

# System Testing in a Data World

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February 26, 2013

# Overview

- Background
- Testing
- Observations

# Background

- Data Processing/Information Technology Industry
- Government Computer System Development and Integration
- Large Scale, Multi-million Dollar, Multi-year efforts
- Performance Engineering

# Testing Considerations

- Cost and Schedule Requirements not considered here,  
(very significantly influence effort)
- Facilities/Utilities/Logistics not considered here  
(may significantly influence effort)
- Of Performance “Requirements” (bounds scope)  
In a perfect world requirements completely defined
- Of “Black Box”  
In an imperfect world requirements are not defined

# Of Performance “Requirements”

- Hardware/Software (Data & Algorithms)
  - Correct
  - Complete
  - Sufficient Hardware or Host System environment
- Response (Upper (.95 p) and Lower Limits)
- Reliable, Available, Maintainable
- Security

# Of “Black Box”

- Bound the Problem (Define/Establish Requirements)
  - otherwise the problem becomes intractable except for the simplest of ‘black boxes’
- Have Correct/Calibrated Inputs
- Define Expected Response
- Stimulate with Inputs
- Measure Responses (content/timeliness)
- Compare Response with Expectation
- Modify Inputs/Expectations & Repeat until ...

# Observations

- **Any instability or uncertainty in Test environment induces risk in Blackbox tests**
- **Host System environment may not be up to the task**
  - **Memory Leaks/Fragmentation - a problem at Application and System Level**  
(fragmentation and garbage collection impacts responsiveness & ultimately availability)
  - **Error Handling/Recovery (e.g., Log file saturation)**
  - **Data Volatility drives storage reorganizations (impacting availability of data)**
  - **Distribute Data to reduce contention (newest and most frequently accessed data appended to the end – not just a mechanical storage devices problem)**
- **Environment Concerns – Temperature, Humidity, Pressure, Radiation, Gravity, ...**