

## 2016 Defense Health Information Technology Symposium

# Performance Management Services for the Military Health System



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**“A joint, integrated, premier system of health, supporting those who serve in the defense of our country.”**



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# Learning Objectives

- Explain the performance monitoring strategy for the DHA
- Recognize the value of the End-to-End (E2E) web-based portal
- Identify the vision for supporting the MHS GENESIS implementation
- Explain the difference between capacity planning and performance management
- Identify the reasons why end-users experience problems with application performance and reliability when server and network metrics show few or no problems

- Infrastructure and Operations Division (I&O) Performance Management Services
  - Purpose
  - What's In It For You?
  - Performance and Planning Management (PPM) Services
- EHR Core Program Office Site Performance Assessments
  - Rapid Response and Assessment Purpose
  - Approach
  - Factors Affecting User Experience
  - Results
  - Proposed Changes

- Performance Management Services

# Purpose

- Information briefing
  - Provide an overview of performance monitoring support to Pacific Northwest (PNW) sites
    - PPM processes system, network, and application related data into actionable information in support of Defense Health Agency (DHA) health care systems
    - Utilizing this data, analytical studies are derived for the enhancement of DHA capabilities to provide highly functional systems in support of our warfighter

# What's In It For You?

- Familiarize you with the capabilities available for reporting and measuring performance across the enterprise
- To access these capabilities request an account via email at [dha.jbsa.ops-sustain.list.e2e-apps@mail.mil](mailto:dha.jbsa.ops-sustain.list.e2e-apps@mail.mil)
- After you have an account, have your common access card (CAC) in place and go to <https://topaz.dha.health.mil>

# PPM Services

- Operations Manager I (OMi)  
Operations Bridge
- Enterprise Performance  
Analytics Warehouse
- Automated Reporting and  
Alerting
- Real End-User Experience  
Monitoring
- Application Performance  
Monitoring
- Application Availability  
Monitoring
- Server Resource Monitoring
- Network Monitoring
- Capacity Engineering and  
Planning (CEP) – Pre/Post
- CEP – Network Assessments
- Server Automation and  
Compliance Monitoring

# OMi Operations Bridge

**Tool:** OMi Operations Bridge

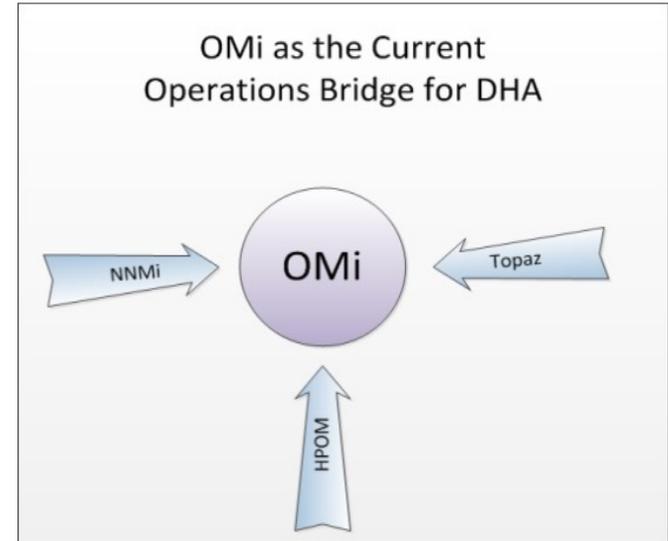
**Measures:** Provides common views and event consolidation and correlation for all enterprise event sources

**Use:** Custom single pane-of-glass for:

- Application, executive, support disciplines
- Single efficient interface to view and analyze related events to better and more easily find root-cause

**Reporting:** OMi is the single source for all reports/data

**Site Access:** Role-based access will be provided to all DHA stakeholders via the Operations Bridge



# Enterprise Performance Analytics Warehouse

**Tool:** Analytics Data Warehouse

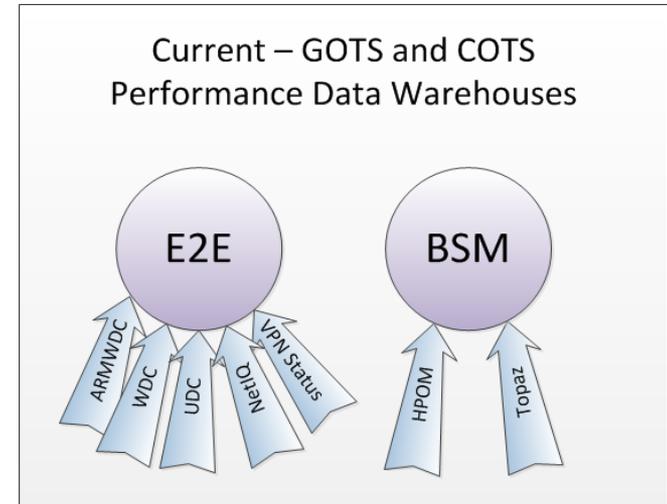
**Measures:** Reporting repository for performance data:

- End-to-End (E2E) Website – Custom data sources and E2E Government-Off-The-Shelf (GOTS) tools
- Business Service Management (BSM) – HP tool suite with ability for external interfaces and data consumption

**Use:** Source for historical reporting of performance and availability data from all tools

**Reporting:** Provides an efficient interface to view and analyze performance data

**Site Access:** Data drives associated tools through role-based access to all DHA stakeholders via Operations Bridge



# Automated Reporting and Alerts

**Tool:** Multiple tool sources

**Measures:** Source for automated hourly, daily, weekly, monthly, ad hoc reports and alerts

- Availability, performance, capacity
- End-user, system, network
- Executive and specific support disciplines
- Automated subscription services
- Based on measured performance and availability as compared to established objectives and thresholds

**Use:** Empowers organizations with up-to-date information for proactive management

**Reporting:** Automated reports and alerts are provided to all subscribed users

**Site Access:** DHA stakeholders can subscribe to alerts and reports through the PPM team

# Real End User Monitoring

**Tool:** Application Response Measurement (ARM) – Government-Off-The-Shelf (GOTS) using ARM Application Programming Interface (API)

**Measures:** Real user transactions performance

- Approximately 140 individual AHLTA transactions instrumented
- Over 90K workstations
- Receives ~4.4 million transactions per day

**Use:** Provide visibility into real user performance – Operational Requirements Document measures

- Provides ability to see actual end-user performance from end-to-end
- Information is used by technicians, engineers, developers, and decision-makers

**Reporting:** Various levels of reporting and customer reports/alerts

**Site Access:** Role-based access will be provided to all DHA stakeholders

# Application Availability Monitoring



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**Tool:** HP Business Service Management (BSM) (Topaz)

**Measures:** Synthetic user transactions

- Monitors sentinel user transaction performance
- Runs 24x7x365, every 5 minutes
- Over 40 DHA applications at 160 sites

**Use:** Provide visibility into user performance experience

- Proactive detection of performance problems
- Simulate application performance from multiple locations to ensure delivery of a consistent, predictable measurement of application performance

**Reporting:** Various levels of reporting, customer reports/alerts

**Site Access:** Role-based access will be provided to all DHA stakeholders

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# Server Resource Monitoring

**Tool:** HP Operations Manager (HPOM)

**Measures:** Monitors server metrics and processes

- Service up/down, central processing unit (CPU)
- Memory, logical disk space
- Physical disk performance

**Use:** Server management

- Allows support teams who monitor systems and applications to launch Splunk, HPOM, and other BSM dashboards from incoming events
  - Provides an overview of system resources and the ability to drill down

**Reporting:** Various levels of reporting

**Site Access:** Role-based access will be provided to all DHA stakeholders

# Capacity Engineering and Planning (CEP): Overview



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- Process of determining future infrastructure and resource requirements of networks, applications, servers, and workstations
- I&O is responsible for CEP in support of the DHA enterprise
  - Providing timely, proactive capacity planning infrastructure recommendations
    - In support of system performance and growth
    - To meet the needs of today and the future
  - Ensuring applications have adequate performance, functioning per end user satisfaction while meeting operational requirements

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# CEP: Pre-Production Assessments

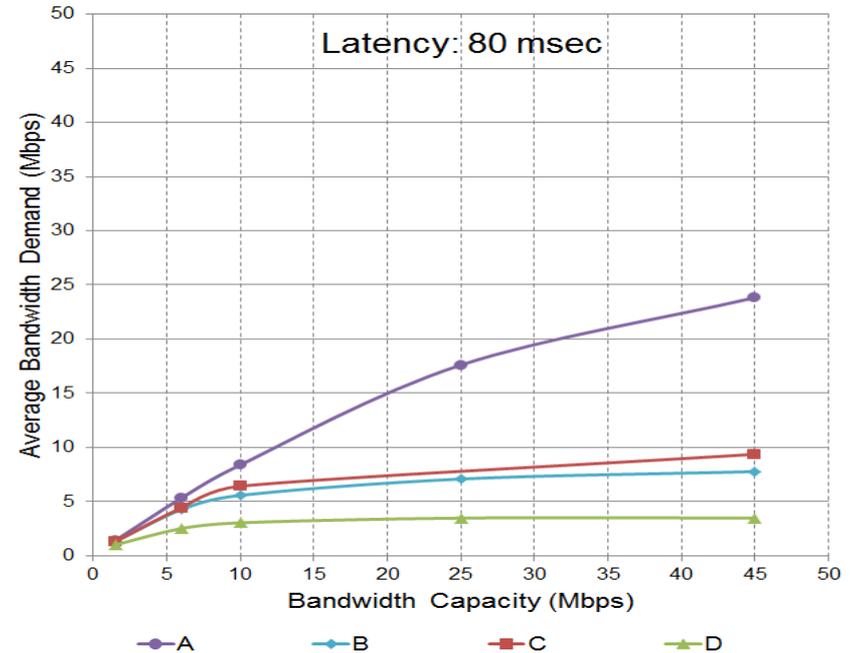
- Capacity and performance testing of new/ existing applications in lab environment
  - To mitigate potential risks prior to new application deployment or significant changes to existing applications
- Benefits
  - Identify maximum number of concurrent users or messages application can support
  - Project expected user response time (user experience) under load
  - Identify network and system capacity and performance constraints, bottlenecks, or time-based issues

# CEP: Production Assessments

- Collect and analyze key performance metrics for applications deployed to production
- Benefits
  - Provide initial performance insight during limited user testing or early operational assessments
  - Modeling/predictive analysis
    - Develop interactive computer models to predict system performance and/or network capacity under varying workloads
  - Trend detection
    - Monitoring and analysis of workload and performance to establish baseline from which performance trends or capacity issues can be detected

# CEP: Network Assessments

- Collect and analyze key performance metrics for networks
- Benefits
  - Assess bandwidth utilization compared to circuit capacity
    - Support timely circuit upgrades before users' performance impacted
  - Identify mix of business versus non-business applications
  - Identify performance issues
    - e.g., high latency or round-trip times
  - Inventory internet protocol (IP) addresses, ports, and protocols in support of data center consolidation initiatives



# Server Automation and Compliance Monitoring

**Tool:** HP Server Automation (HPSA)

**Measures/Provides:** Server management

- Operating system (OS) and vendor software patching
- Software installation (vendor and custom)
- Remote server desktop
- Scheduled automated task scheduling
- Compliance monitoring

**Use:** Server management

- Support teams can centrally manage servers' configurations regardless of OS
- Alerts when servers are out of compliance
  - HPSA users save 1000s of hours every month

**Reporting:** Various levels of reporting on compliance and configurations

**Site Access:** Role-based access for all DHA stakeholders

- Site Performance Assessments

# Purpose – Site Assessments

Users experience significant performance issues with the existing network infrastructure and critical clinical applications, including AHLTA and CHCS. A rapid, forensics-based methodology has been deployed to identify near-term, low-cost, rapid improvements that can be made to improve Health Information Technology performance and achieve the access to care that DHA leadership seeks to provide.

# Approach

- Deploy subject matter expertise and equipment at Walter Reed National Military Medical Center (WRNMMC) and Naval Medical Center Portsmouth (NMCP) to provide visibility from the **end user's perspective** on availability and performance, to uncover issues, and recommend solutions for providing rapid, visible results
- 24x7 dynamic monitoring
- Establish thresholds and set alerts
- Conduct deep forensics analysis

# Factors Affecting User Experience

- Application
  - System of systems
  - Outages/degrades
- Infrastructure
  - End user devices
  - Non-standard configurations
- Training
  - Deficiencies in use of application
  - Conflicts between clinicians' workflow and application

- Dashboards developed for:
  - Network traffic
  - Layer 4 and Layer 7 metrics
  - Application flow maps
- Worked with SPAWAR to reduce PC-over-IP (PCoIP) broker failures by 95% at NMCP
  - SPAWAR performed maintenance at six additional military treatment facilities to reduce similar PCoIP broker failures

# Results - continued

- Eliminated 98% of the 45,000 identified retransmission errors (RTOs) associated with AHLTA at WRNMMC
- Resolved hundreds of thousands of Domain Name Server (DNS) errors
  - Application configurations
  - DNS configurations
- Established alerts forewarned of CHCS outage

# Proposed Changes

- Proactive monitoring
  - Create alerts based on lessons learned
  - Reduce or eliminate outages and degrades
- Monitor real-time production traffic of application
- Perform holistic assessments
  - Current practices focus on application, network, or training
  - Establish performance baselines and monitor changes

# Summary

- Performance monitoring processes we have and those that will be implemented
- PPM services and tools we have and will be implemented
- Proactive monitoring by EHR Core Program Office has been implemented

# Key Takeaways

- Performance monitoring and capacity planning support legacy applications and will support MHS GENESIS
- Proactive monitoring has identified and resolved the majority of network and clinical application errors
  - Improves access to care

# Questions?



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# Evaluations

Please complete your evaluations

# Contact Information



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