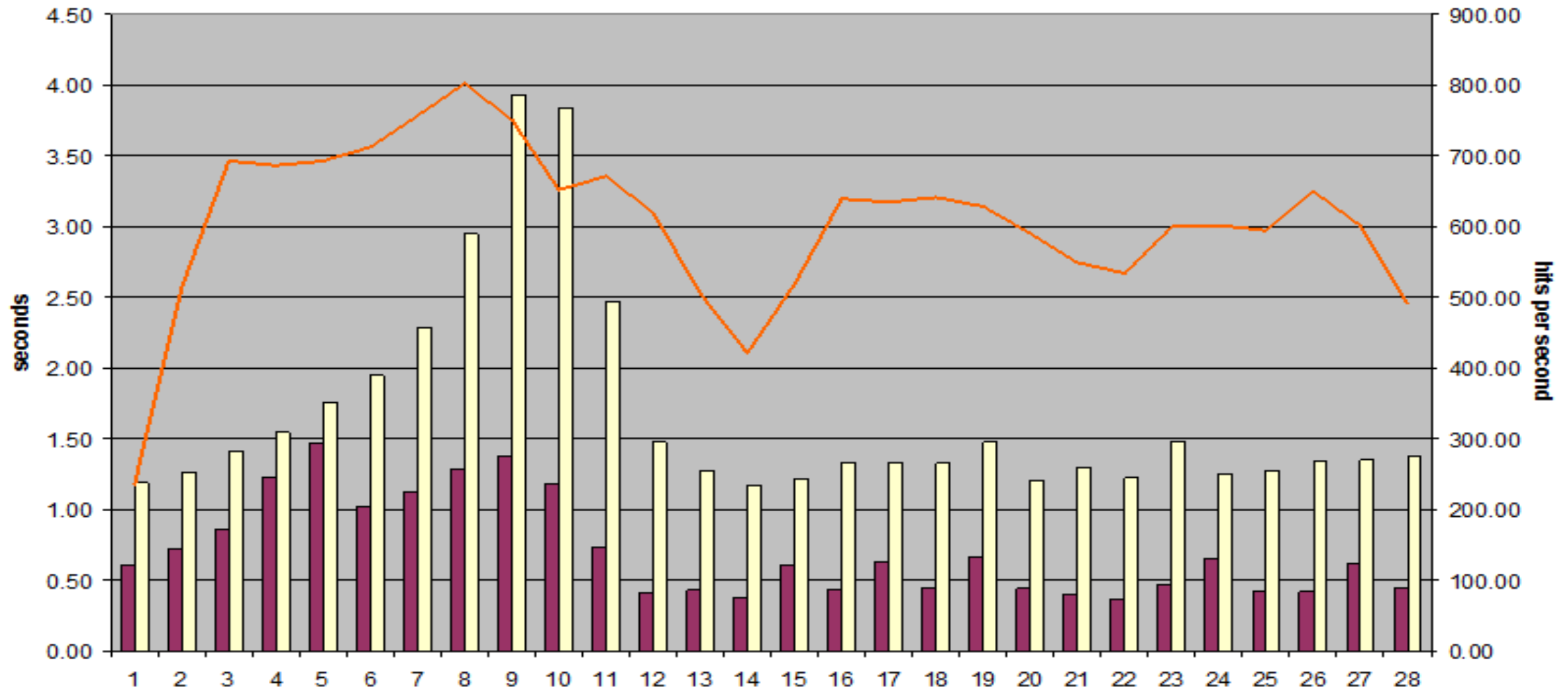
After

5-TruClient
7-JavaScript

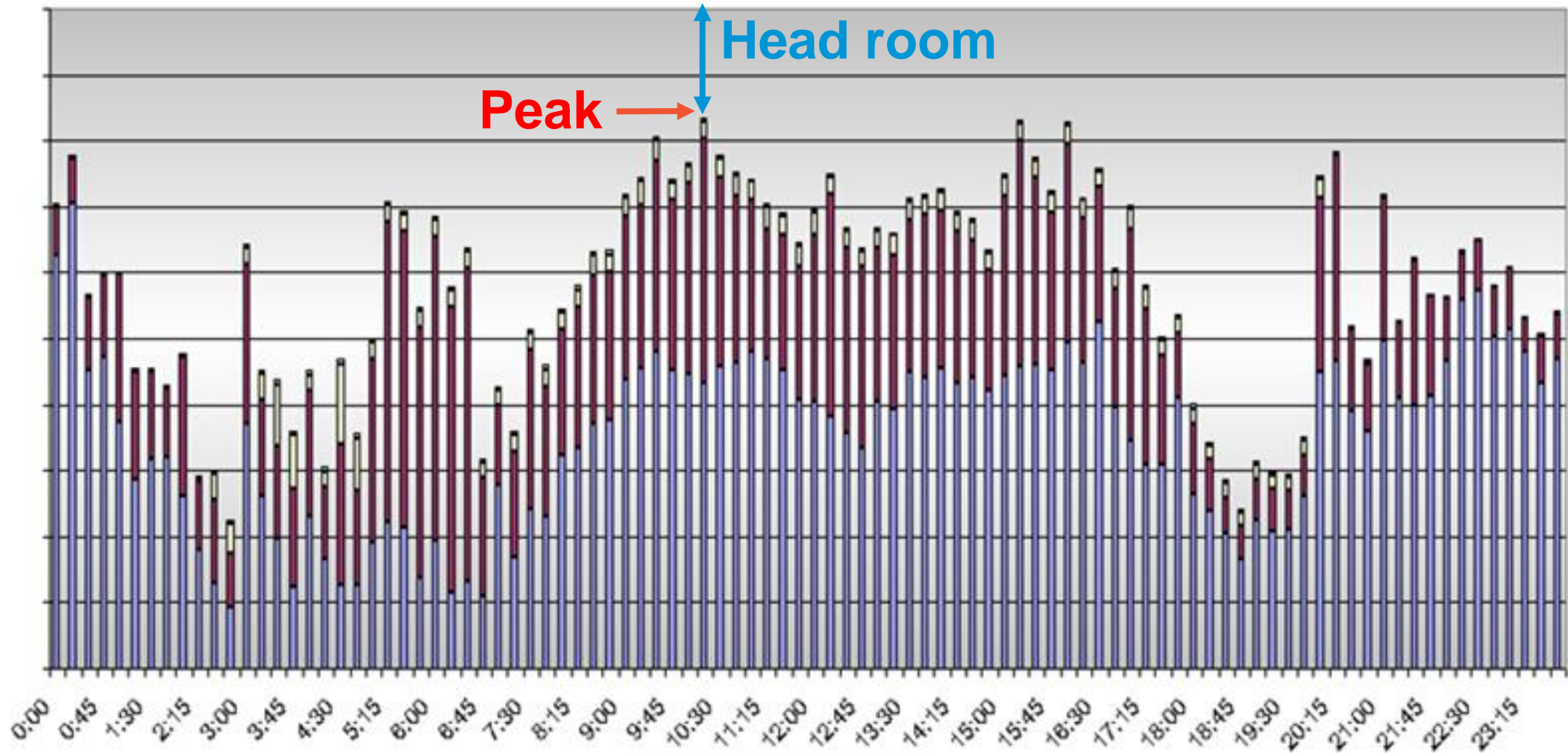
Single-user variability test results



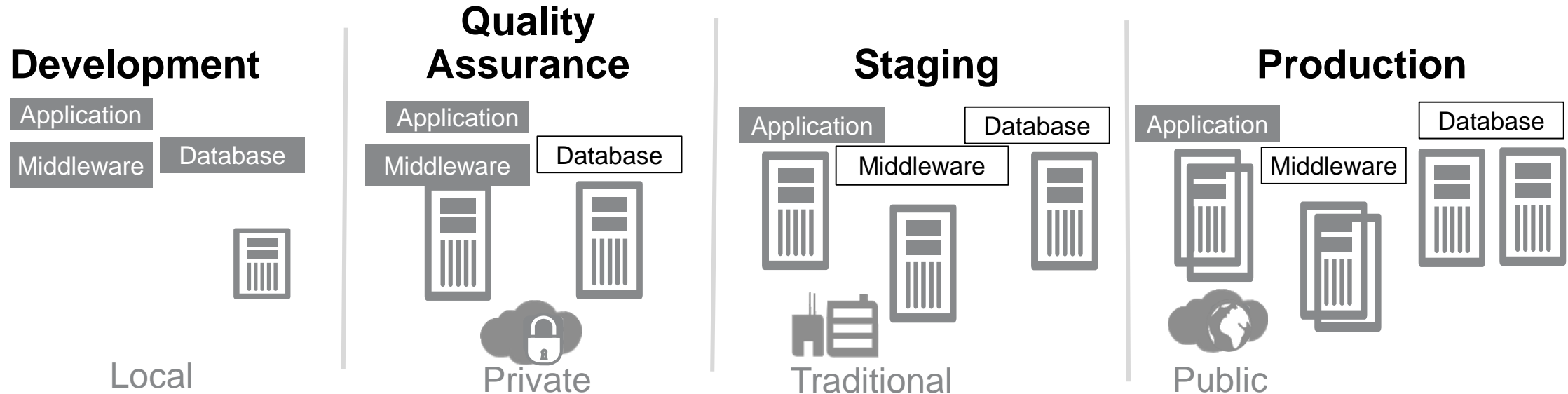
Response time & Hits per second



% Utilization



Different configurations during lifecycle

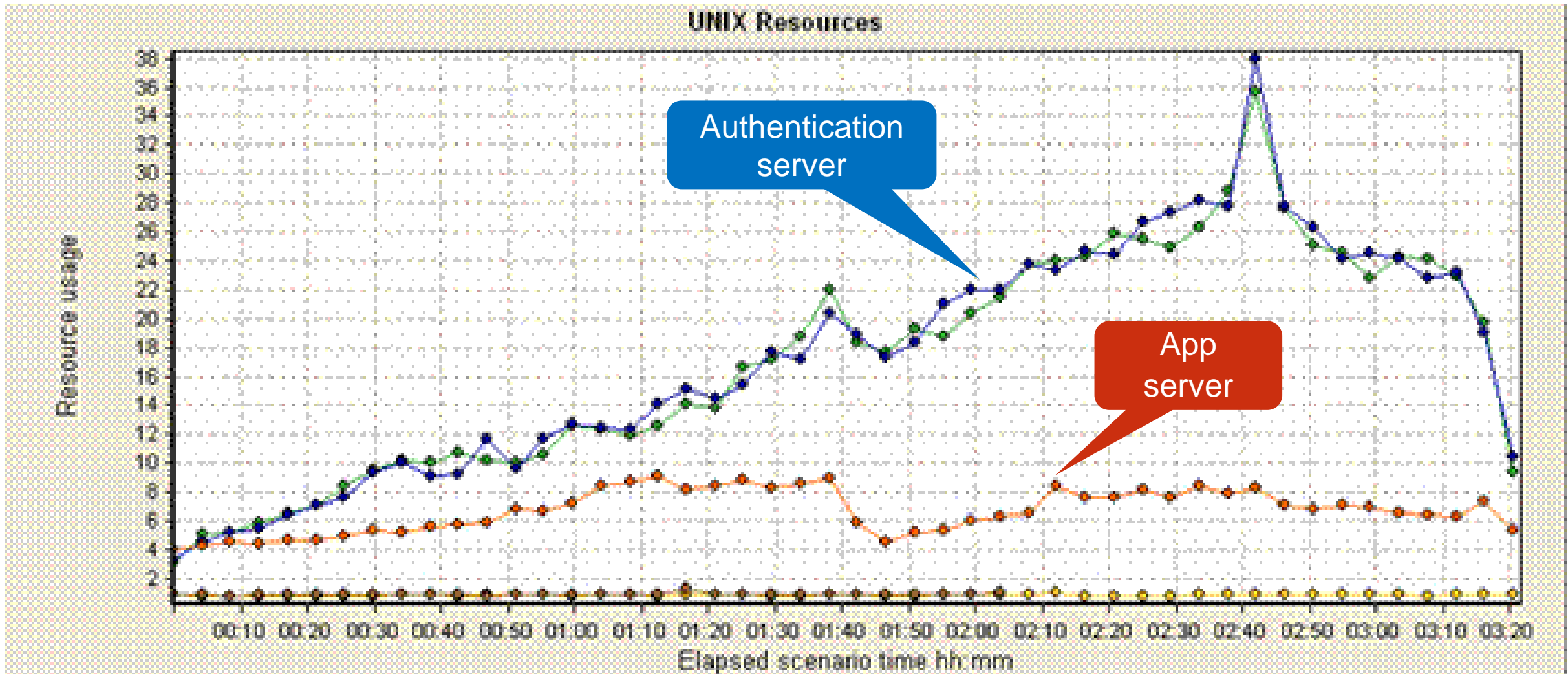


Why “it worked on my machine” but not elsewhere:

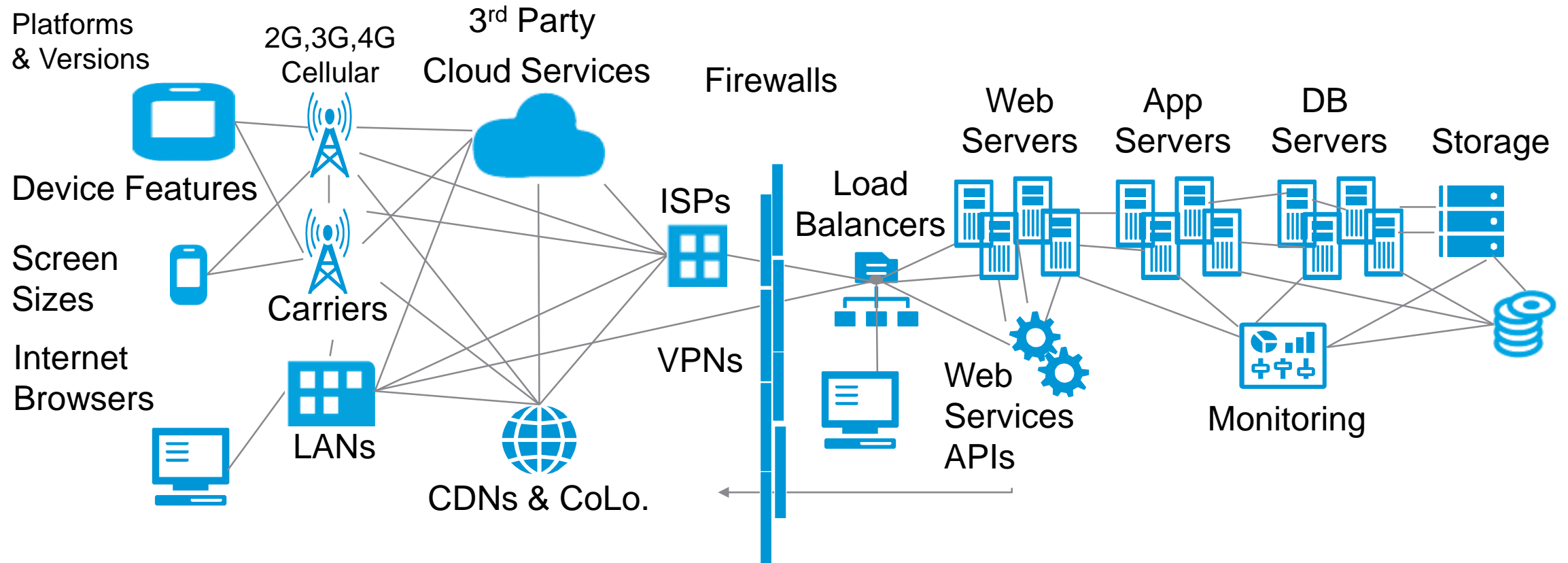
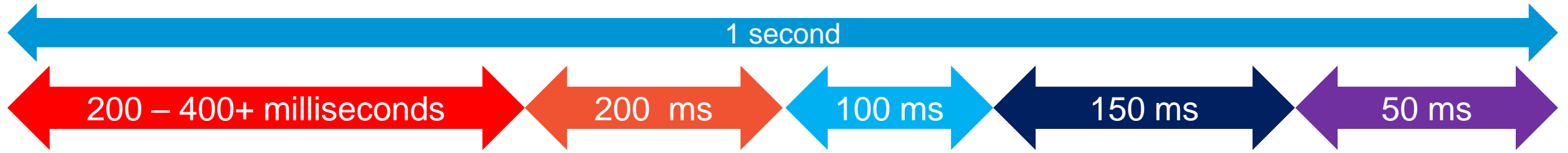
- ❖ Provisioning and deployment processes are time-consuming
- ❖ Manual processes are error-prone
- ❖ Different people, tools, processes for each environment
- ❖ Manual creation and hand-off of deployment docs and checklists

Co-existence Testing

Resource usage by server



Time Budgets



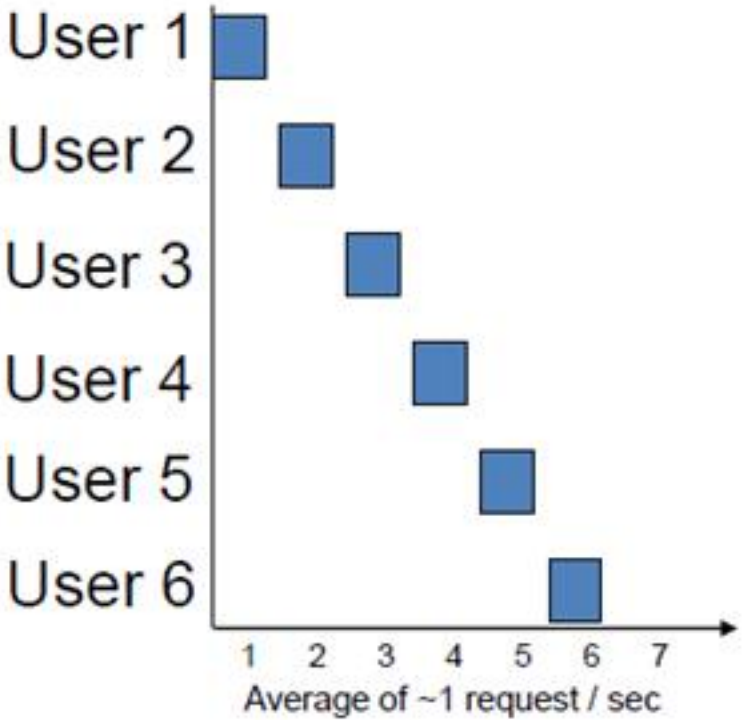
Measure exposure to performance risks

Server side

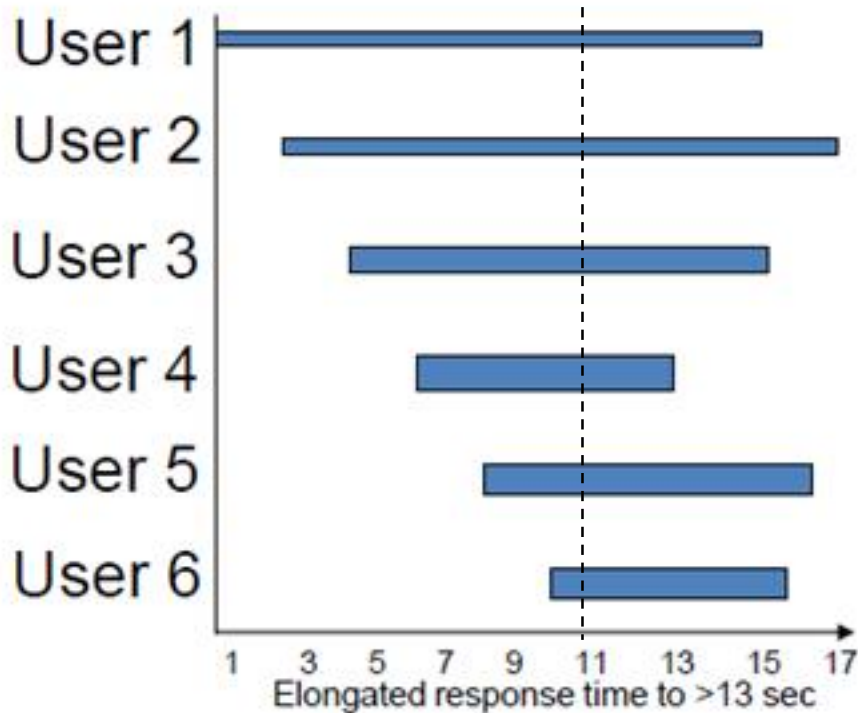
Risks	To exposure extent of risk
1. Network impact	1. SpeedTest.net to Global Library
2. Spikes in network and server	2. Landing page repeat access
3. Pages load too many resources	3. Traverse through app iterations
4. Server spike capacity bottlenecks	4. Stress tests from log-in
5. Internal contention	5. Rendezvous mix of transactions
6. More hardware doesn't increase capacity as much as expected	6. Scalability up and out
7. Servers underutilized	7. Different configurations, database sizes

Concurrency and rendezvous

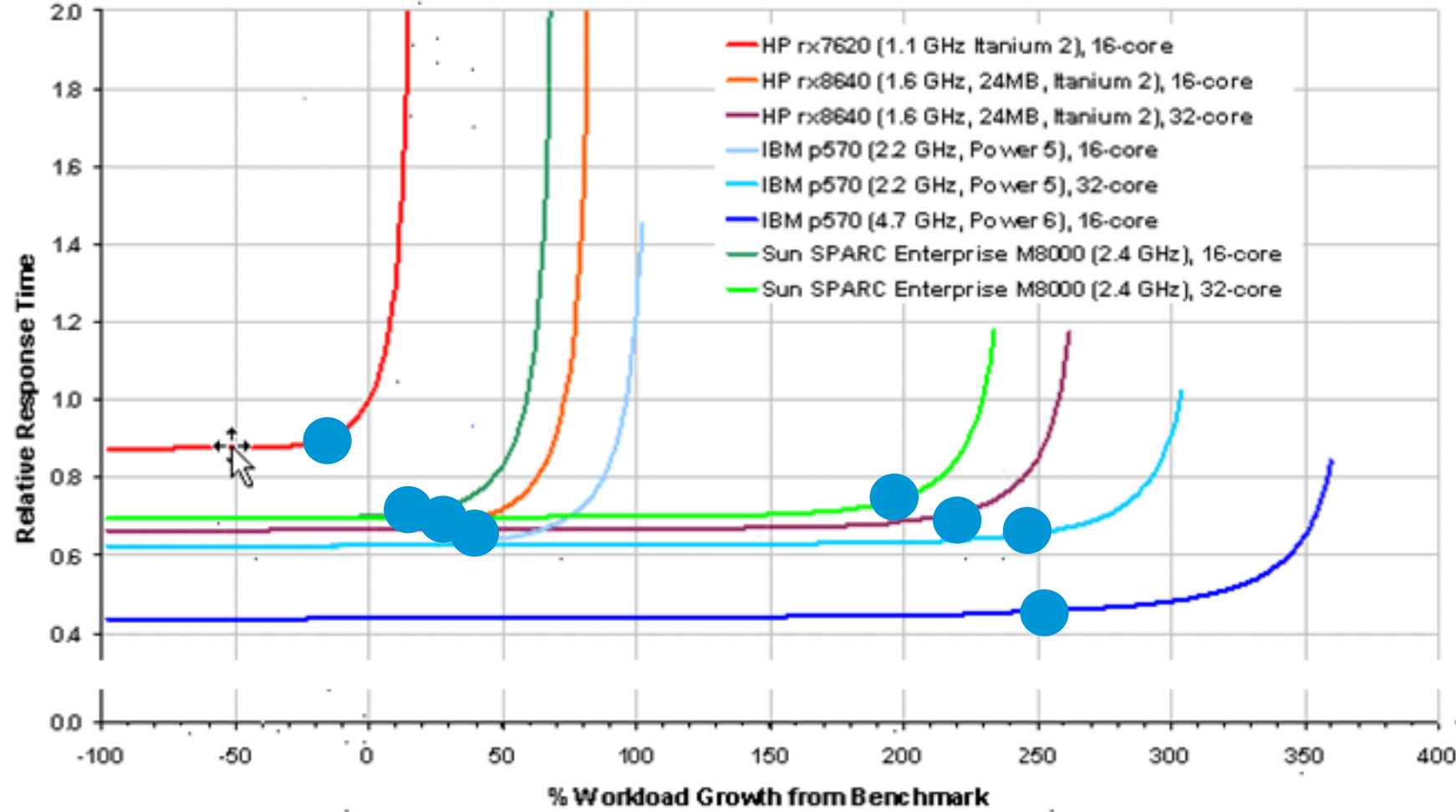
High Bandwidth / Low Latency
(Impact of Local Users)



Lower Bandwidth / Higher Latency
(Impact of Relocated, Remote, or Mobile Users)

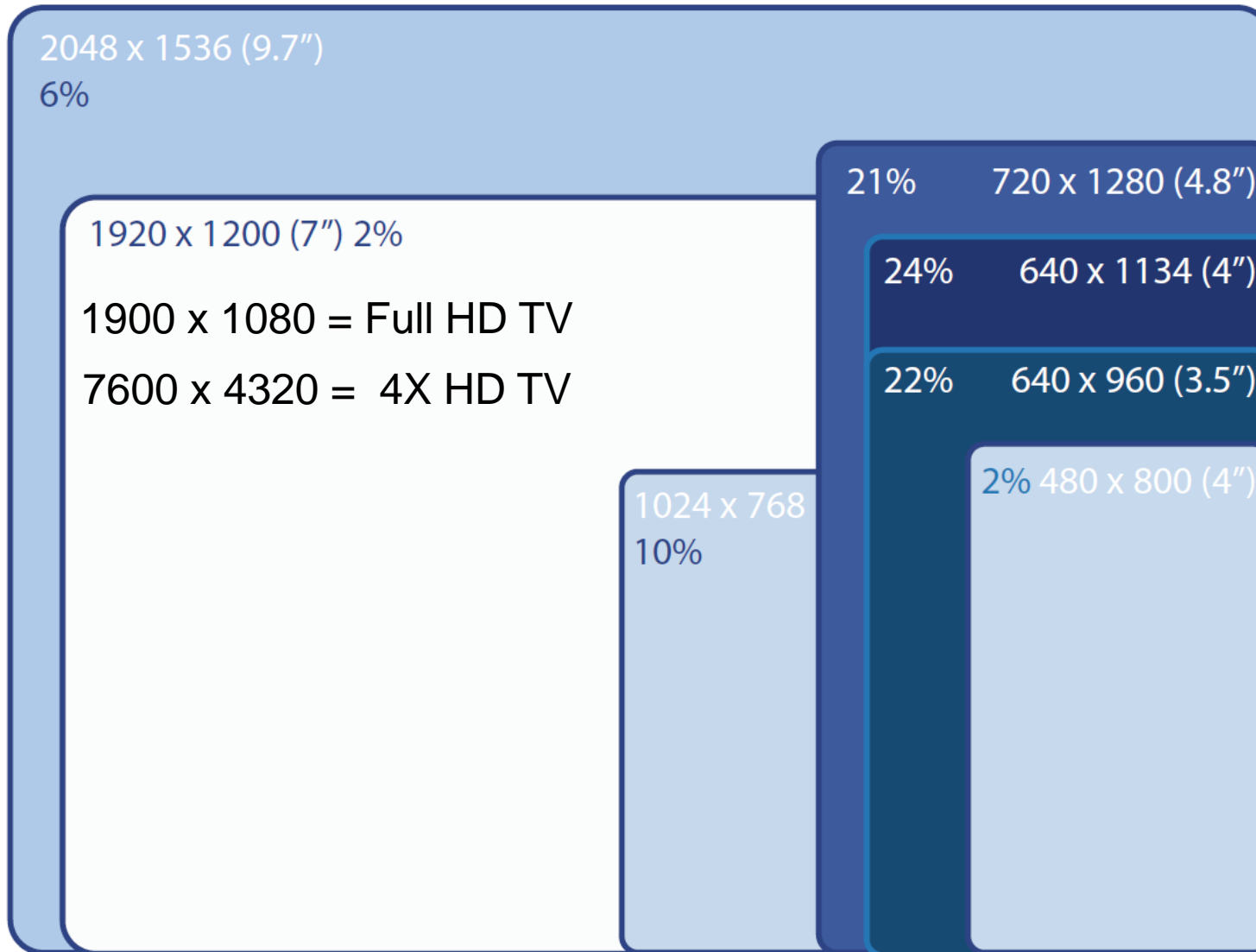


Scalability limits



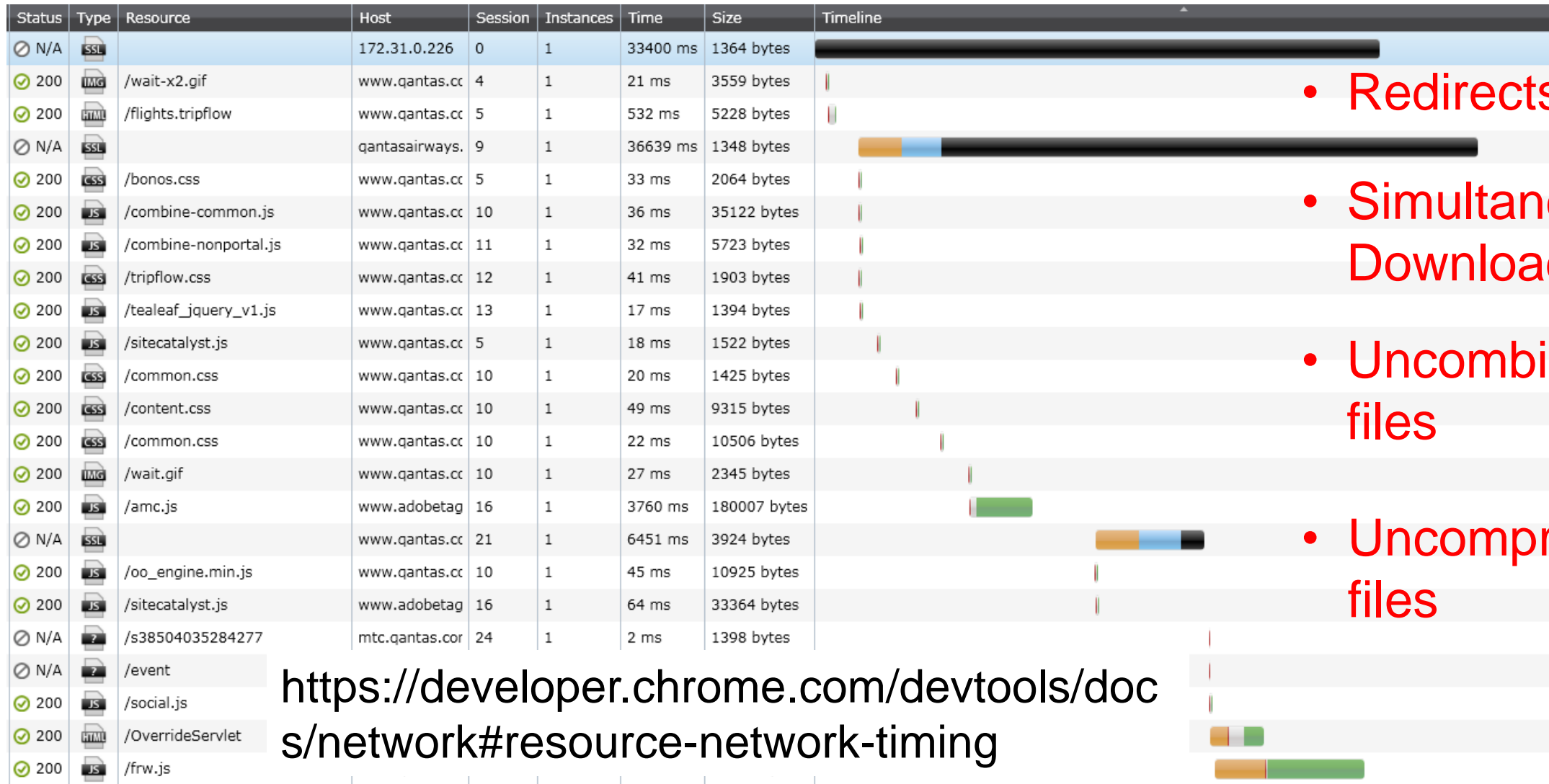
<http://www.perftest.com>

Mobile screens density growing beyond Full HD



<http://www.perfectomobile.com/content/mobilecloud-device-statistics>

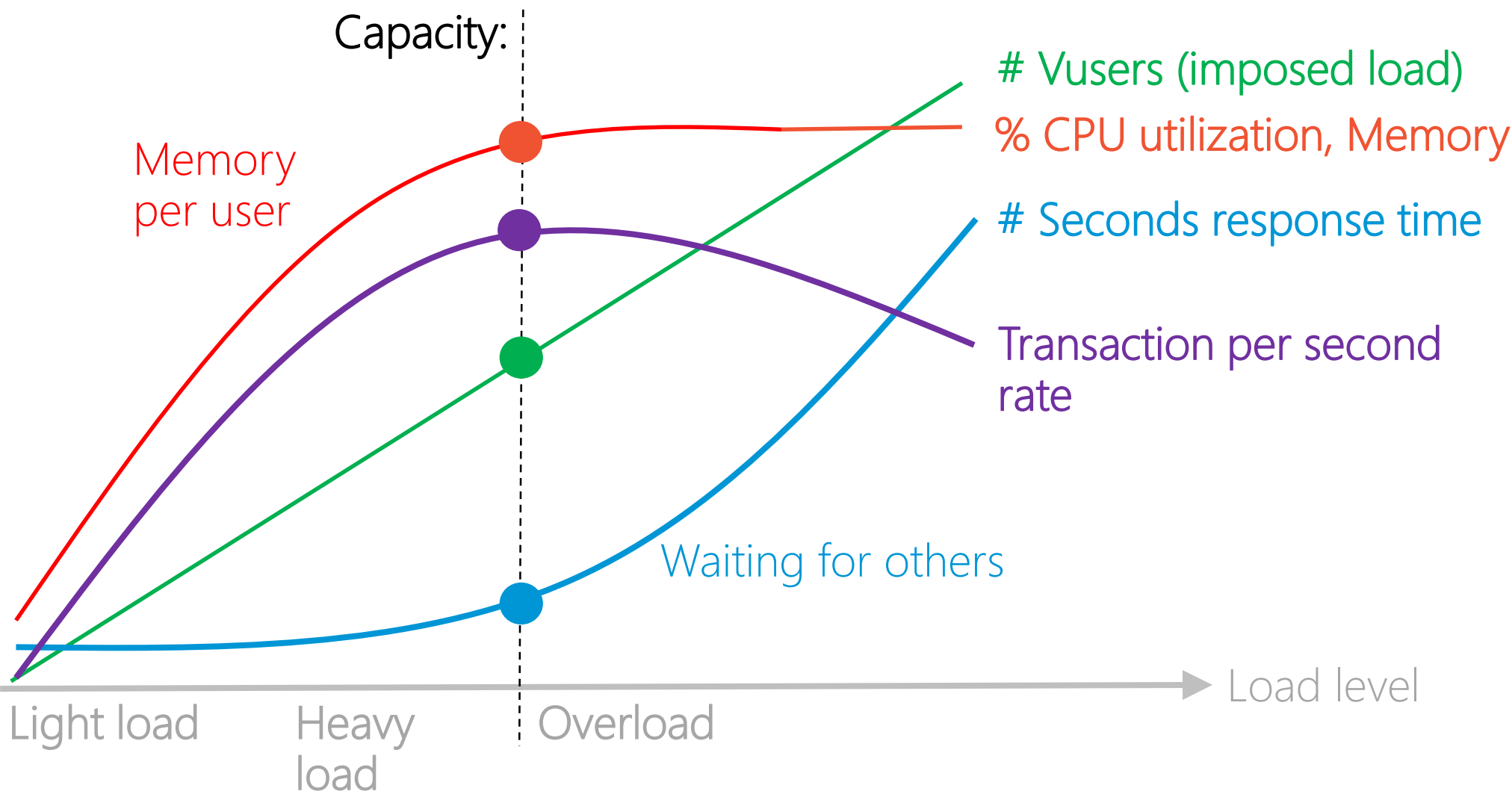
Waterfall Chart



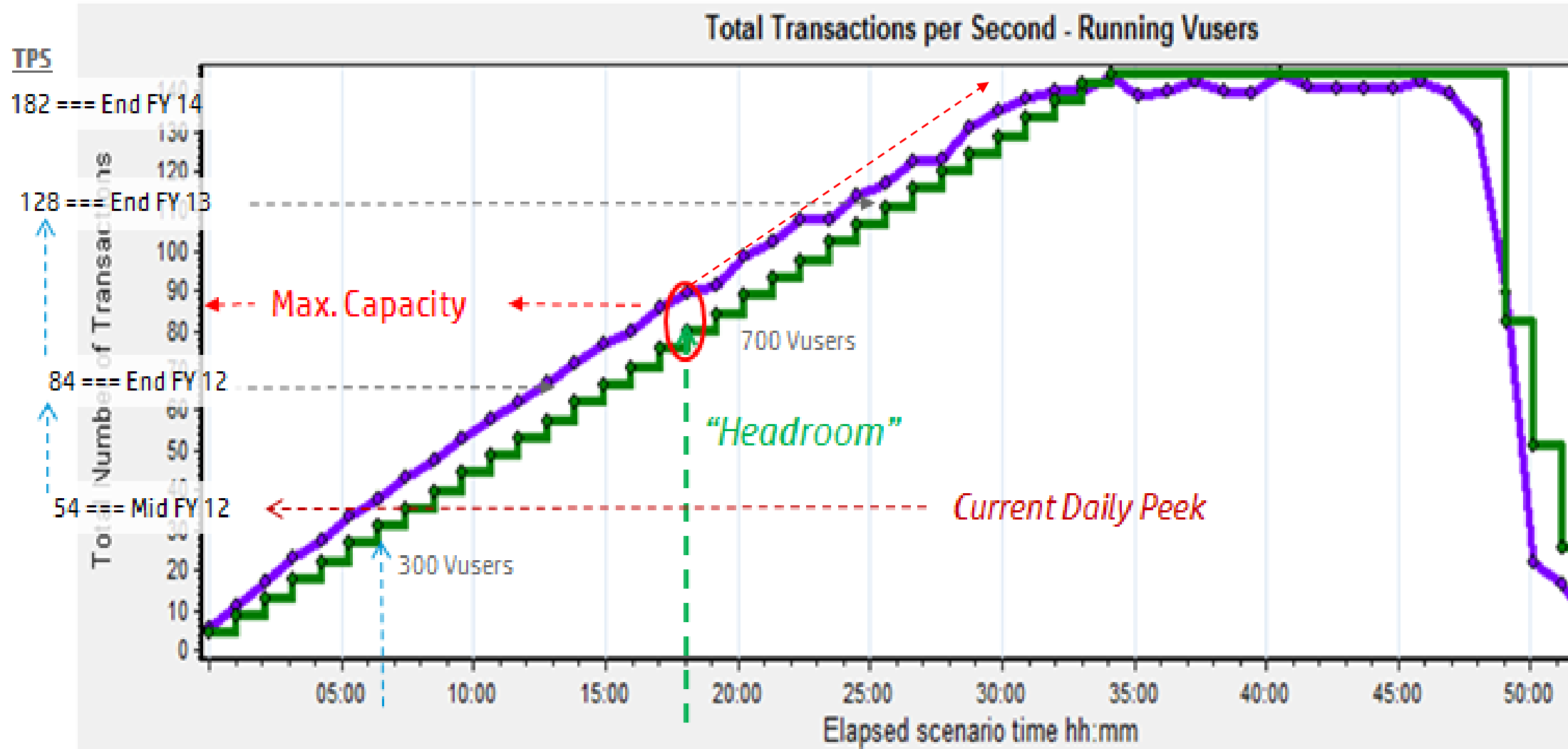
- Redirects
- Simultaneous Downloads
- Uncombined files
- Uncompressed files

<https://developer.chrome.com/devtools/docs/network#resource-network-timing>

Capacity story in multiple dimensions



Projections (example)



Throughput:

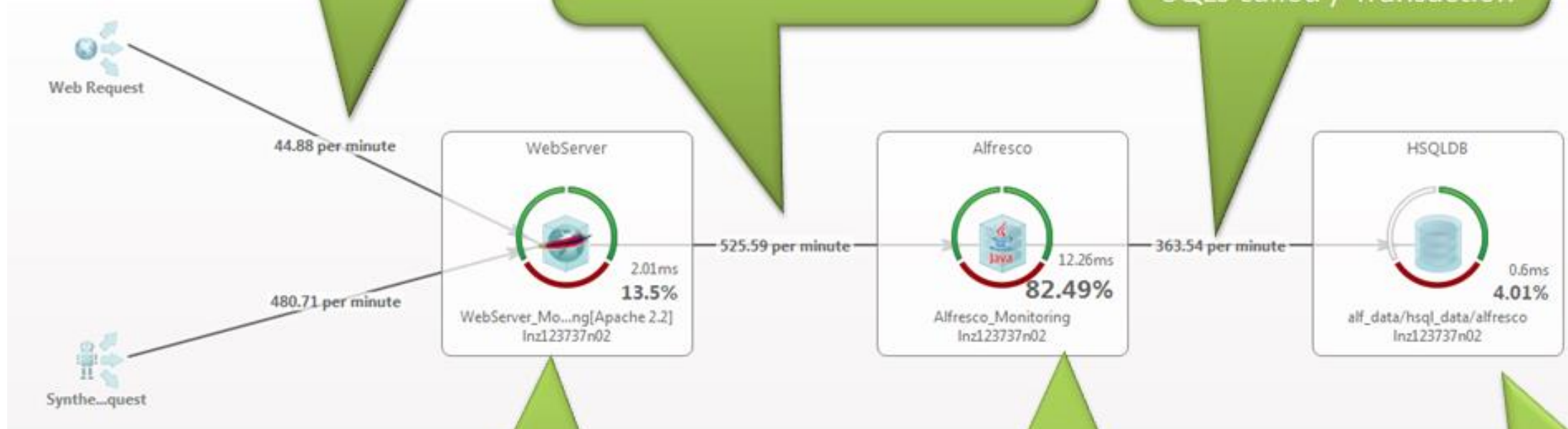
Bandwidth Requirements
per Transaction / User

Load Balancing:

Time Spent between Tiers
Requests waiting between Tiers

Connection Pool:

Pool Utilization
Acquisition Time
SQLs called / Transaction



Web Server:

Worker Thread Utilization
I/O, Memory, CPU

App Server:

Worker Thread Utilization
I/O, Memory, CPU
Time Spent in Components
(Servlet, Web Services,
Hibernate, JDBC/ADO.NET, ...)

Database Activity:

Slow SQLs
Total # SQLs
SQLs called frequently
Prepared vs. Non Prepared

Bottleneck symptoms

a) Slow first transaction

b) Bottleneck at low thread count

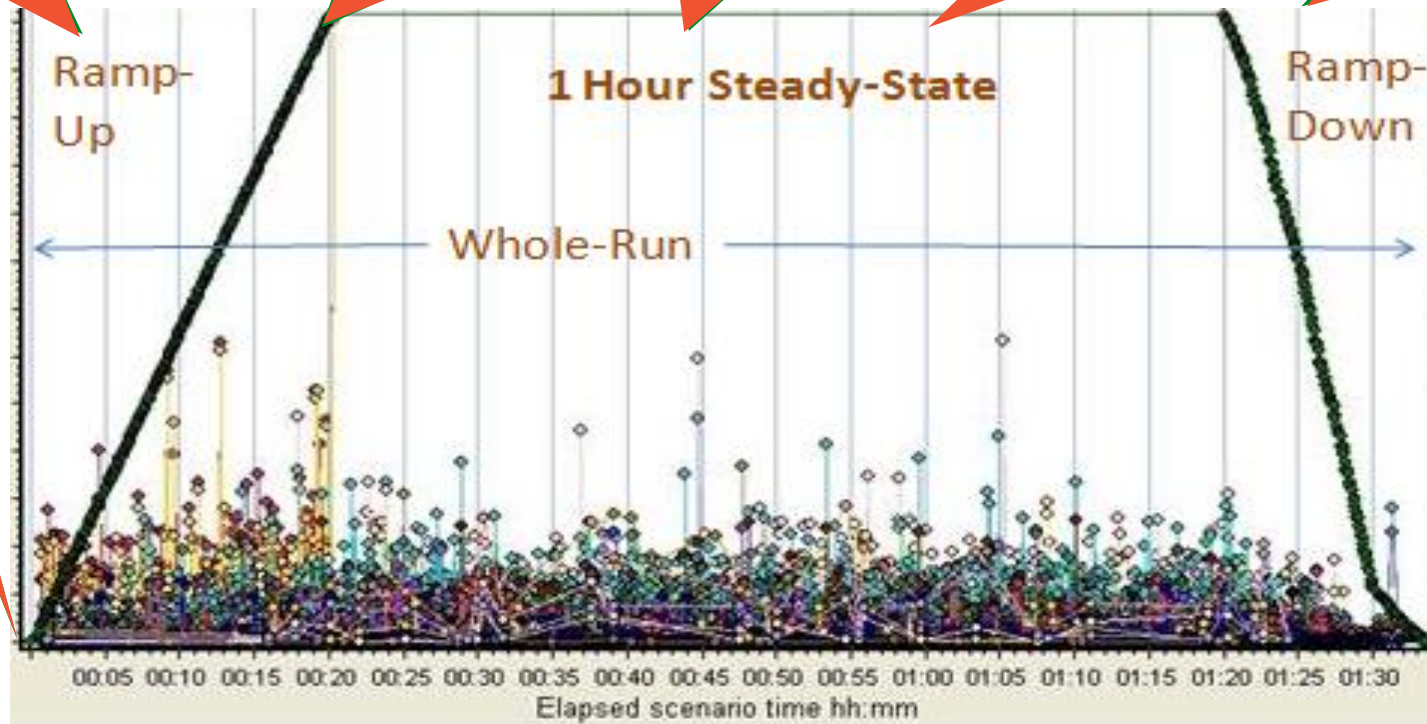
c) Many db. connections per user

d) High memory usage

e) High network usage

f) Response time spikes

g) Slow clean-up recovery



Possible internal bottlenecks

Component pre-loaded?

Max. Threads Setting too low?

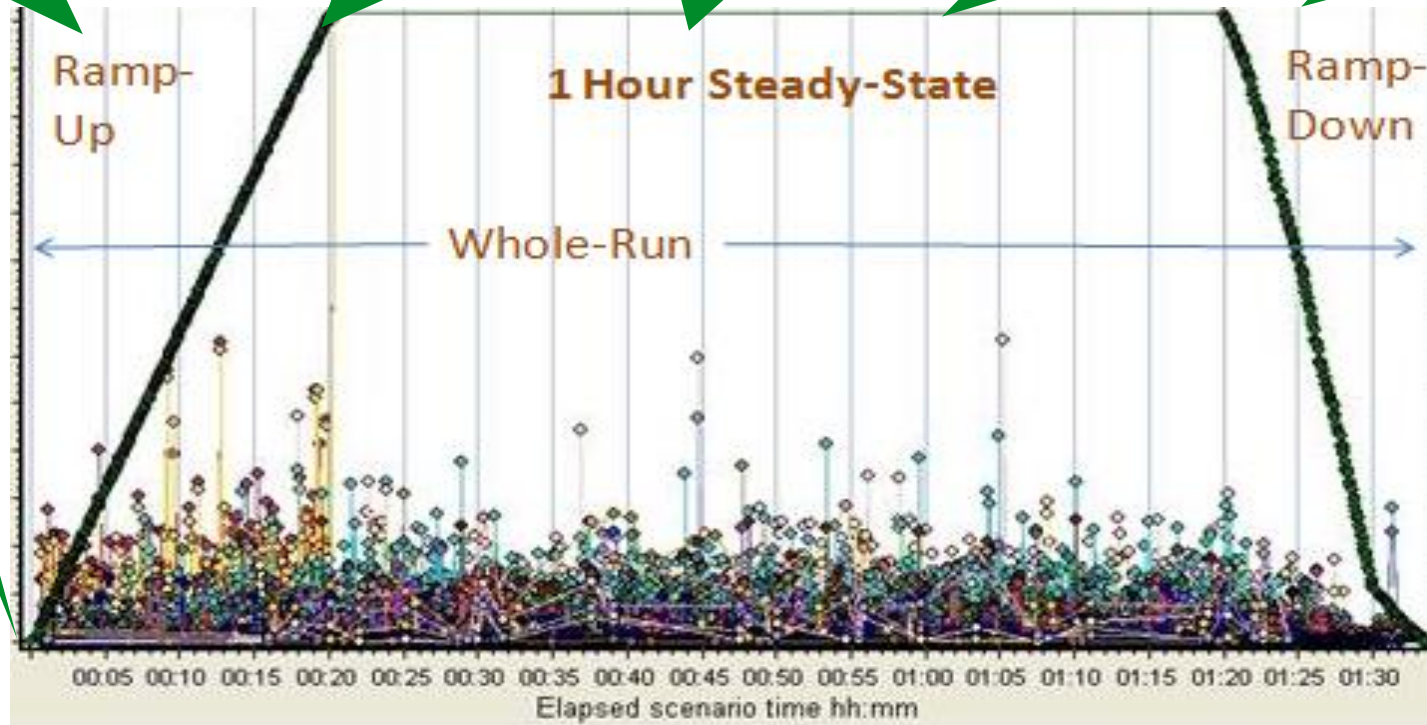
Database connection pooling?

Single-threaded coding?

Too many & large files downloaded

Garbage Collection Memory?

Time-out settings too long?



POLL



Jonathon

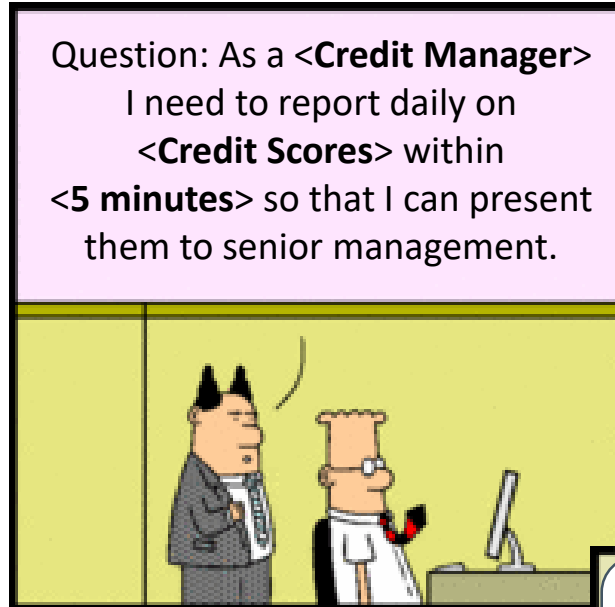
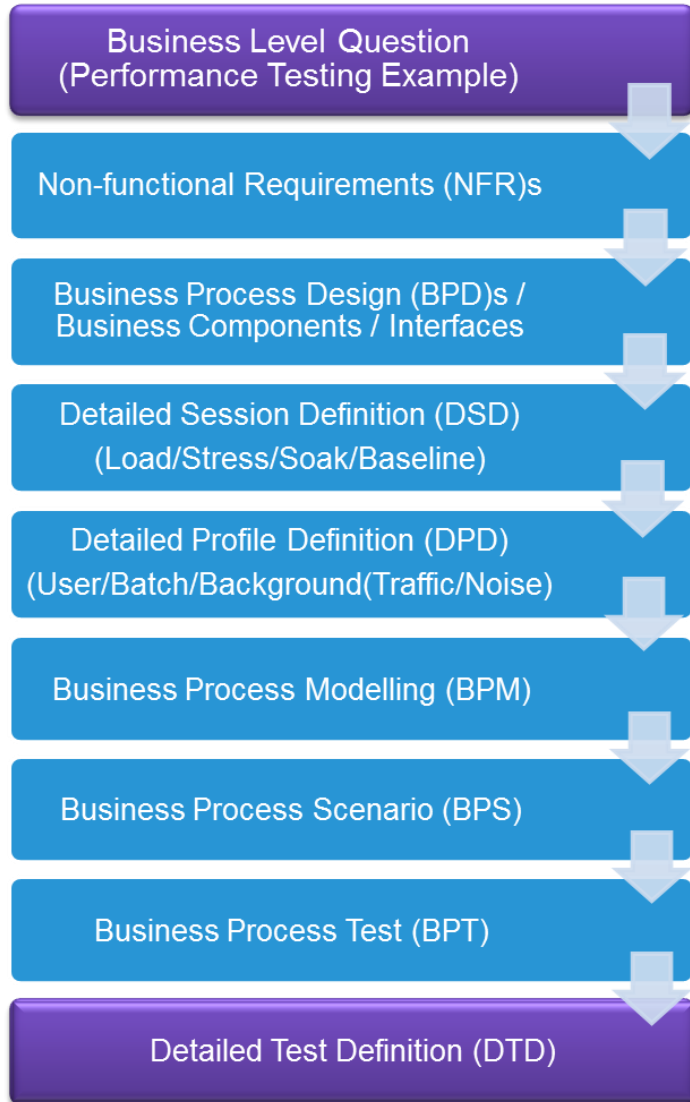


Performance Lifecycle

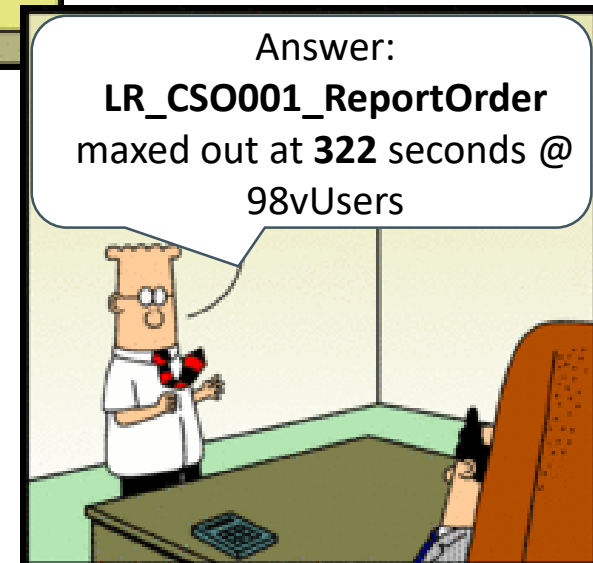
- Performance Virtualization Lifecycle (PVL)
- Performance Application Lifecycle (PAL)



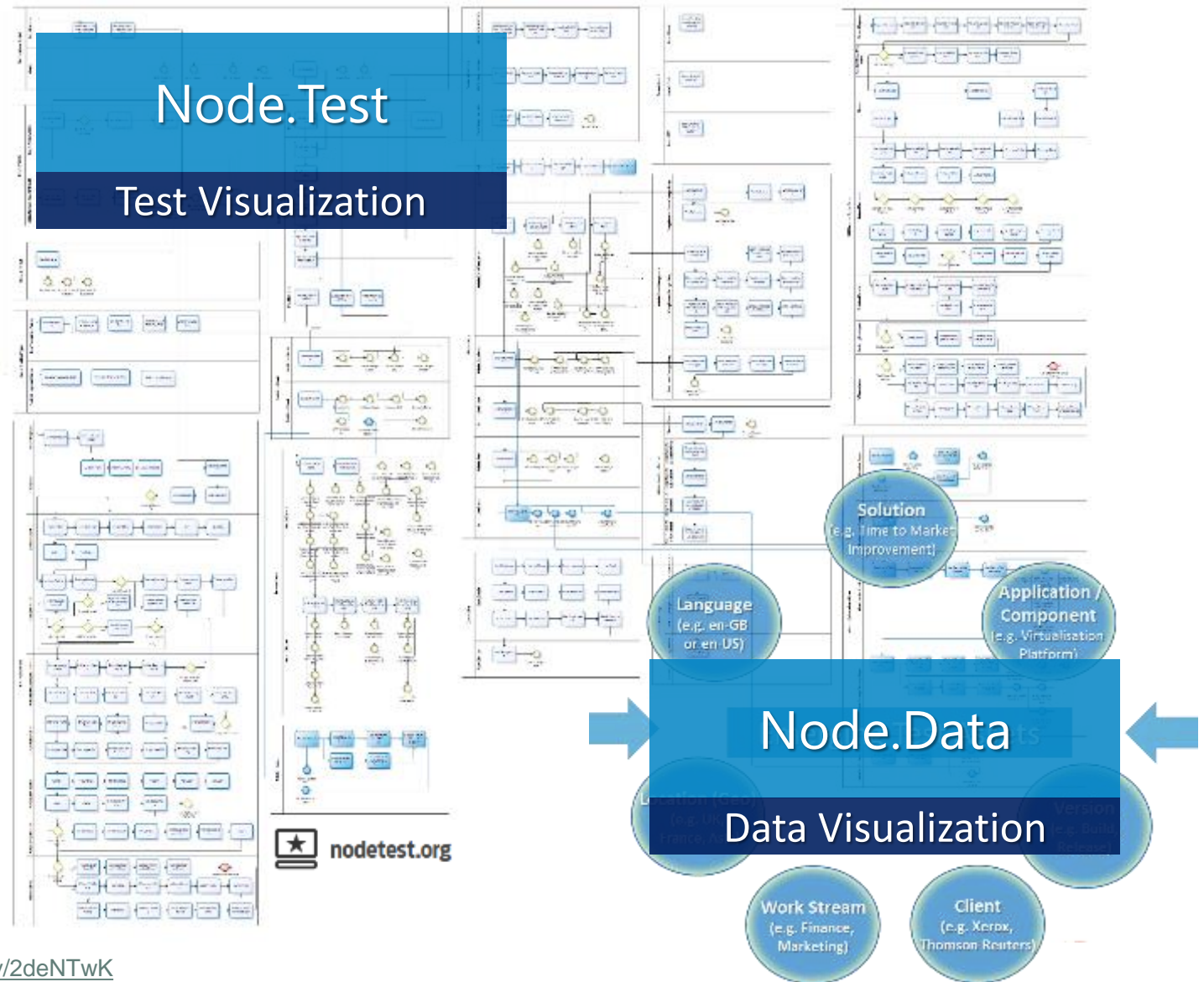
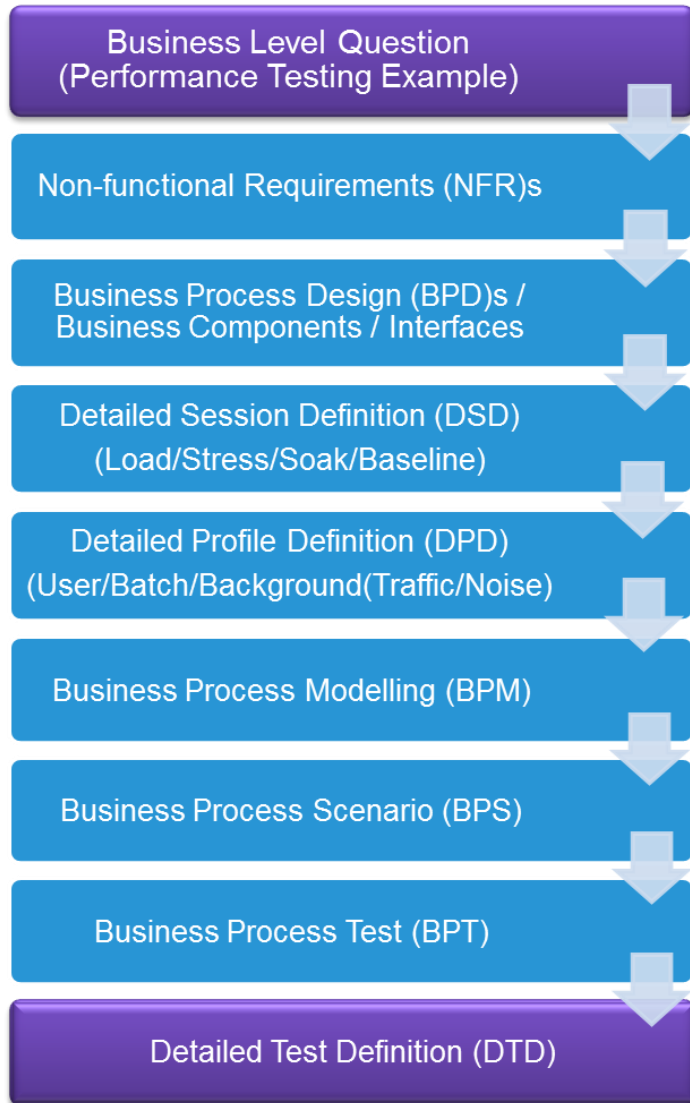
Performance Lifecycle Visualization – Business Questions?



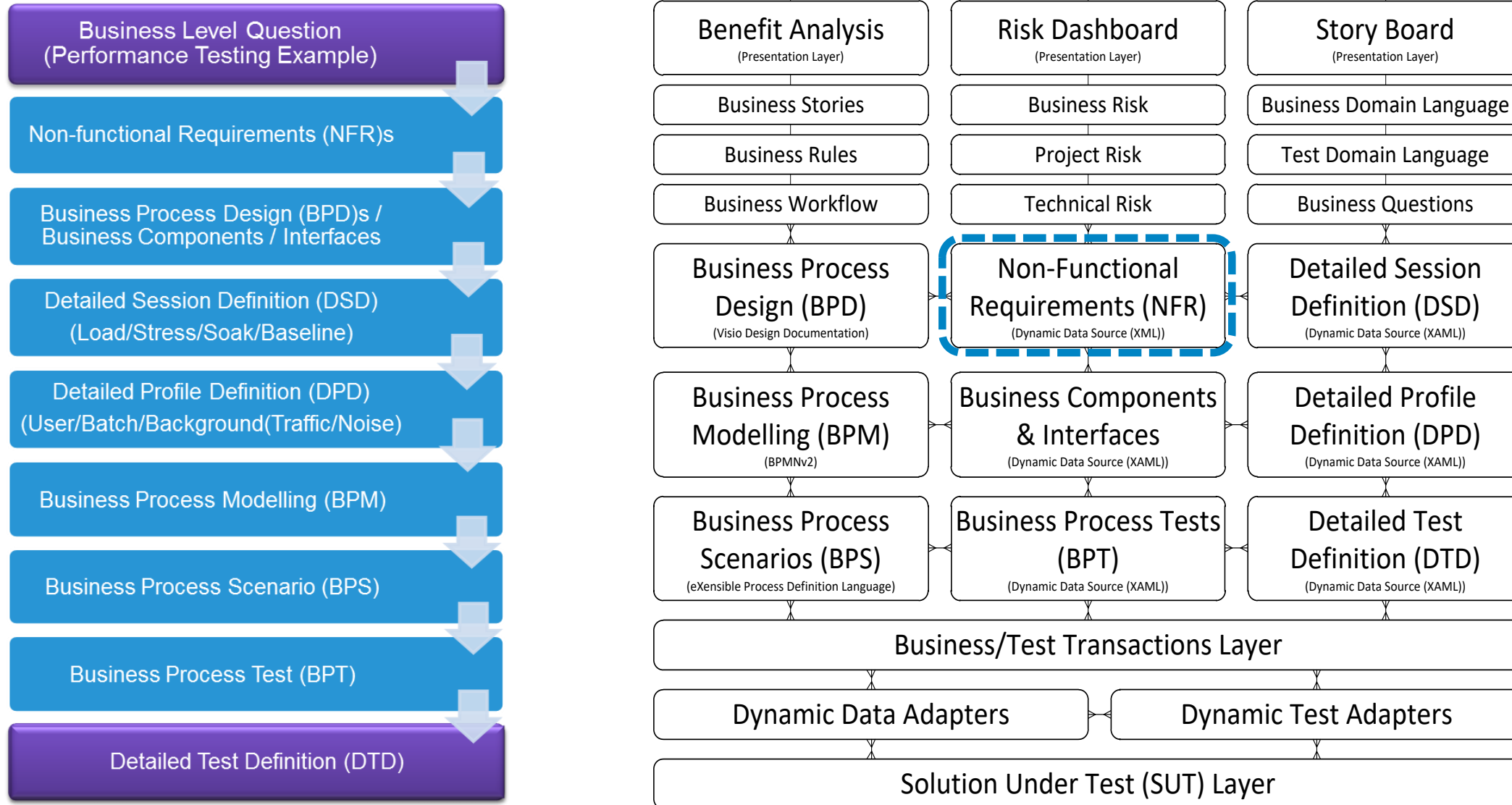
ATDD Statement



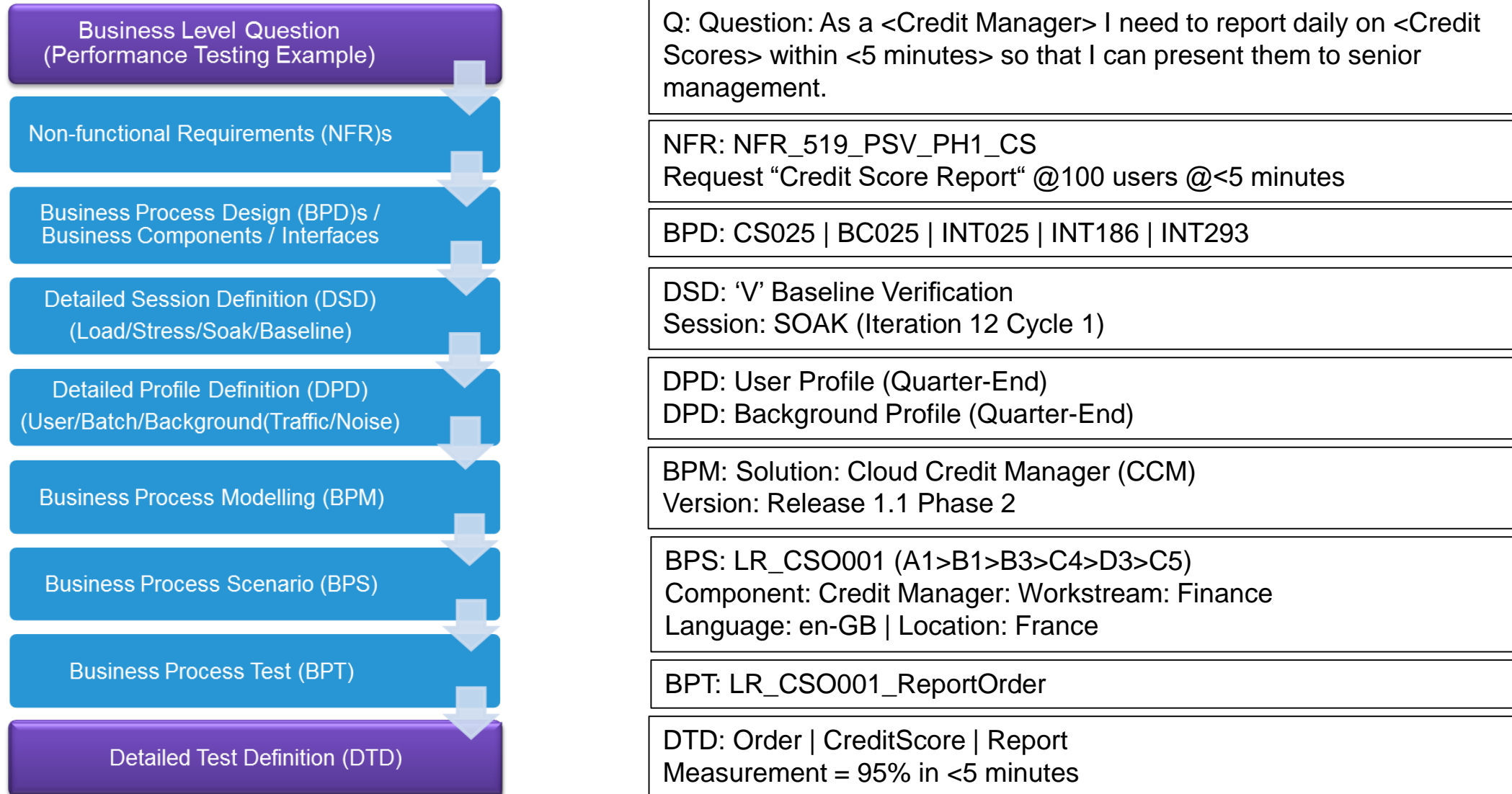
Performance Lifecycle Visualization – NodeTest



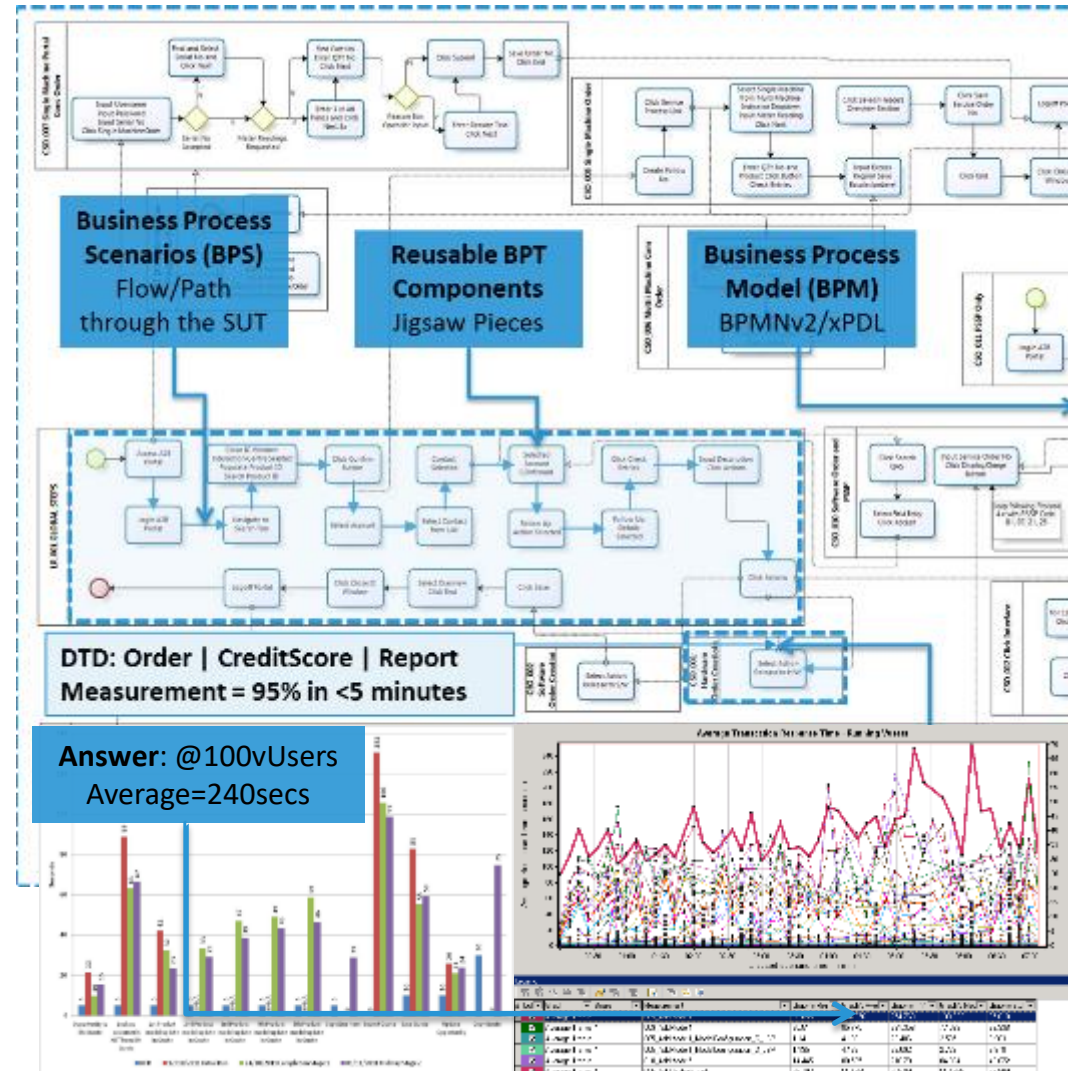
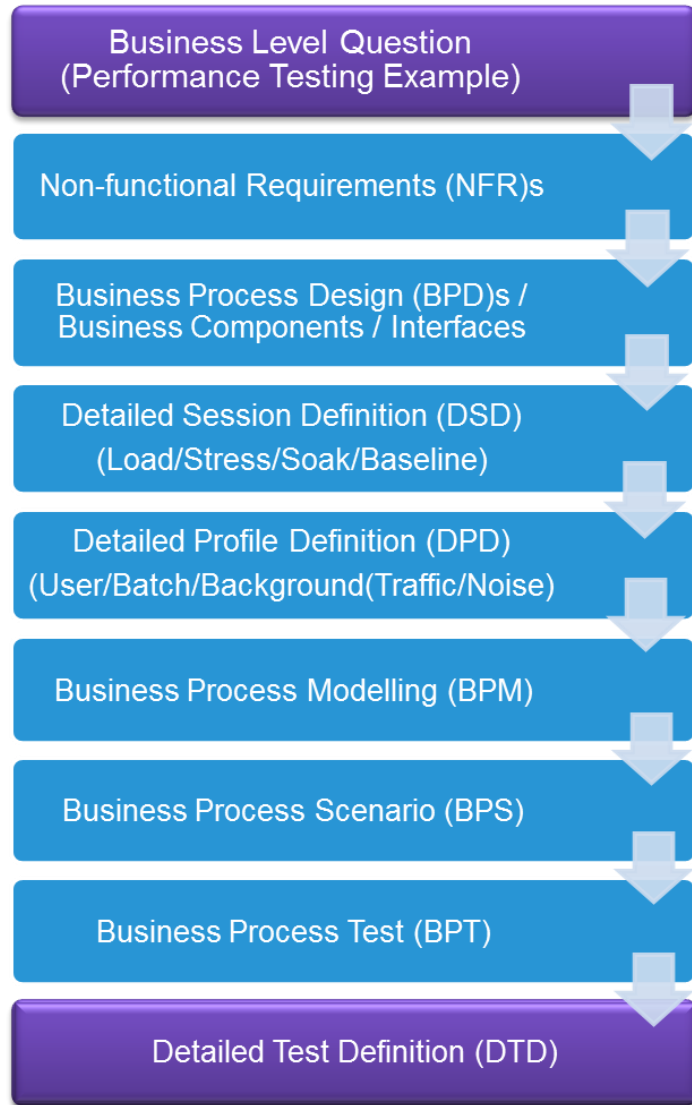
Performance Lifecycle Visualization – Non-Functional Requirements



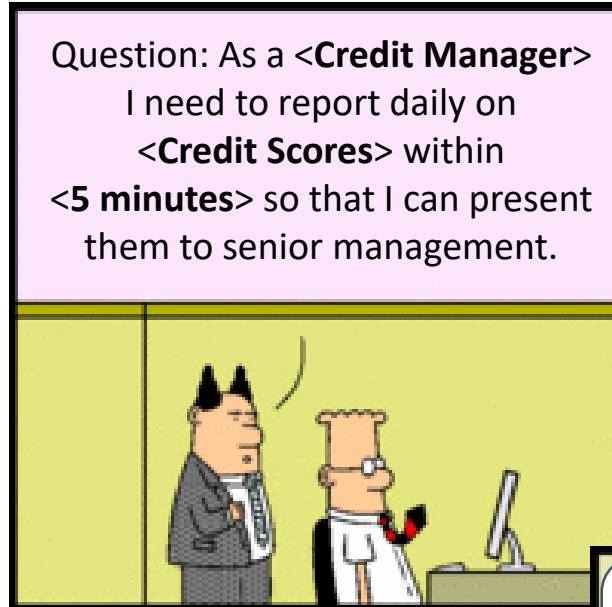
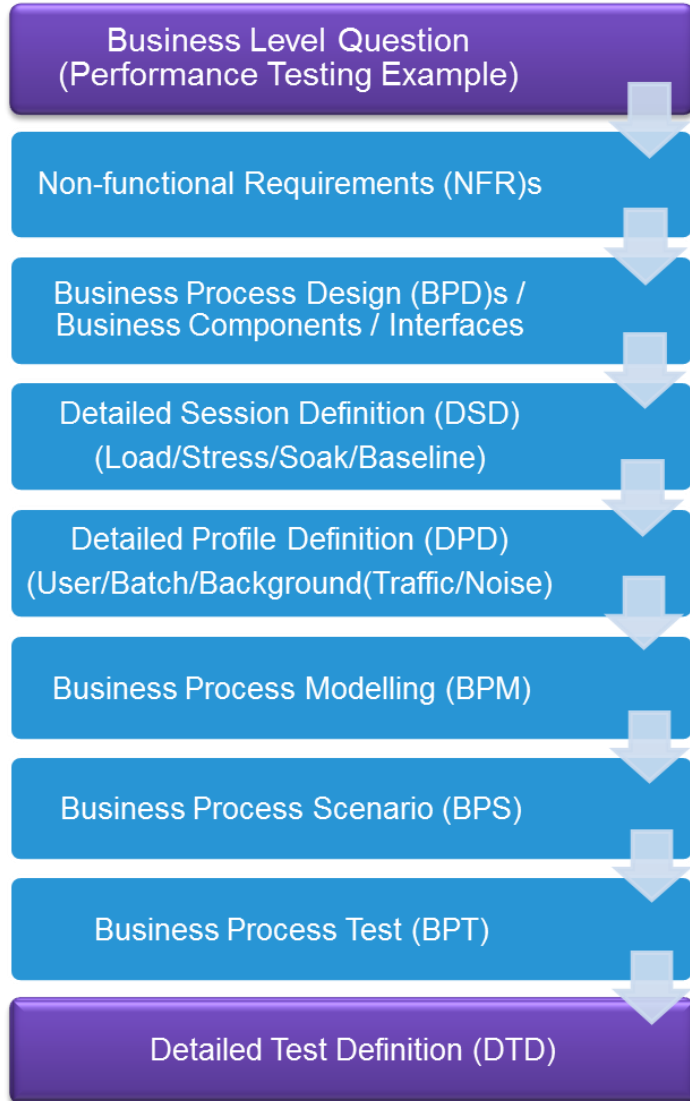
Performance Lifecycle Visualization – NFR Traceability



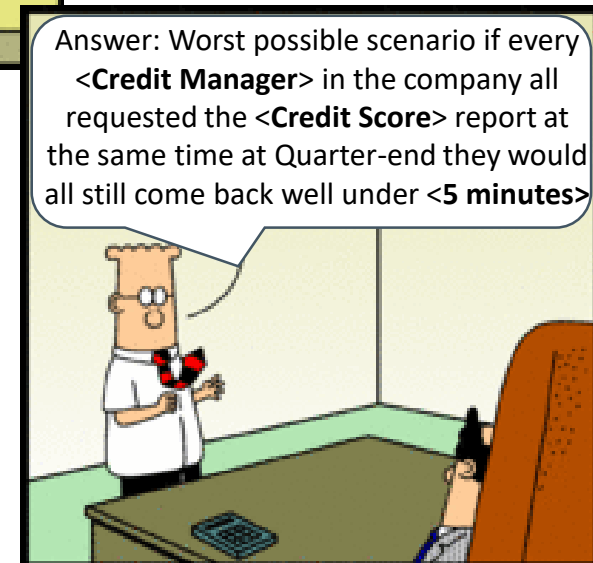
Performance Lifecycle Visualization – NFR Visualization



Performance Lifecycle Visualization – Business Answer?



Business Answer



Performance Application Lifecycle (PAL 2.0)



PAL Overview — Import a dataset, create a PAL Scenario, Run test, Compare reports



The most accurate load test, zero time, PAL (Performance Application Lifecycle) analyses your web production logs of all of the business processes performed by your real users and brings the performance engineer the most accurate load test.

Performance Application Lifecycle (PAL 2.0) – Import

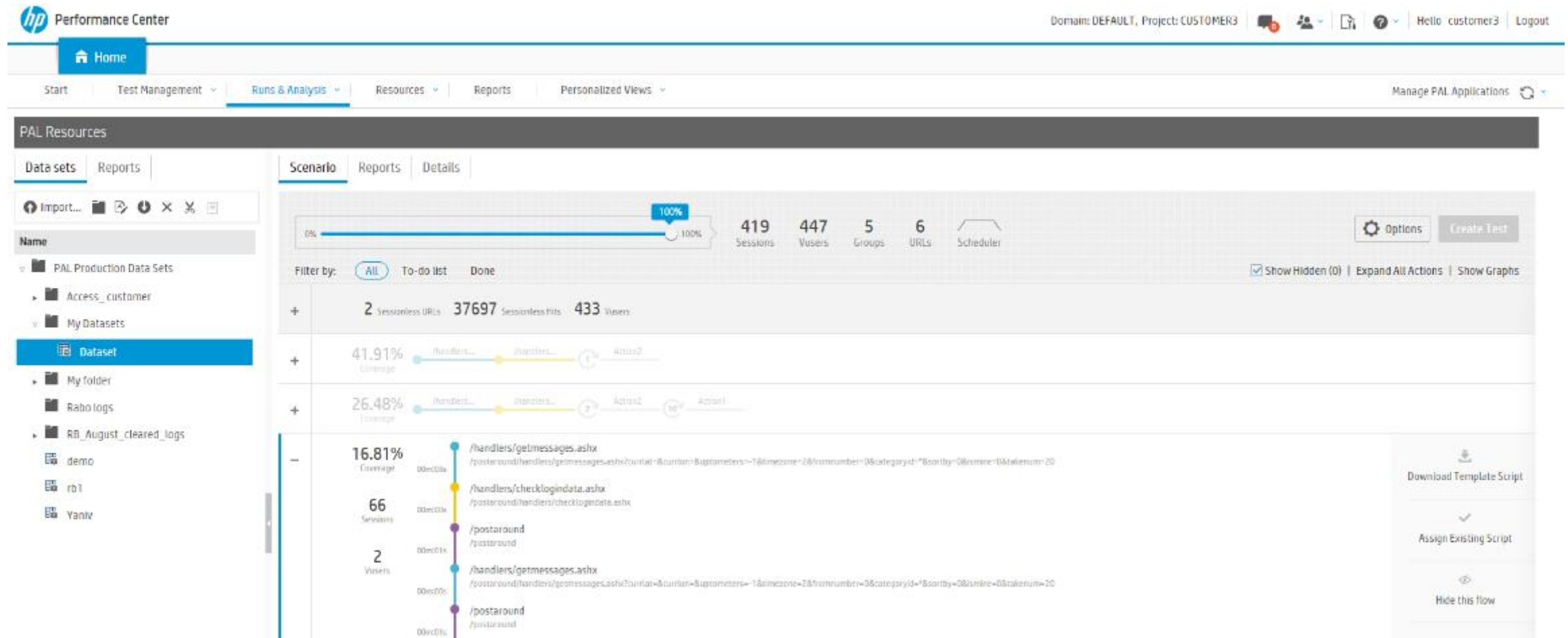
The screenshot shows the 'PAL Data Set Creator' interface at Step 1, 'Select data source'. A progress bar at the top indicates three steps: 1. Select data source (active), 2. Upload log, and 3. Set duration. Below the progress bar, a list of data sources is displayed with radio buttons: Microsoft IIS W3C extended log (selected), Apache logs, Google analytics, Webtrends, and HP Real User Monitor. At the bottom right, there are 'Back' and 'Next' buttons.

The screenshot shows the 'PAL Data Set Creator' interface at Step 3, 'Set duration'. The progress bar at the top shows all three steps completed with green checkmarks. The main area displays a line graph titled 'Select data set Duration' with the instruction 'Move slider to choose time range'. The graph shows a red area representing data volume over time, with the x-axis ranging from 19:00 to 20:00 on 22.05.15. A slider below the graph is positioned at the end of the time range. At the bottom, there are 'Back' and 'Create' buttons, and a confirmation dialog with 'OK' and 'Cancel' options.



To many developers, Performance engineers are a nuisance who waste time poking around a system that is "already perfect" or "one we already know that is slow".

Performance Application Lifecycle (PAL 2.0) - Model




“There has been no common definition of how to define and implement these loads and how to run the tests there is variability in test execution and ambiguity in the interpretation of the results.” Alan Korncoff, PhD, Chief Engineer

Performance Application Lifecycle (PAL 2.0) - Build

Job name

Build a free-style software project
This is the central feature of Jenkins. Jenkins will build your project combining any SCM with any build system, and this can be even something other than software build.

Build a maven2/3 project
Build a maven 2/3 project. Jenkins takes advantage of your PC to practically reduce the configuration.

 **Console Output**

```
Started by user anonymous
Building in workspace D:\Jenkins\workspace\RunLoadRunner
[RunLoadRunner] $ D:\Jenkins\workspace\RunLoadRunner\HpToolsLauncher.exe -paramfile
"Started..."
1 tests found:
D:\myLoadRunner\JenkinsDebug.lrs
-----
09/09/2013 11:56:46 Running: D:\myLoadRunner\JenkinsDebug.lrs
Cleaning up the environment...
Preparing scenario D:\myLoadRunner\JenkinsDebug.lrs for execution.
Error: Scenario D:\myLoadRunner\JenkinsDebug.lrs does not have an SLA configuration
Test result: Error
09/09/2013 11:57:46 Test complete: D:\myLoadRunner\JenkinsDebug.lrs
-----
Cleaning up the environment...
-----
Run status: Job failed, total tests: 1, succeeded: 0, failures: 0, errors: 1
Error : D:\myLoadRunner\JenkinsDebug.lrs
-----
Build step 'Execute HP tests from file system' changed build result to FAILURE
Finished: FAILURE
```

Build Triggers

- Build after other projects are built
- Build periodically
- Poll SCM

Build

Add build step ▼

- Execute HP tests from HP ALM
- Execute HP tests from file system**
- Execute HP tests using HP ALM Lab Management
- Execute Windows batch command
- Execute shell
- Invoke Ant
- Invoke top-level Maven targets

Build

Execute HP tests from file system
Make sure to enable the **Publish HP tests results** to be published.

Tests

Timeout

LoadRunner-Specific Settings...
Delete

Build

Execute HP tests from file system
Make sure to enable the **Publish HP tests results** to be published.

Tests

Timeout

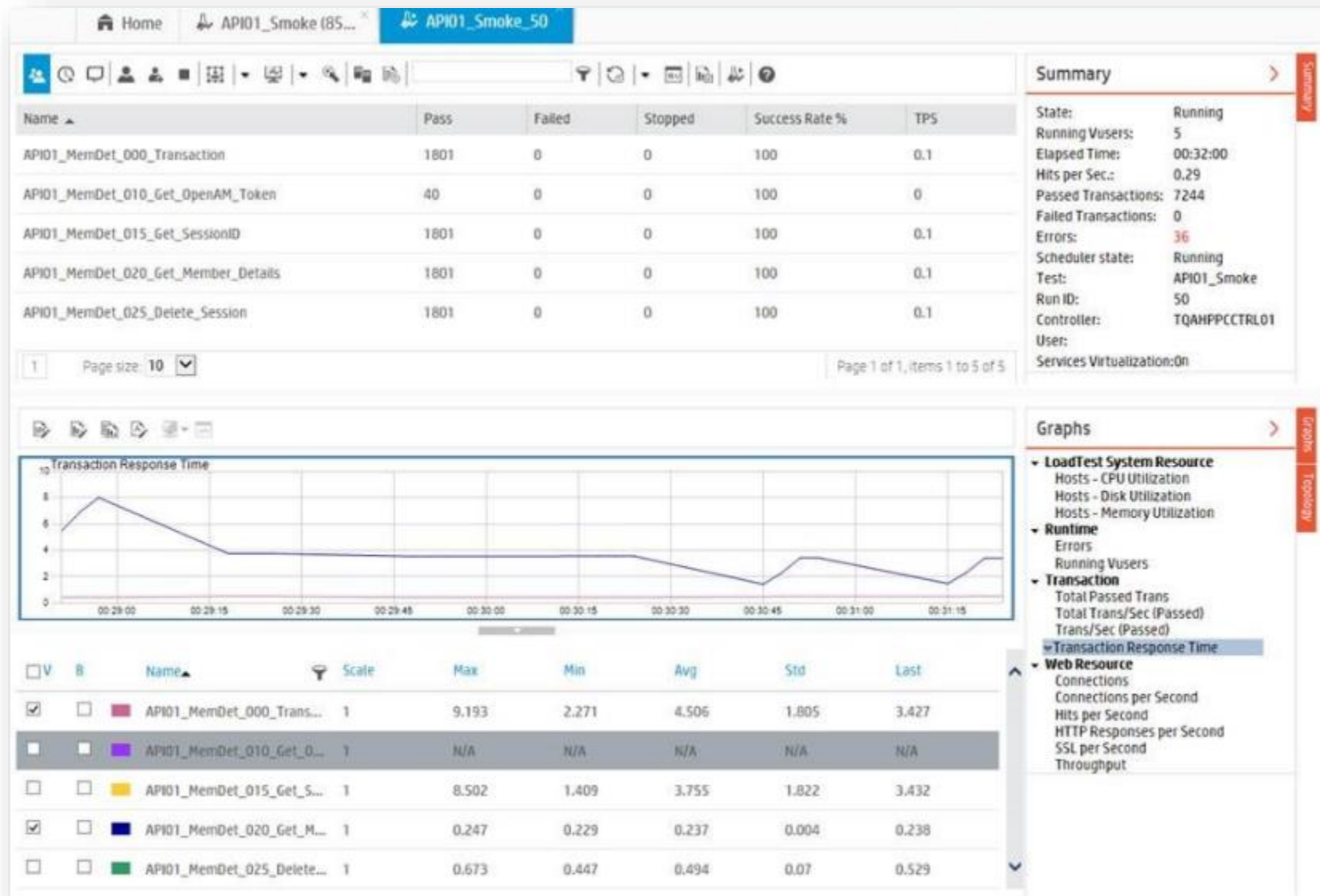
Aggregate downstream test results
Archive the artifacts
Build other projects
Publish HP tests result
Publish JUnit test result report
Publish Javadoc
Record fingerprints of files to track usage
Create or Update Label in Performe
E-mail Notification

Add post-build action ▼



“...solution delivery lifecycle is lean, so reduction of waste and duplication of effort. Connected Intelligence really give one single view of the world, so that we can try and reduce that waste and move to more operational excellence.”

Performance Application Lifecycle (PAL 2.0) - Execution



POLL



Eric



2016 Performance Engineering Summit



<http://bit.ly/PESummit2016-Blog>



Who Becomes a Performance Engineer?

- Functional Tester
- Developers
- Ops / DBA / Network Admin / Other Technical
- Entry level CS grads / EEs



PE Education: Architecture

- Draw and Interpret System Diagrams
- Basic Environment Management (patching, shared resource / services)
- Test Environments vs Production (containers / cloud options, configuration, virtualization)



PE Education: Test Design, Strategy

- Goals, Requirements, Desirements, Stakeholders
- Concurrency, Arrival Rate, and Scheduling
- Scalability / Capacity / Reliability
- Continuous Integration



PE Education: Load Modeling

- Identifying Transactions and Workflows
- Calculating Workload Transactions and TPS
- Log File Analysis, Queries, Production Monitoring, and Other Sources of Data
- Test Data



PE Education: Scripting

- Parameterization / Dynamic Content
- Transaction Measurement and Naming Conventions
- Think Time and Pacing
- Why Validations are Necessary



PE Education: Interpreting Results

- Understanding Measurement and Metrics
- Reading Results and Interpreting Graphs
- Error and Success Rates



PE Education: Interpreting Results

- Bottlenecks:
 - Network Bandwidth and Application Throughput
 - Resource Saturation / Operating Range
 - Memory and Garbage Collection
- Explaining Queues (Little's Law)



POLL

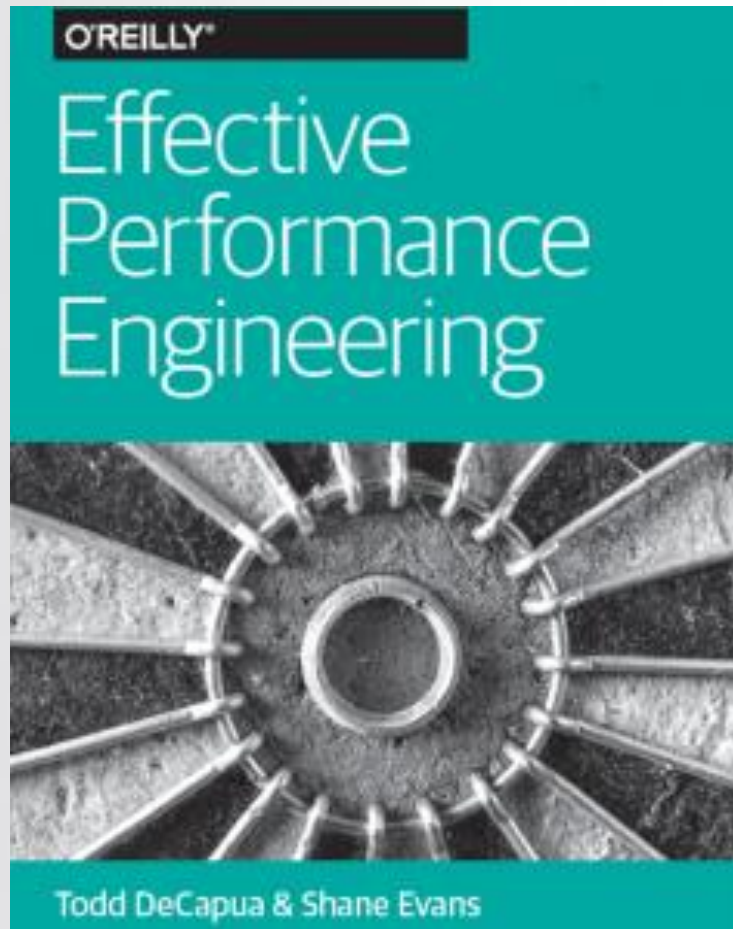


Todd



Book: Effective Performance Engineering

<http://bit.ly/EffPerfEng>



Website / Report: TechBeacon.com



<http://bit.ly/PE15Report>

<http://TechBeacon.com/Performance>



Conferences: A lot out there

The logo for the Velocity conference, featuring the word "Velocity" in a teal, sans-serif font.

<http://conferences.oreilly.com/velocity>

The logo for the STP Software Test Professionals Conference Fall 2016. It features the letters "STP" in a large, bold, black font, followed by the text "SOFTWARE TEST PROFESSIONALS CONFERENCE FALL 2016" in a smaller, black, sans-serif font.

<http://www.stpcon.com/>

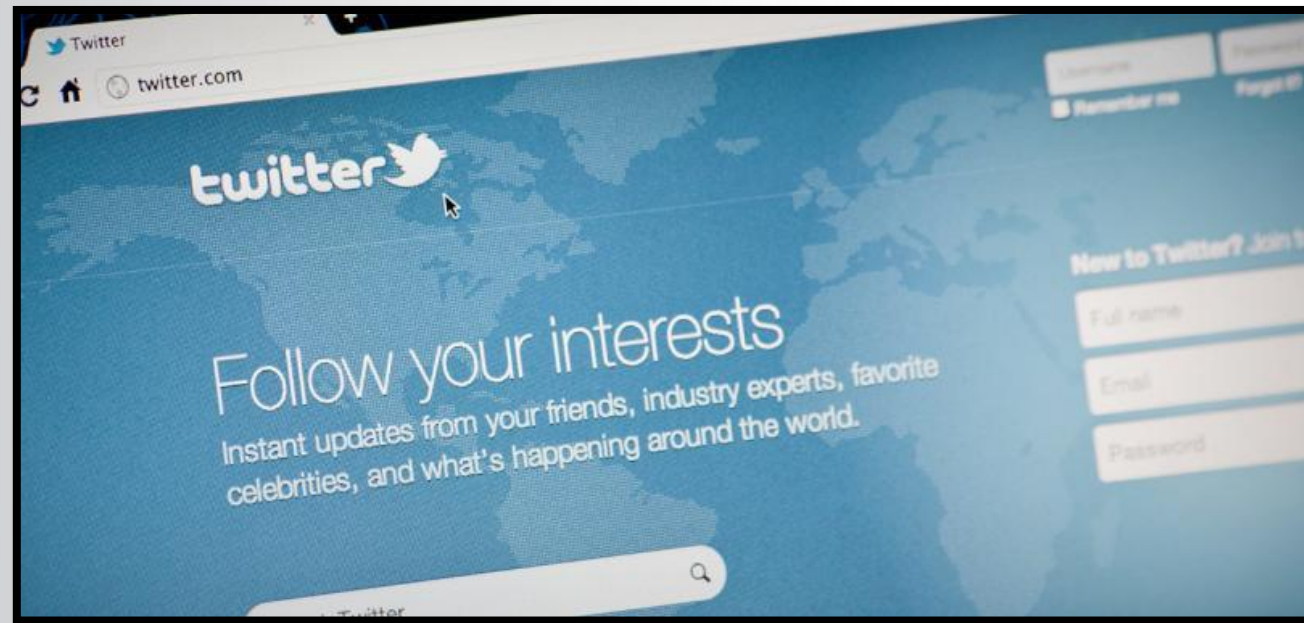
The logo for the CMG Computer Measurement Group IMPACT conference. It features the "CMG" logo with a stylized bar chart icon, followed by "Computer Measurement Group" in small text. Below that is the word "IMPACT" in a large, colorful, geometric font. At the bottom, the text "INTERNET • MOBILE • PERFORMANCE & CAPACITY • CLOUD • TECHNOLOGY" is displayed in a smaller font.

<http://www.cmg.org/>

The logo for VivIt, featuring the word "VIVIt" in a colorful, sans-serif font. The "i" is blue and contains a white dot. The logo is surrounded by a circular border with the text "YOUR INDEPENDENT IPE SOFTWARE COMMUNITY" in a smaller font.

Social Network(s): Where to start

30 top Performance Engineering leaders to follow on Twitter



<http://bit.ly/30TopPEs>



Slack



<http://effperfeng.slack.com>



Monthly Vivit Worldwide Performance Engineering SIG Webinars

Second Tuesday of Every Month

[BLOG: PE is Fastest Growing Special Interest Group In The World](#)

12 Jan 2016:

[Vivit Worldwide PE SIG 2016](#)

9 Feb 2016:

[PE in Agile](#)

8 Mar 2016:

[PE in a CoE](#)

12 Apr 2016:

[PE and Value to the Business](#)

10 May 2016:

[PE as a Competitive Differentiator](#)

14 Jun 2016:

[PE and Your End User](#)

12 Jul 2016:

[PE and Value to Technology](#)

9 Aug 2016:

[PE and Proven Practices](#)

13 Sep 2016:

[PE Tools](#)

11 Oct 2016:

PE Education

8 Nov 2016:

PE Solution Overview

13 Dec 2016:

PE Core Capabilities

Call for Speakers Survey: <http://goo.gl/forms/YmFJZIRna1>





Discover
2016
London
Nov 29 -
Dec 1

Discover 2016 London

- Excel London

- In today's idea economy, success favors enterprises that can reinvent to outpace the competition. Discover 2016 can put your enterprise in the lead. Come to the intersection of digital transformation, technology and ideas. Accelerate what's next for your business.
- Join more than 10,000 IT executives, architects, engineers, partners and innovators from around the globe. Accelerate your unique digital transformation journey. Explore how to deliver seamless experiences, harness data, mitigate risk, boost agility and enable workforce productivity.
- Dive into Discover 2016.

Register Now and receive your member discount
hpe.com/discover



Top ten reasons to attend

1



Get ready to transform your IT

Transforming to a hybrid infrastructure, protecting your digital enterprise, empowering the data-driven organization and enabling workplace productivity can position your enterprise for success. Learn how Hewlett Packard Enterprise is the best strategic digital partner equipping you for transformation.

2



Hear from the Hewlett Packard Enterprise leadership team and other industry visionaries

Learn about our four Transformation Areas and hear directly from President and Chief Executive Officer Meg Whitman and the executive team on how Hewlett Packard Enterprise is helping you go further, faster.

3



Accelerate next with Hewlett Packard Enterprise Transformation Advisors

Bring your digital transformation to life through one-on-one consultations with our solution architects on hand to answer your questions and address your challenges to help you accelerate what's next for your business.

4



Seize valuable opportunity

Time-to-value is the new name of the game, and the ability to capitalize immediately is key to survival. Through the Transformation Zone and Innovation and Spotlight Sessions, you'll learn how HPE can help you transform your organization to significantly reduce the time-to-value of your IT investments.

5



Accelerate transformation with IT consumption

The velocity of change in today's IT world is daunting. Driving innovation while still running the business is essential. Through a series of Spotlight, Theater and Breakout Sessions, learn how you can fund transformation, map your investment strategy to your IT roadmap and achieve faster time-to-market.

6



Take a sneak peek at tomorrow's technologies

Customers and partners under CDA can get early access to preview upcoming Hewlett Packard Enterprise products and solutions.

7



Find answers to your biggest business and IT challenges

Discover 2016 is the perfect place to find solutions, seek new innovations and learn how Hewlett Packard Enterprise can help your enterprise succeed.

8



Explore the Transformation Zone

Interact with experts and peers and learn more about Hewlett Packard Enterprise's most innovative technologies. See the latest products and solutions while speaking with the engineers and architects who created them.

9



Expand your network and grow relationships

Engage with other IT professionals, schedule formal onsite meetings at the Hewlett Packard Enterprise Meeting Center or visit the Guru Bar to chat with Hewlett Packard Enterprise experts.

10



Tap into the power of our partners

Meet with Discover 2016 sponsors, including Intel and Microsoft, in the Transformation Zone. See how collaboration and our growing network is bringing more opportunity and advantages for you.

Thank you

www.vivit-worldwide.org

bit.ly/VIVITPE

