

Performance and Scalability Testing: Within Agile Development

08 May 2012

Version 4

Agenda

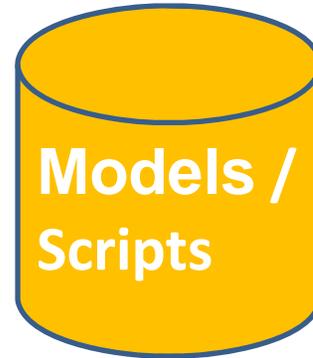
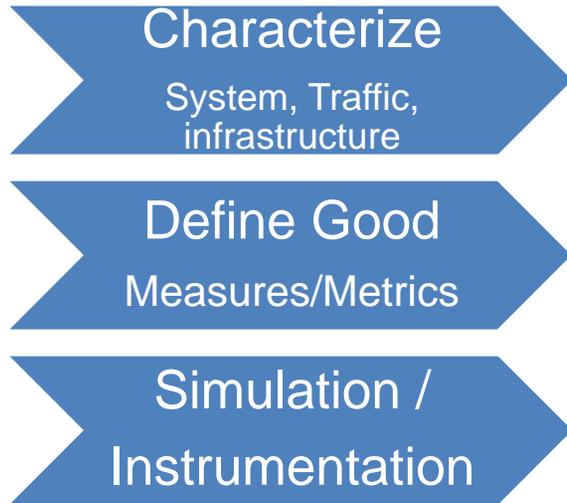
- Definitions.
- Performance and Scalability Methodology.
- Case Study: Enterprise Service–X (ES-X).
- Summary.



Definitions

- Performance Testing: To determine how a system performs in terms of responsiveness and stability under a particular workload.
 - A measure of efficiency/effectiveness.
- Scalability Testing: To determine the capability of a system to increase performance under an increased load when resources are added.
 - Increase “work” per additional resource.

Performance and Scalability Methodology



Execute

**Each Cycle
Fast & Cheap**

**Take
Action**

Analyze

Resource Intensive /
Invest Once

Positive User Experience		
Scalable	Reliable	Responsive



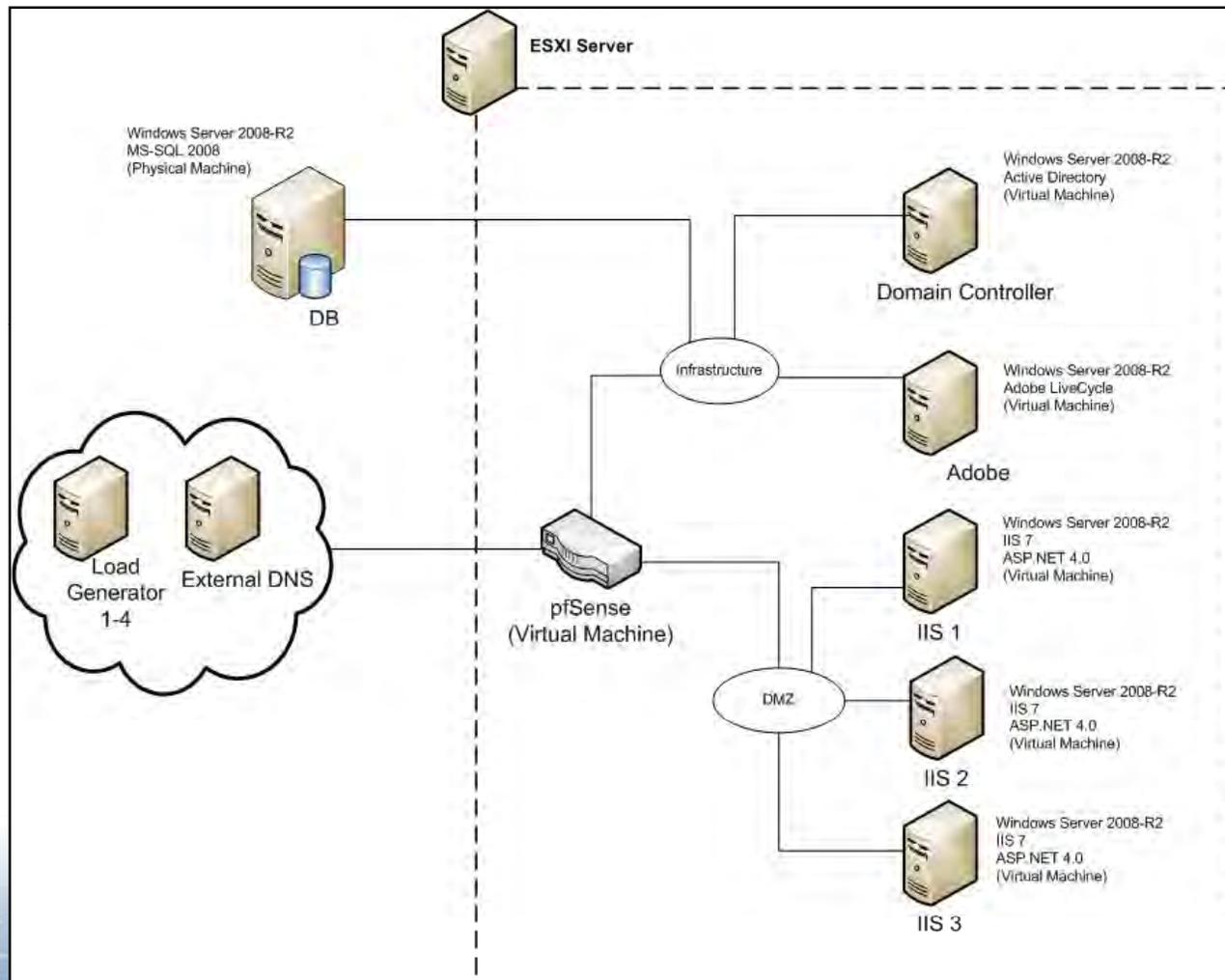
Case Study

Enterprise Service-X (ES-X)



ES-X System Description

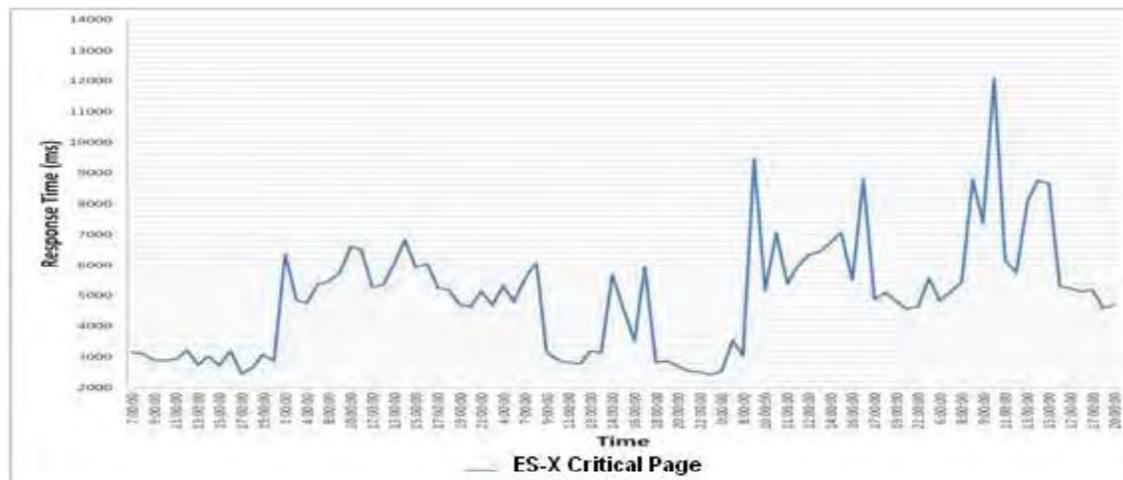
Logical View – Test Architecture



Problem - User Experience Degraded Over Time

Characterize

- Objective: Define current system limitations.
- Reviewed the ES-X Internet Information Services (IIS) and Microsoft Structured Query Language (SQL) log file using Microsoft Log Parser.



- Obtained current response times, concurrent users, most hit pages, typical actions, frequency and queuing information.
- Keep scope on application assets to reduce complexity.
 - Add complexity over time as the parts are validated.

Define Good

- ES-X reviewed on historical usage and ‘as is’ loading.
 - Log files are a rich source for operational performance data.
 - Example: Correlation between pages with highest response times and highest number of hits.
- “*Microsoft guide Improving .NET Application Performance and Scalability*”:
 - Chapter 15: Measuring .NET Application Performance.
 - Chapter 16: Testing .NET Application Performance.
- Metrics & Measures.
 - 32 critical system metrics.

Instrumentation

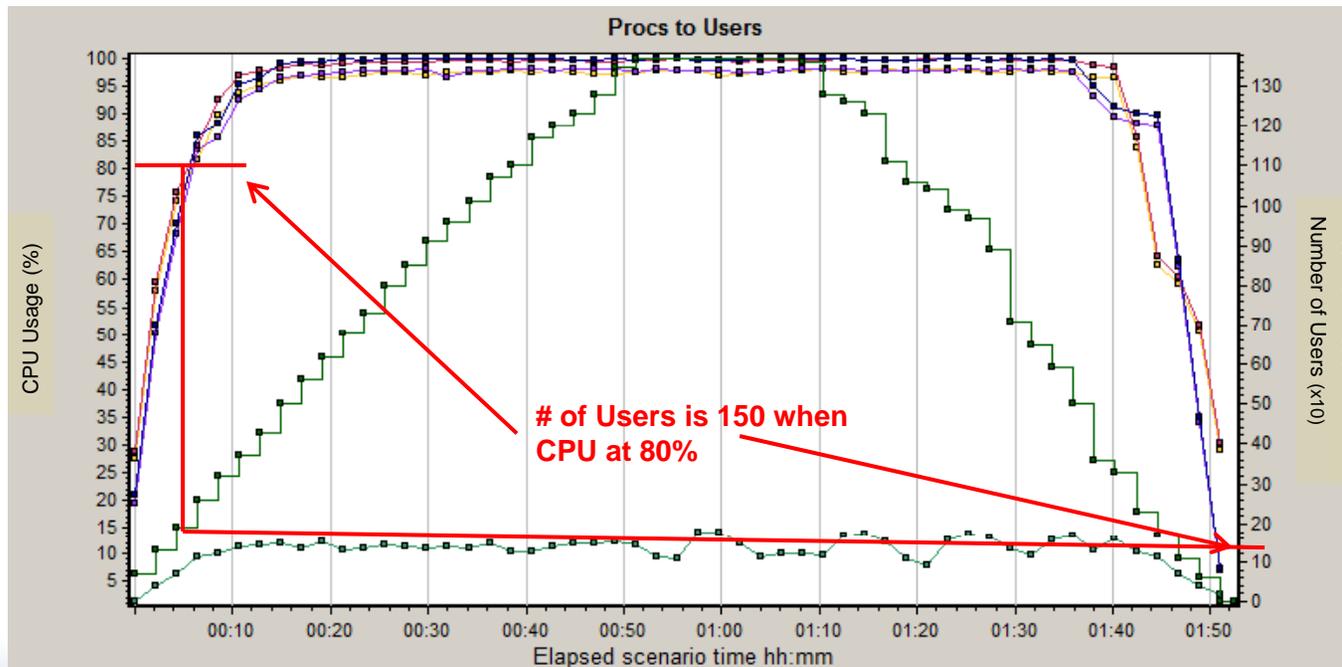
- HP Load Runner.
 - High fidelity user simulation modeling.
- 5 User Roles (work flow) based on IIS review.
- Public Key Infrastructure (PKI) authentication.
 - Obtained Certs from DoD Test Certification Authority (CA).
- Up to 1500 simulated users.
 - Network Operations community limited in size.
- Arrival rates evenly spaced.
 - While not operationally realistic allows for determination of user loads that can be supported.

Execution

- Executed scenarios several times, over a one day period.
 - Ease of execution run supported several follow on runs.
- Executed potential ‘what if’ scenarios.
 - Increase/Decrease computing resources.
- Experienced ‘faulty’ data during analysis phase (suspected bad data).
 - Ease and speed of execution runs supported follow on runs to address and obtain ‘good’ data.

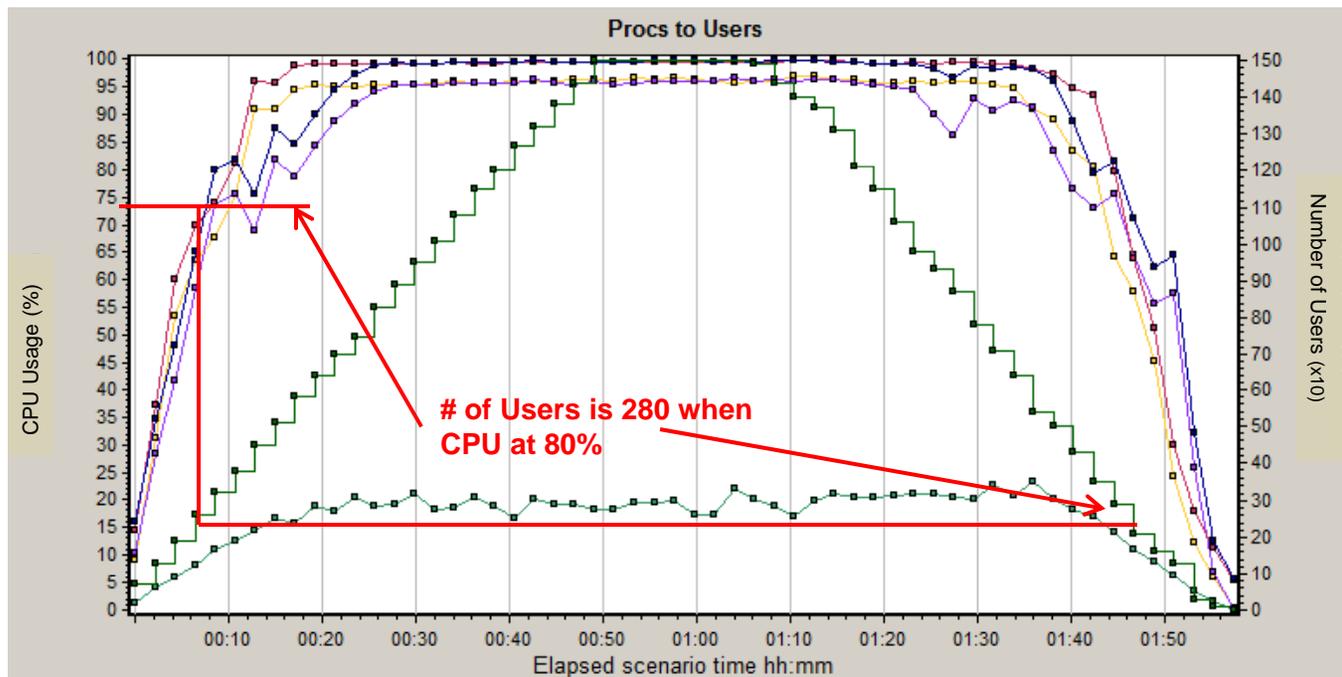
Analyze

- ES-X Resource Usage on a 2 core web server.
 - 150 Users/Web Server before computing resource usage hits 80%.



Analyze

- ES-X Resource Usage on a 4 core web server.
 - 280 Users/Web Server before computing resource usage hits 80%.



Take Action

- ES-X scales (linearly), efficiency is a concern.
- Enterprise Cloud Computing supports flexible/dynamic capacity allocations:
 - No sunken cost.
 - Pay for only the capacity you need today.
- Solution for ES-X:
 - Increase computing capacity in the short term to improve current User Experience and meet the User planned transition dates while maintaining the User Experience.
 - Improve application efficiency (# users / core).
 - Dial down capacity as efficiency is improved and fielded.

Summary

- The User Experience WILL define your product.
- Performance and Scalability Testing is critical for Enterprise Services:
 - It must scale to support increasing users.
 - Performance is vital, budgets don't support unlimited scaling.
- Characterizing the usage/load is critically important, and difficult.
 - For Enterprise Services just determining User - base/patterns difficult.
- Upfront investment in characterizing, instrumentation and scenarios.
- Upfront investment support many low cost execution runs.
- Performance and Scalability fit within the agile development model.

QUESTIONS

