ABOUT THE SPEAKERS

- Boris Zibitsker
  - CEO BEZNext
  - Manage development of Performance Assurance software for Data Warehouse and Big Data applications for On Prem and Cloud environments

- Alexander Podelko
  - Specializing in performance since 1997
  - Currently Consulting Member of Technical Staff at Oracle (Stamford, CT)
  - Performance testing and optimization of Enterprise Performance Management (EPM) and Hyperion products
  - Board director at Computer Measurement Group (CMG) – non-profit organization of performance and capacity professionals

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OUTLINE

- Introduction and Problem Description
- Value and limitations of the performance testing
- How modeling and optimization add value to Performance Testing
- Summary - Testing and modeling reduce risk of performance surprises

DEVOPS FOR NEW SYSTEMS
TRADITIONAL LOAD/PERFORMANCE TESTING

Focus: Can the System Handle Peak Load?
DEVOPS FOR NEW SYSTEMS
TODAY’S PERFORMANCE TESTING

App Development
- Plan
- Code
- Create
- Test

Operations
- Release
- Deploy
- Operate

DevOps
Continuous Deployment
Continuous Delivery
Continuous Integration
Agile Development

- All the time
  - Early performance testing
  - Continuous performance testing
- Different scope
  - Full-scale testing not always feasible
  - Component / subsystem / small-scale / etc.
- Different environments
  - Lab / Cloud (IaaS) / Cloud (SaaS)

CONTINUUM OF OPTIONS

Testing Approach
- Automated / Regression
- Traditional
- Exploratory / Agile

System
- Well-known
- Traditional
- New

Scenarios
- System validation for high load
  - Outside load (service or cloud), production system
  - Wider scope, lower repeatability
- Performance optimization / troubleshooting
  - Isolated lab environment
  - Limited scope, high repeatability
- Testing in Cloud
  - Lowering costs (in case of periodic tests)
  - Limited scope, low repeatability
LOAD GENERATION

Record and Playback: Protocol Level

Load Generator

Load Testing Tool

Virtual Users

Network

Server

Application

Programming

Load Generator

Load Testing Tool

Virtual Users

API

Network

Server

Application

Record and Playback: UI Level

Load Generator

Load Testing Tool

Virtual Users

Browsers

Network

Server

Application

MOST POPULAR LOAD TESTING TOOLS

Commercial

- Microfocus LoadRunner family
- Microfocus Silk Performer
- Neotys NeoLoad
- IBM Rational Performance Tester
- RadView WebLoad
- SmartBear LoadNinja

Commercial on the top of Open Source

- Broadcom/CA BlazeMeter
- Tricentis Flood.io
- RedLine13
- Octoperf

Open Source

- Apache JMeter
- Gatling
- k6
- Locust
Performance Testing and Modeling for New Applications

TESTING STRATEGY BECAME VERY NON-TRIVIAL

Challenges
- A lot of options along many dimensions
- Defined by context
- “Automation” is only one part of it
  - Important for iterative development
- Part of performance engineering strategy
  - Should be considered amongst other activities

Sample of Questions to be answered to define Testing Strategy
- What are performance risks we want to mitigate?
  - What part of this risks should be mitigated by performance testing?
- Which performance tests will mitigate the risk?
- When we should run them?
- What process/environment/approach/tools we need in our context to implement them?

VALUE AND LIMITS OF TODAY’S PERFORMANCE TESTING

Value
- Pro-active way to mitigate performance risk
- Early problem detections prevents costly redesigns and delays
- Flexibility – strategy may be optimized for specific context
- Constant stream of performance-related information

Limits
- Expensive on a high-scale level
- Partial info, lack of a holistic view
- Role of modeling –
  - complement Performance Testing by creating a big picture view
  - answering many what if questions
  - Evaluating options
  - Development proactive recommendations
ROLE OF MODELING DURING APPLICATION DEVELOPMENT

- Predict new applications implementation impact
  - Predict how new application will perform in production environment
  - Identify Anomalies and their Root Causes during testing of new applications
  - Develop recommendations to Application Developers
- Predict how new application will affect existing production applications
  - Predict how implementation of new applications will affect Response Time and Throughput of existing applications
  - Develop capacity planning recommendations
  - Set up realistic expectations

ROLE OF MODELING FOR OPERATIONS

- Develop Proactive Performance Management and Workload Management Recommendations
  - Compare performance measurement results after implementation of the new application with expected
  - Develop proactive performance tuning recommendations
  - Develop proactive workload management recommendations
  - Reevaluate Capacity Planning recommendations
MODELING IS A BASE FOR PERFORMANCE ASSURANCE FOR DEVOPS

Data Collection & Workload Characterization → Modeling & Optimization → Performance Assurance

Assumptions

Performance Assurance
- Performance Engineering
- Dynamic Performance Management
- Capacity Planning
- New Applications
- Production Environment
- Future Environment

Verification & Feedback

TEN STEPS OF APPLYING MODELING TO OPTIMIZE APPLICATION DEVELOPMENT AND OPERATIONAL DEVOPS DECISIONS

When RT will exceed SLG? What should be done proactively?

Response Time

Delay Time (D)

Queueing Time (Q)

Service Time (S)

Workload Growth

SLG
FIRST STEP
DATA COLLECTION DURING PERFORMANCE TESTING AND FOR PRODUCTION WORKLOADS

Data Collection during Performance Testing of New Application on Test System and for all workloads in Production Environments

Measurement Data Types
- Hardware and Software Configuration
- Response Time
- Throughput
- CPU Utilization and CPU Service Time per request
- Disk Utilization, I/O rate, #I/O operations per request and KB/Request, Channel Utilization
- Memory utilization
- Network utilization
- Level of concurrency

SECOND STEP
WORKLOAD CHARACTERIZATION

Test and Production Environments
THIRD STEP
ANOMALY AND ROOT CAUSE DETECTION

Performance Testing and Modeling for New Applications

FOURTH STEP
WORKLOAD FORECASTING FOR NEW AND PRODUCTION WORKLOADS

Test and Production Environment

Expected Workload and Volume of Data Growth
FIFTH STEP
PREDICTING IMPACT OF EXPECTED WORKLOAD AND VOLUME OF DATA GROWTH IN PRODUCTION ENVIRONMENT

SIX STEP
PREDICTING IMPACT OF NEW APPLICATION IMPLEMENTATION

**Relative Response Time**

**Relative Throughput**
SEVENTH STEP
PREDICTING IMPACT OF THE WORKLOAD MANAGEMENT OPTIMIZATION
WORKLOAD MANAGEMENT OPTIMIZATION WILL NOT BE SUFFICIENT TO MEET SLG

EIGHTH STEP
PREDICTING MINIMUM ON PREM UPGRADE REQUIRED TO MEET SLG AFTER NEW APPLICATION IMPLEMENTATION
ADDITIONAL 14 NODES WILL BE REQUIRED TO MEET SLG
NINTH STEP
DETERMINING APPROPRIATE CLOUD PLATFORM FOR NEW APPLICATION

BEZNext Approach to Selection of the Appropriate Cloud

- Predict the minimum configuration required to meet SLGs
  - Instance type and # of instances which will be required Hour by Hour, Shift by Shift, Month by Month to meet SLGs for each of On Prem Production workload on each of the optional Cloud Platform
  - Predict cost of running On Prem Data Warehouse Workloads on each of the optional Cloud Platforms
- Select Cloud platform capable to meet SLGs for all of the growing workloads with the lowest cost

TENTH STEP
AUTOMATIC RESULT VERIFICATION AND CREATION OF CONTINUOUS PERFORMANCE ASSURANCE PROCESS
SUMMARY

- Performance testing is the main source of performance measurement data during development process.
- Performance measurement data needed to create and validate models predicting new applications performance.
- Modeling complements performance testing allowing fast and inexpensive analysis of what-if scenarios.
- Modeling results provide value to Application Developers and Operations during DevOps process.
- Testing + Modeling is a way to mitigate performance risks early and avoid performance surprises.

THANK YOU!

QUESTIONS?

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