

Requirements Development Techniques for Custom COTS Products

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Agenda

- Project Background – Round One and Two
- Pre-Proposal Activities
 - Customer
 - Supplier
- Proposal Activities
- Post-Proposal Activities
- Post-Contract Award Activities
- On-Going Activities
- Conclusions
- Questions

Project Background – Round Two

- Round One
 - Transatlantic Development of a COTS Product
 - Steep Learning Curve for all Stakeholders
 - Hard Lessons Learned by all
- Round Two
 - New Requirements; ranging from simple → complex
 - Knew the supplier capabilities
 - SCM TRIAD Relationships developed and proven
 - Knew that changes will occur
 - There are unknowns everywhere
 - Apply Lessons Learned from Round One

Different and Better Subcontract and Requirements Mgmt Approach was Needed

Pre-Proposal Activities

- Draft Technical Requirements Document (TRD)
 - Requirements workshops with key stakeholders
 - End Users
 - Acquisition
 - Information Security Engineers and Specialist
 - System Administrators
 - Prime/OEM
 - Supplier(s)
 - Define, Review, Revise Requirements and Priorities
 - Define objectives and goals of this upgrade
 - Include Concept of Operations (CONOP)

Refine and Understand Requirements and Context Before RFP Issued

Proposal Activities

- DRAFT version(s) of subcontract requirements document
- DRAFT version(s) of concept of operations/capability
- Open dialog with supplier(s) on technical requirements
 - Frequent technical exchanges via teleconferences
- Detailed review of supplier proposal
- Creation of detailed basis of estimates
 - Includes activities and artifacts
- List of Assumptions and Risks/Opportunities
 - The Unknown Unknowns
- Detailed List of Customer Furnished Information
- Identification of Prototyping and Risk/Complex Areas
- Include \$ & time for unknowns and contingency



Post-Proposal Activities

- Continue technical interexchange dialogs
 - Refine and understand system context
 - Identify limitations and constraints
 - Include design concepts and implementation
 - Focus on risk areas and unknowns
 - Document discussions and close action items
- Revise DRAFT requirements documents
- Create, revise concept of operations/capabilities
- Maintain engagement with stakeholders
- Focus on terminology and interpretations

Keep Making Progress on Requirements and Reducing Risks → Get Ahead

Post-Contract Award Activities

- Subcontractor Kick-Off Meeting
 - DRAFT Requirements Review
- Requirements Development → Preliminary
 - System, product and component levels
 - Repository and current
 - Requirement Change Board and Process
- System Requirements Review (SRR)
 - On-Site, Face-to-face, w/ stakeholders
- System Design Review (SDR)
- Refinement of Requirements Occurs



Create and Update Concept of Capabilities/Operations

On-Going Activities

- Continued requirements refinement and change
 - Plan for this at the beginning
 - Control via requirement management and change control
- Continual Technical Exchange Dialogs
 - To understand requirements
 - To verify design approach
 - To validate design implementation
- Revision of requirements and design artifacts
 - Concepts of Capability/operations and use cases
- Interim engineering releases and system testing
- Incremental deliveries of capabilities

Continual Reviews and Open Dialog Exchanges between Technical Organizations

Conclusions

- Continual requirements definition and refinements
 - Derived at the level system, product and component
 - Create concept of capabilities/operations artifacts
- Open and periodic technical interexchange & reviews
- Provide interim and incremental releases of:
 - Capabilities – prototypes, engineering releases
 - Artifacts – specifications, designs, test plans and procedures
- Plan for requirements changes
 - Provide for \$ & time to allow for unknowns and updates



Do not Underestimate Requirements Changes, Plan for and Resist Otherwise !

Questions



About the Author

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Is a Systems Engineering Fellow at Raytheon and has an extensive background in computer based systems, software, and networking technologies. Presently, he is the System Architect and lead Systems Engineer on the VoIP enterprise project. John principal duties are lead technical engineer, system architect, security architect and technical subcontract management. Recently he was the systems engineer for an embedded network-oriented project, conceptual development of system and network architecture for the delivery of real-time data over homogeneous links, including evaluation of VoIP-based implementations, trade studies on cryptographic algorithms and devices. John has a M.S. in Software and Systems Engineering from George Mason University, John is an adjunct professor at GMU where he teaches Computer Security and Privacy, and Network Security and Cryptography in the Telecommunications program in the Electrical and Computer Engineering department.



BACKUP

Acronyms

- CONOP Concept of Operations
- COTS Commercial Off the Shelf
- GMU George Mason University
- OEM Original Equipment Manufacturer
- SCM Supply Chain Management
- SDR System Design Review
- SRR System Requirements Review
- TRD Technical Requirements Document
- VoIP Voice over Internet Protocol