

Jet Propulsion Laboratory

OCIO

California Institute of Technology

Information Technology Directorate

Industry Briefing

Information Technology
Infrastructure Support and Services
(ITISS)

Information Technology Directorate

Agenda

Topic**Speaker**

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Jim Rinaldi

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Joel Esparza

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Gordon Campbell

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Michael Stefanini

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Jim Rinaldi,
JPL Chief Information Officer

Welcome

The OCIO Strategy for providing IT Operational Excellence includes significant use of highly qualified subcontractor workforce integrated into the OCIO team, and infusion of industry best practices from our subcontracting partners

Joel Esparza,
ITISS Subcontract Manager,
JPL Acquisition

Introduction

- Today is primarily a technical overview of the current JPL environment and the work effort contemplated under ITISS
- The RFP and additional information will be posted to the JPL Acquisition web site
- Please do not ask questions during the presentations
 - Instead, save your questions until the end of the presentations or submit questions via the available 3×5 cards
 - All questions asked, whether addressed here or not, will be posted to the JPL Acquisition web site

ITISS Subcontract Specifics

- Currently, JPL is contemplating:
 - A ten-year subcontract, starting with a three-year base period, a three-year option, and a four-year option
 - No requirement for a dedicated facility
 - NAICS Code: 541513
- Acquisition schedule:
 - RFP release mid-January 2013
 - 60-day proposal preparation period

Gordon Campbell,
Manager,
IT Vendor Management Office

ITISS Overview

- The OCIO currently utilizes two subcontracts to provide the support it needs:
 - DICE Subcontract provides an “Integrated Managed Solution” for JPL’s interoperable desktop computing, including email, and provides the Unified Service Desk
 - ISAS Subcontract provides Operations and Engineering support, Telecom Administration, support for Application Development and System Administration
- The OCIO also participates in one additional subcontract for web development work

ITISS Overview (continued)

- The ISAS Subcontract will conclude on September 30, 2013 after ten years of successfully supporting the OCIO mission
 - This subcontract supports both OCIO IT Operations and OCIO Development and some Mission IT Engineering
 - The ITISS Subcontract will primarily support IT Operations
 - There is currently a dedicated facility (Bradley) and approximately 120 employees
 - The ITISS Subcontract will utilize JPL facilities or non-dedicated subcontractor facilities
 - The current Subcontract is cost plus fixed fee
 - The ITISS Subcontract will be time and material, with a goal of transitioning some efforts to firm fixed price

ITISS Overview (continued)

- Encouraging suppliers to invest and participate:
 - Reach back (benchmarking their own work with continuous process improvement that can be shared)
 - Ability to build upon experience to reduce costs
 - Proven processes and tools for infusion
 - Ability to interface with customers
 - Transition to deliverables (not to hours provided)

ITISS Overview (continued)

- Reorganization in the OCIO has led to two distinct Divisions:
 - 172 performing Engineering and Development
 - JPL is contemplating two or more subcontracts focused upon the needs of the Division 172 (applications and engineering)
 - 173 providing ongoing Operations and System Administration
 - This ITISS Subcontract will support Division 173 (operations and sustaining operation engineering)
- Subcontractor employees will report to their own management and technical leads

Michael Stefanini,
Section Manager,
Division 172

Overview

The Engineering and Application Development Division provides:

- Application Development
 - .NET, Visual Studio, SharePoint, MSSQL, MySQL, Java, PERL/PHP, HTML5, IOS, Android, Windows Mobile
- Web Design
 - HTML5
- Project Data Management
 - Team Center
- Computer Aided Engineering
 - NX, Matlab
- Knowledge and Content Management
 - SharePoint, Docushare
- Engineering
 - Cloud Platform
 - Monitoring
 - Desktop Management
 - Application Hosting

A Day in the Life

A supporting SWO may be asked to:

- Provide temporary assistance, expertise, consulting, or supplement a specific JPL task
 - Join a fast-paced JPL-lead effort, working with other contractors and JPL staff while adhering to JPL architectural, operational, and software development processes
- Execute a JPL project plan, development effort, or provide a working product or solution
 - Deliver a completed system/solution that meets or exceeds stated requirements while adhering to JPL architectural, operational, and software development process requirements
 - All artifacts must also meet JPL standards and formats

Division 173's Role at JPL

“This contract is for your Division, Stephen”

– Jim Rinaldi, JPL CIO, circa 2012

Stephen O’Hearn,
Division Manager,
Operations, Networking &
Cybersecurity
(Division 173)

Division 173's Role at JPL – What?

- To provide...
 - Operations
 - Networking
 - Cybersecurity
- ...related engineering and supporting services in turn for OCIO services and other partner IT providers
- Partner IT providers?
 - e.g., EBIS, MSL GDSS, Cassini, Juno, DSN and others

Division 173's Role at JPL – How?

- By creating and operating the foundational, ubiquitous, and essential IT infrastructure that supports...
 - Availability
 - Integrity
 - Confidentiality
- ...running over a robust voice-data-video transport capability, of compute and storage capacity, HPC resources, updated data centers

Division 173's Role at JPL – With?

- Employing a cross-discipline operations team with a dedicated Quality Assurance team
- Leveraging network and host-based security tools
 - Firewall, IDS, web proxy, virus / malware detection, packet capture, data mining, spear fishing detection, privilege restriction and other technologies
- Using cyber identity management processes and authentication technologies
 - HR, provisioning, TFA, PKI, LDAP, Kerberos, AD

Division 173's Role at JPL – Who?

- JPL Staff
- Partner contractor personnel
 - Lockheed-Martin (DICE)
 - Raytheon
- Vendors
 - Cisco
 - Netapp
 - HP/Dell/SGI/Sun

Division 173's Role at JPL – ITISS?

- The next stage on this path towards tasks and services, together as a **Team**
- The full scope of functional effort is up for proposal so please do not leave anything out
 - I need to see past performance and how the first and lower tiers will interoperate with each other and myself before I can realistically judge
 - The full scope may not be tasked out however if the proposals aren't compelling (ID/IQ)

Richard Van Why,
Section Manager,
Unified IT Operations

Overview

- Operations staff consists of 48 contactors performing IT Ops, Network Ops, and Tel Ops
- Currently, there are 6 leads:
 - Network
 - End User Support
 - Problem Management/ Monitoring
 - Operations
 - SA
 - TEL
- Daily assignments are processed through Remedy
 - ~3000 tickets per month
 - JPL management provides technical direction to the teams supporting the SWO
- 24×7 Operations:
 - Staffed business hours (e.g., Monday through Friday 7:00 am through 7:00 pm)
 - On-call during non-business hours
- System and Network Monitoring
 - Spectrum, Statseeker, NetIQ, Nagios
- Other tools
 - Remedy, Alterpoint
- Majority of systems supported are local in Pasadena
 - A small percentage are in a Denver data center for DR and some in the Cloud

A Day in the Life

- Client/User Support
 - Provide user administration for service-level incidents and requests
 - Handle warm-transfer calls and/or tickets escalated from Unified Service Desk (USD)
 - Provide in-depth troubleshooting and analysis of client issues not solved by the USD, including:
 - IS and Network software client issues
 - Network connectivity, including wired, wireless, remote access, DNS, and DHCP
 - Process service requests, including:
 - Account creation, deletion, or configuration for multiple services
 - Network port activation, deactivation, speed/duplex settings, and vLAN configurations on network switches
 - IP address management, assignments, and DNS updates
 - Coordinate VM provisioning
 - Handle on-boarding and off-boarding

A Day in the Life (continued)

- System Monitoring, Incident/Problem/Change Management
 - Respond to traps, alerts, or other events that indicate a service anomaly
 - Monitor, manage and communicate service outages
 - Engage appropriate personnel and escalate as necessary
 - Work to restore normal service as quickly as possible
 - Team with SAs and or service engineers/developers to determine root cause
 - Identify corrective action and initiate requests for change
 - Ensure systems are monitored appropriately
 - Review system checks and proper thresholds
 - Submit/track monitor requests
 - Coordinate testing, upgrades, and system configuration changes
 - Validate procedures and rollback plans before change is applied
 - Ensure proper configuration management practices
 - Test/validate applied changes

A Day in the Life (continued)

- System Administration
 - Support hardware, software, and applications comprising OCIO IT Services
 - Install, configure, operate, monitor, backup, and restore Unix- and Windows-based servers
 - Team with Service Engineers and Database Administrators in problem solving and performance tuning of systems and applications
 - Configure and monitor system backups
 - Determine, configure, and implement system monitors
 - Write custom scripts for automated builds of Linux, Solaris, VMWare, and other systems
 - Work with IT Security to resolve security issues and/or apply system patches
 - Coordinate and manage major projects, including rollout of new technology, system upgrades, and other large-scale activities
 - Support high-performance computing
- Database administration
 - TBS

A Day in the Life (continued)

- Network Operations/Field Support:
 - Respond to alerts, events, customer reported issues, and team-escalated problems as required
 - Perform analysis, monitoring, troubleshooting and repair of network switches, routers, wireless access points, firewall appliances and other devices
 - Troubleshooting and analysis of issues with DNS, DHCP, TCP/IP, IP Address Management System, and Perimeter Access (PARs and security actions including host shutdowns and border blocks) services
 - Planned work, including network upgrades and new product rollouts
 - Respond to alerts, events, customer reported issues, and team-escalated problems as required

Jaime Mantel,
Group Supervisor,
Project IT Systems Operations

Overview

- **Staffing:** Currently 36 system administrators, including 13 from the ISAS contract
- **Distribution of Work:** Job assignments are usually submitted by customers by email, trouble ticketing system, or phone call
- **Team:** One large team with both JPL and subcontractor personnel, including sub-teams determined by customer needs that include both JPL and subcontractor personnel
- **Support Environment and Requirements:** Mostly Linux and Solaris OS support with associated hardware (i.e., monitors, raid storage, printers, projectors, blade technologies, etc.). VMWARE with mostly Linux VMs. LDOMs and zones for Solaris based VM environments. Thin Clients using Oracle SunRay software with Sun Blade hardware in the back end
- **Types of Work Activities:**
 - A lot of end user support (i.e., Engineers, Scientists, Technicians, etc.)
 - Test Bed IT infrastructure setup, configuration, and Systems Administration support
 - ATLO and Launch Systems Administration support
 - Mission Operations Systems Administration support
 - Development environment Systems Administration support
- **Tools:** SSH, LDAP, Zabbix, Nagios, WREQ, Remedy, Wiki, Shell Scripting, Samba
- **Work Schedule:** Most work is normal business day, with some exceptions (i.e., ATLO and Launch support, Special Mission Operations Support, off hour emergency work.). The exceptions are usually scheduled before hands
- **Funding:** Direct funded

A Day in the Life

- The SA checks his/her email, voicemail, and ticketing system and addresses the items that are most time sensitive
- The SA checks logs and output from the Zabbix or Nagios monitors
- The SA works on their ongoing task list
- The SA communicates with the customer as to task completion or regarding issues that may interfere with task completion
 - Clear and concise communication is critical
 - Some missions and customers have SLAs, other do not
 - The ones with SLAs have return-to-service and support-time constraints
- The SA refers to an SA Wiki, Google, teammates, etc. for information, as needed
- The SA works with his/her teammates on completing tasks, depending on the activity
- The SA documents any new or updated activities and procedures in the Wiki when needed
- The SA attends the necessary meeting(s) required by his/her customers

Joy Laibl,
Group Supervisor,
Networking Technologies

Overview

- Sustaining Engineering and Development of the JPL and Mission Network
 - Systems and Services include:
 - WAN, LAN connectivity and management
 - Perimeter Security
 - WiFi
 - Remote Access Services
 - IP Address Management (DNS/DHCP) and NTP services
 - Network TV Services
- Sustaining Engineering and Development may be augmented by burstable tasks

Overview (continued)

- Certified structured copper and fiber optic cable infrastructure
 - Over 350 hubroom (comm room) locations in 150 buildings and sites
- Network monitoring for all network components and network connections
 - Spectrum
 - Statseeker
- Configuration Management
 - CMDB
 - Remedy
 - Alterpoint
- Network Operations with 24x7 support for critical services and .9995 availability or better
 - 30 minute response, 2-hour return to service
- Ad Hoc network consulting for special projects and activities and missions

Staffing

- The Network Operations Group consists entirely of Subcontractors:
 - Network Operations Team Lead
 - Network CMDB Analyst
 - Network Technicians
 - Network Operations Engineers
 - Network Inventory Administrator
- The Network Engineering Group is a combination of JPL employees and four Subcontractors

A Day in the Life

- Network Operations
 - Manage Incident Response (network trouble tickets)
 - Manage and Respond to network alerts and outages
 - Network Connections/Disconnects
 - Hubroom Audits
 - Inventory control and management of 3000+ items
 - On-call support is part of Network Operations

A Day in the Life (continued)

- Network Engineering
 - Resolve escalated Operational issues
 - Respond to escalated network alerts and outages
 - Sustaining engineering of Operational environment including:
 - Service enhancements
 - Develop and plan upgrades
 - Consulting with missions and customers

Backup Data/Fact Sheet

- Major Vendors
 - Cisco
 - Juniper
 - Palo Alto
- Service Vendors/Contracts
 - Los Nettos
 - CENIC
 - AT&T and Verizon
 - Networx (NISN)

Patrick Kleinhammer,
Network Architect,
Telecommunication Services

Overview

- Support for all aspects of the JPL telephony-related services
 - Voice (primarily Cisco VoIP with some AT&T standard services)
 - Telephony applications such as voicemail and collaboration (Cisco Unity and MeetingPlace)
 - Data circuits
 - Legacy/specialty mobile device services (pagers/satellite phones)
 - Notes:
 - Standard JPL mobile phone services and satellite phone services are provided under a contract that is not part of this task
 - Telecommunications Services is **not** responsible for spacecraft communications support

Overview (continued)

- Cable installation and maintenance
 - Structured cabling
 - Moves, adds, changes (MAC)
 - 1000 moves and 500 adds per year
 - All JPL cable infrastructure (telephone, network, etc.), including inter-building connections via manhole system
 - Fiber backbone
 - RF cabling
 - Copper
 - Overseeing/coordinating ~\$1M worth of cabling per year

Service Areas and Staffing

- Telephone administrative support
 - Team Lead and administrative staff
- Cable installation and maintenance
 - Facilities Coordinators
 - Support staff
- Telecommunications engineering
 - Engineering lead

Support Area Functions and Tools

- Coordination and Provisioning
 - Remedy (average 400 tickets per month)
 - Communications Service Request (average 50 phone orders and 50 disconnects per month)
- Technician Support
 - Remedy
- Equipment Procurement and Distribution
 - Remedy
- Bill Processing and User Chargeback

Other Service Areas and Tools

- Cable Installation and Maintenance
 - Remedy
 - AutoCAD
- Telecommunications Engineering
 - Remedy
 - Cisco's Voice over IP (VoIP) Unified Communications Manager
 - Cisco Unity Voice Mail
 - Cisco MeetingPlace audio, web and video Conferencing

A Day in the Life

- Typical activities include
 - Respond to user service orders from JPL Facilities, JPL Fire Department, and JPL Networking
 - Respond within one day
 - Respond to user trouble reports
 - Respond within four hours, fix within twenty-four hours
 - Deploy and remove phones
 - Respond within one day, VoIP provision within 3-5 day
 - Deliver and install user-ordered equipment
 - Respond within one day
 - Oversee and coordinate cable installations
 - Respond to trouble tickets within four hours
 - Review and process vendor bills (AT&T, Verizon, etc.)

Backup Data/Fact Sheet

- Vendors:
 - Cisco, AT&T, Verizon, Level 3, City of Pasadena (fiber optic cabling), Comscope, and Corning
- Numbers:
 - 7,000 VoIP Phones
 - 10,000,000 feet of Cat-5 copper cable
 - 600,000 feet of fiber optic cable

Matthew Derenski,
Cybersecurity Engineer,
Cybersecurity Policies,
Technologies, & Operations

Overview

- The Security Operations Center (SOC) is inherently a JPL operation
- The SOC may be augmented by burstable tasks, as shown on the slide that follows
- The Cyber Security Group, which encompasses the SOC, consists of thirteen individuals, two of whom are currently Subcontract employees

Overview (continued)

- As part of the on-going effort to strengthen JPL's cyber security stance, the JPL Cyber Security Group may augment its current capabilities with "burstable" resources, both human and non-human.
- The work to be performed will be requested as required and as necessary on an ad-hoc basis.
- Tasks:
 - Forensic analysis
 - Initial incident triage
 - Support applications security program development
 - Develop filters for security applications
 - Perform security research
 - Develop reports on security incidents and research
 - Prepare for and anticipate threats
 - Produce ITAR threat protection policies
 - Train staff on trending threats
 - Process SPAMS and ABUSE messages for the IT Security Group
 - Provide high-level security experts for limited periods of time
 - Penetration testing

A Day in the Life

- Staff respond to requests for assistance received through email, telephone, remedy requests, management inquiries, security alerts, and SOC bulletins
- Staff perform research, engineering, and security operations as necessary and assigned to address issues and regular tasks

Questions