

IT Infrastructure Consolidation: One Network, Any Application

Presenter – Steve Murphy, PMP
Senior Systems Engineer
QinetiQ NA, IMCS Contract
Kennedy Space Center, FL

NASA PM Challenge 2012
February 22 – 23, 2012

Agenda

- Introduction
- The Technology Selection Challenge
- The Project Implications
- Case Study – Kennedy Integrated Transmission System (KITS)
- The OTN Technology
- Questions and Answers

Introduction

- When Implementing IT Projects, Technology Selection is Often a Key Factor in the Success of the Project
- Infrastructure IT Projects Have Implications on Future Projects Using the Infrastructure
- Understanding the Overall Implications of the Technology Selected Can Improve Project Success

The Technology Selection Challenge

- Technology Selection Factors
 - Current Technologies
 - Technology Trends
 - Standard Vendors
 - Project Charter
 - Technology Review Processes
 - Trade Studies
 - Project Budgets and Phasing
 - Procurement Costs
 - Life-Cycle Costs
 - Technology Life-Cycles

The Project Implications

- Technology Selection too Early
 - Allows Better Cost and Schedule Planning
 - Drives Evaluation and Trade Study Schedules
 - Limits New Innovations
- Project Driven Selection
 - Project Charter Selection Locks in a Technology
 - Limits Technical Approach
 - May Limit Future Advances
- Use of Current or Standard Vendors
 - Stability of Platforms
 - Ease of Migration
 - May Limit Selection of a Best Technology

The Project Implications - Continued

- Project Budget and Phasing
 - Affects Implementation and Migration
 - Project Life-Cycle vs. Technology Life-Cycle
 - Supported Customer Needs and Expectations
- Technology Review Process
 - Trade Studies and Review Driven
 - Coordination Across Technology Users
 - Needs to Address Customer Priorities
 - Needs a Conflict Resolution Process

Case Study: KITS

- Kennedy Integrated Transmission System (KITS)
 - Consolidation of Many Operational Carrier Like Transports
 - Asynchronous Transfer Mode (ATM) Backbone
 - Ethernet End-User Interfaces
 - Command and Control
 - Facility Power and Utility
 - Access Control
 - TDM T-Carrier and SONET Backbones
 - Primarily Telephone
 - Low Speed and Carrier Transport
 - Operational Video Transport
 - Dark Fiber Customer Requirements

Case Study: KITS – Continued

- KITS - Continued
 - Project Officially Kicked Off in 2008
 - Primary Considerations
 - End-of-Life/End-of-Support for ATM Equipment
 - End of Shuttle Program/New Constellation Program
 - Explosion of IP and Bandwidth Customer Requirements
 - Trade Studies Implemented
 - Multi-Protocol Label Switching (MPLS)
 - Provider Backbone Bridges (PBB)
 - Additional Technology Review and Trade Study
 - Add/Drop Multiplexing
 - Optical Transport Network (OTN)

Case Study: KITS – Continued

- KITS - Continued
 - Technology Review Process
 - Contractor Review Initial Process
 - NASA Review Process
 - Coordination Across All Communications & Imagery Projects
 - Integrated with Budget Roadmap Process
 - Conflict Resolution Process Needed and Implemented
 - OTN Technology Reviewed and Accepted
 - Provided Customer Needs of Isolation and Bandwidth Allocation
 - Supports Data, Voice, and Video Common Backbone

Case Study: KITS – Continued

- KITS - Continued
 - Project Implementation
 - Implemented Using NASA 7120.7 IT Project Infrastructure Project Management Process
 - Completed the Preliminary Design Review (PDR) Successfully On-Time and On-Schedule
 - Required a Second PDR – Due to the Constellation Program Cancellation
 - Completed the Critical Design Review (CDR) Successfully On-Time and On-Schedule
 - Began a Seven Phase Implementation of the New OTN Backbones
 - Currently Working on Phase 5 Implementation of the First OTN Backbone

Case Study: KITS – Continued

- KITS - Continued
 - Project Technology Changes and OTN Flexibility
 - Failure of a SONET Vendor's Equipment
 - Cancellation of the Constellation Program and Transition to 21st Century Launch Complex Requirements
 - Coordination and Potential Interface With Air Force Eastern Range Transport
 - Consolidation with Serial Data Transport Backbone

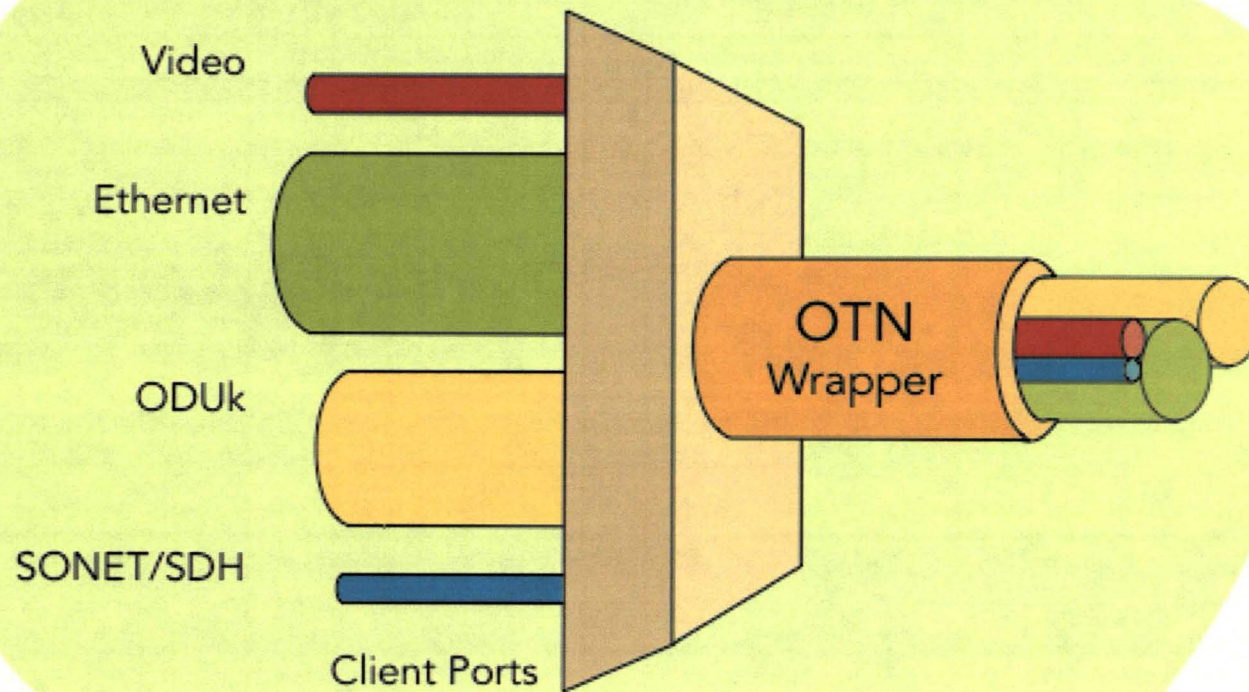
OTN: The Technology

- Technology Based Upon Carrier Requirements to Consolidate SONET and IP Based Backbones
- Standardized by the ITU in the G.709 Standard
- Sometimes Called "Optical Channel Wrapper" or "Digital Wrapper"
- Provides SONET Like Fail-Over < 50 ms and Includes Forward Error Correction
- Supports Bandwidths up to 100 Gb/s
- Supports Optical Transport For – IP, Ethernet, SONET, FibreChannel, ESCON, and SMPTE Video

OTN: The Technology - Continued

- Uses Standard Operations, Administration, and Maintenance (OAM) Signaling
- Supports Both Dense Wave Division Multiplexing (DWDM) and Coarse Wave Division Multiplexing (CWDM) Technologies
- All Optical Transport Immune to EMI in Operational Environments
- Vendors Also Support Optical Add Drop Multiplexing
- Multi-Vendor Support By Most Carrier Equipment Vendors
- Increasingly Moving into the Enterprise Domain

OTN: The Technology - Continued



Summary

- The Technology Selection Process Integrated All User Requirements
- Selection Process Included Technology and Project Life-Cycle Timelines
- Selection of OTN Technology Allowed Flexibility for New and Changing Requirements
- Allowed the KITS Project to Remain On-Schedule and On-Budget
- The Technology Selection Allowed for Flexibility in Requirements
- Support for Enterprise Transport Allows Use In Other Areas

Thank You for Your Attention!

Questions?