Introduction to ITIL: A Framework for IT Service Management

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What is ITIL?

- **Information Technology Infrastructure Library.**
- Provides a best practice framework for identifying, planning, delivering, improving, and supporting IT services (i.e., IT Service Management).
- Enables IT organizations to deliver services that satisfy the business’ needs and are aligned with the business’ goals.
- The ITIL framework describes the “what” a service provider must do, not the “how”.
  - ITIL recognizes that industry, maturity level, size, and other factors differ for every organization.
  - Part of ITIL’s success is due to it being “vendor neutral”. It can be implemented within any IT organization.
Benefits of ITIL

- Proven, widely used framework
- Provides a common business language for IT organizations
- Creates a communication path between IT organization and the business
- Enables the collection of valuable information about service provided by an organization
- Aligns IT services to the needs and goals of the business
- Provides a structured approach to launching and maintaining IT services
- Provides a proactive management plan for assessing operational health, predictability, and accountability for all IT services
- Provides a method to engage staff towards a common goal
IT Service Management (ITSM) Lifecycle

- ITIL views ITSM as a lifecycle – there are phases but no definitive starting and stopping points
- 5 phases:
  - Service Strategy
    - design, development, and implementation
  - Service Design
    - design and development
  - Service Transition
    - development and design
  - Service Operation
    - delivery and support
  - Service Improvement
    - create and maintain value
Case Study

ISC Provider Desk
A Quick Overview of Provider Desk Operations

LSP contacts Provider Desk

Incident ticket is created and routed based on the nature of the request

Requests for 2nd and 3rd tier support and Provider Services are assigned to Provider Desk staff

After requested action is performed, ticket resolved

Request is routed to the appropriate ISC service provider

Provider Desk monitors and intervenes if needed
Managing Incidents

- **Incident**: an unplanned interruption to an IT service or the reduction in the quality of a service
- Incident Management is the process within the Service Operation phase of the ITSM lifecycle
  - Typically the role of a service desk within an IT organization
- Objective is to coordinate the rapid restoration of IT services
- Incident Management does not repair any failed component within the IT infrastructure – its purpose is to coordinate the work of the other functional areas of the IT organization
- Not all incidents are equal and therefore do not require the same level of response in the same time frame
  - Cascading timescales (i.e., Service Level Agreements)
Lifecycle of an Incident

1. Identification & Logging
2. Classification & Prioritization
3. Investigation & Diagnosis
4. Resolution & Recovery
5. Incident Closure
The “What”

- Provider Desk categorizes the request based on available information
- Operational Categorization
  - what is being asked for by the client
  - Ex: Dead Port = Troubleshoot > Customer Reported Issue
- Product Categorization
  - relevant service and/or action that needs to be performed to resolve incident
  - Ex: Dead Port = Infrastructure > PennNet > Wallplate > Dead Port
- Properly categorizing requests enables the collection of valuable data
Provider Desk prioritizes request based on service providers’ SLAs

**Impact:** measure of what the incident does to the business
- Ex: a campus-wide network outage has a higher impact than a single dead port

**Urgency:** measure of how quickly the incident needs to be fixed
- Ex: An incident involving Amy Gutmann is going to be given a (much) higher urgency

**Priority = Impact + Urgency**

Impact and Urgency are adjusted based on the details of the incident
Diagnosis & Escalation

- Based on initial categorization and/or analysis, incident is escalated to most appropriate service provider for further investigation and diagnosis.
  - “Functional Escalation” for technical or functional expertise
  - Assignee is responsible for performing requested work
- Diagnosis can and will involve different providers
  - Incident is assigned to whomever is currently performing work
- Provider Desk monitors and intervenes when needed
  - Ownership – Provider Desk is accountable for the incident even when it has been escalated to the service provider
- Provider Desk will also escalate when SLA downtime is exceeded, increased and unforeseen impact, upon client request, and other factors
  - “Hierarchical Escalation” to service manager for increased severity of incident
Resolution & Closure

- Once issue is addressed, the incident is resolved
- Incidents can result in the identification of a Problem
  - Problems are the underlying cause of one or more incidents and are handled by the Problem Management
  - Ex: Multiple reports of Linux machines experiencing AirPennNet Connection issues led to the identification of a Problem with AirPennNet. Fix was a network configuration change.
  - Until a Problem is addressed, the fix for an Incident may be a Workaround
- Closure: following resolution, Provider Desk works to ensure to the Incident is satisfactorily resolved
How ITIL Helps Us

- Metrics, metrics, metrics
  - Better data leads to more valuable information
  - Helps us measure our performance and optimize operations
- Helps to identify actions Provider Desk needs to perform based on industry standards as defined by ITIL
- Clearly defined roles and responsibilities
- Facilitates partnerships and communications with service providers
  - We’re speaking the same language, working in the same process
- Enables efficient and effective incident management which minimizes impact of IT service failure
- Enables us to be proactive, not just reactive
- Better service, better customer satisfaction
Case Study

ISC Computer Operations
Setting the Stage

- Be honest with yourself about “current state”.
- Outline a strategic vision for the organization.
- Understand budgetary implications.
- Obtain Senior Management support for the program.
- Know your resources.
- Develop a tactical (execution) plan.
- Prepare for cultural change...and resistance to it.
- Measure the benefits
Understanding the Current State

- University standard toolset is available for Incident Management, but internal use is minimal.
- Crystal Reporting is the reporting tool of choice.

...For Computer Operations in 2004
- Incidents are not logged.
- No quantifiable trending data is available.
- No metrics for recurring incidents are available.
- Changes are logged via spreadsheet.
- Work volume is an approximation.
- Turnaround time for requests can be up to two weeks.
Reassess the Organizational Structure and Change It

- Problem Management
- Change Management
- Asset Management
- Metrics and Reporting
- IT Audit/Quality Management

You must....
- Assess if you have the right people with the right (or potential to grow) skill sets.
- Educate the staff so they are comfortable with the ITIL methodology.
- Organize the functions as a team.
- Know what the business problem is that you’re trying to solve.
- Invest time to support your staff and guide the transition.
- Provide clear performance goals as incentive for employees to invest in the strategy.
<table>
<thead>
<tr>
<th>Goal/Project/ Responsibility</th>
<th>Expected Results/Timeframe</th>
</tr>
</thead>
</table>
| Active participation in the implementation of BMC Enterprise automation tools to streamline current work activities and allow additional services to be assimilated into Computer Operations. | ✗ Attend education as directed by management to familiarize staff member with automation and specific tools.  
✗ Identify elements of your position that are potential automation candidates.  
✗ Actively participate in project program as required.  
✗ Execute additional tasks in plan formulated by project manager.  
✗ Identify areas of self education (Web seminars, vendor presentations, etc.) to supplement job skills; work with manager to schedule. |
| Active Disaster recovery participation for at least 1 exercise.                              | ✗ Schedule as outlined by DR Coordinator(s). |
| Implementation of core processes is key to successful management of the Enterprise. Actively participate in the introduction of core process methodology into Computer Operations utilizing the Remedy toolset: Incident, Problem, Change, Root Cause, Asset Management. | ✗ ALL changes are to have a change management record with appropriate approvals (as rolled out w/ Remedy program).  
✗ Remedy tickets subject to audit for accuracy, clarity, completeness. This includes, but is not exclusive to, logging tickets, recording problem activity, and reusable problem solutions. |
| Secure the University’s systems environment and physical plant.                               | ✗ Identify and remediate potential areas of risk in Computer Operations tools, processes, and procedures.  
✗ Identify and remediate potential areas of risk in the physical plant including, but not exclusive to, the Command Center and the Computer Room (Data Center). |
| Reduce cycle time.                                                                           | ✗ Identify processes, procedures, and tools that will result in a net reduction in cycle time (systematic or manual).  
✗ Document and submit associated cost and/or time savings  
✗ Collaboratively work with the appropriate groups to implement recommendations |
| Actively participate in additional (unplanned) projects or programs that may arise due to University or departmental requirements | ✗ TBD |
| Develop metrics associated with job function that provides management analytical data to make business decisions. Metrics are to be provided on a monthly basis. | ✗ Develop measurable success and failure metrics for function.  
✗ Determine method to consistently capture data in an automated fashion. |
Execute and Deliver

- Implementation targets are identified and prioritized.
- Create an Operational Plan.
  - Plan for the re-engineering of current work/incident flows.
  - Introduce workflow diagramming concepts.
  - Train the trainer strategy is implemented.
  - Schematics for Incident/Change/Asset Management are developed.
  - Staff communication to prepare for change.
  - Tactical and strategic goals are set for staff and reflected in each performance cycle.
- Execute the Plan
  - How will you measure success?
  - How do you sustain the momentum?
  - How do keep the program evergreen?
# Sample Re-engineering Results

<table>
<thead>
<tr>
<th>ELIMINATED TASK LIST</th>
<th>REASON for ELIMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check spool %</td>
<td>threshold could be set in EMS</td>
</tr>
<tr>
<td>Check initiators each shift</td>
<td>initiators are automatically reset at predefined times</td>
</tr>
<tr>
<td>Check TSM processing</td>
<td>CCO group added to TSM / Fastback process distribution email list</td>
</tr>
<tr>
<td>Check LPDSERV print queue</td>
<td>a development automated process (user submits)</td>
</tr>
<tr>
<td>Check # scratches pulled</td>
<td>scratches pulled daily .... reports available</td>
</tr>
<tr>
<td>Check scanning status</td>
<td>scanning completed as received / all exceptions to be noted in Change record</td>
</tr>
<tr>
<td>Check Mellon remotes</td>
<td>no longer applicable .... process went from SNA to VPN</td>
</tr>
<tr>
<td>Check jobs on hold</td>
<td>print jobs only on hold as the exception</td>
</tr>
<tr>
<td>Check fiche pickup / delivery</td>
<td>not necessary to note (day to day activity)</td>
</tr>
<tr>
<td>Check VRI pickup / delivery</td>
<td>not necessary to note (day to day activity)</td>
</tr>
<tr>
<td>Check tapes loaded into Magstar</td>
<td>not necessary to note (day to day activity)</td>
</tr>
<tr>
<td>Check ‘G’ jobs / initiators</td>
<td>now being done at operator’s discretion</td>
</tr>
<tr>
<td>Check CICS regions down</td>
<td>scheduled / monitored via ZEKE</td>
</tr>
<tr>
<td>Check dumps complete</td>
<td>scheduled / monitored via ZEKE</td>
</tr>
<tr>
<td>Check CICS regions up</td>
<td>scheduled / monitored via ZEKE</td>
</tr>
<tr>
<td>Check FDR’s complete</td>
<td>scheduled / monitored via ZEKE</td>
</tr>
<tr>
<td>Check ORS database backup schedule</td>
<td>scheduled / monitored via ZEKE</td>
</tr>
</tbody>
</table>

## ELIMINATED FORMS

<table>
<thead>
<tr>
<th>FORM</th>
<th>REASON</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISC System Checkoff List</td>
<td>tasks for same have been deleted (initiator and job displays)</td>
</tr>
<tr>
<td>Daily Operations Check-off Sheet</td>
<td>all tasks deleted due to <strong>Manage by Exception</strong> principal</td>
</tr>
<tr>
<td>Machine Room Shift Turnover Log</td>
<td>all entries deleted save outstanding problems/instructions which now become incident/problem tickets related to the appropriate Change record.</td>
</tr>
<tr>
<td>Data Center Inspection Checklist</td>
<td>all findings are now noted and recorded in the Change record activity log and when necessary, facilities or incident tickets are opened</td>
</tr>
<tr>
<td>Service Area</td>
<td>Sample Response</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Description</td>
<td>Brief description if not obvious.</td>
</tr>
<tr>
<td>Clients Served</td>
<td>Users, LSPs, Admin System Owner, etc.</td>
</tr>
<tr>
<td>Phone Intake</td>
<td>&quot;No&quot; or Phone Number</td>
</tr>
<tr>
<td>Email Intake</td>
<td>&quot;No&quot; or Email Address</td>
</tr>
<tr>
<td>Web Intake</td>
<td>&quot;No&quot; or URL</td>
</tr>
<tr>
<td>Other Intake</td>
<td></td>
</tr>
<tr>
<td>Intake Staff</td>
<td>Individual, Group/Team, Other</td>
</tr>
<tr>
<td>Monthly Request Volume</td>
<td>Requests/month. Estimate/range is fine.</td>
</tr>
<tr>
<td>Next Tier (if any)</td>
<td>Standard point of referral/escalation for issues that can not be resolved.</td>
</tr>
<tr>
<td>Service Level Agreement?</td>
<td>Do you manage to an existing SLA?</td>
</tr>
<tr>
<td>Performance Measure 1</td>
<td></td>
</tr>
<tr>
<td>Implemented or Planned?</td>
<td>Implemented</td>
</tr>
<tr>
<td>Performance Measure 2</td>
<td>Volume Measurement</td>
</tr>
<tr>
<td>Implemented or Planned?</td>
<td>Planned</td>
</tr>
<tr>
<td>Supporting System (if any)</td>
<td>PlanView, Remedy, etc.</td>
</tr>
<tr>
<td>Start Date</td>
<td>End Date</td>
</tr>
<tr>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>01/02/07</td>
<td>03/28/07</td>
</tr>
<tr>
<td>01/01/07</td>
<td>01/31/07</td>
</tr>
<tr>
<td>01/15/07</td>
<td>01/15/07</td>
</tr>
<tr>
<td>01/16/07</td>
<td>01/16/07</td>
</tr>
<tr>
<td>01/16/07</td>
<td>01/16/07</td>
</tr>
<tr>
<td>01/16/07</td>
<td>01/16/07</td>
</tr>
<tr>
<td>01/17/07</td>
<td>01/17/07</td>
</tr>
</tbody>
</table>
Incident opened after performing Weekly Data Center Facilities Inspection.
Sent request to Penn Facilities for WorkReq to have lights replaced in the Forms Storage Area at 3401 Walnut.
**Change Request Information**

**Full Name** (LAST, FIRST)  CAWLEY, STEPHEN  
PenKey: cauleys  
Email: cauleys@isc.upenn.edu  
Street: Computer Operations  
Phone: 215-898-4355  
Summary: Facilities - Weekly Data Center Inspection

### General
- **Category:** Facilities  
- **Type:** Weekly Data Center Inspection  
- **Status:** Closed  
- **Priority:** Low  
- **Escalated?:** Yes  
- **Urgency:** Low  
- **Scope:** Local  
- **Health Status:** On Target  
- **Health Reason:** 

### Description
Facilities - Weekly Data Center Inspection

**Change ID:** CHG0000000001049  
**Change Type:** Change  
**Pending:**  
**Approval Status:** Not Required  
**WIP Status:**  
**Closure Code:** Automatically Closed  
**Sequence:** 0

**Group:** ISC DCF  
**Supervisor:** Steve Cawley  
**Requested Date:**
### Change Request Information

**Full Name** (LAST, FIRST)  
CAWLEY, STEPHEN

**PennKey**  
cawleys

**Primary Affiliation**  
Staff

**PennCard ID**  
29456306

**Center**  
Information Systems and ...

**Organization**  
Computer Operations

**Email**  
cawleys@isc.upenn.edu

**VIP**  
No

**Street**  
Computer Operations

**Phone**  
215-898-4355

**Summary**  
Facilities - Weekly Data Center Inspection

---

### Tasks for Change Request

<table>
<thead>
<tr>
<th>Summary</th>
<th>Sequence</th>
<th>Implementer</th>
<th>Planned Start</th>
<th>Planned End</th>
<th>Escalate</th>
<th>Request Level</th>
<th>Status</th>
<th>Item Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform DCE Weekly Inspection</td>
<td>1</td>
<td>Steve Ca</td>
<td>7/6/200</td>
<td>7/6/200</td>
<td>No</td>
<td>Low</td>
<td>Closed</td>
<td>Perform DCE Weekly Inspection</td>
</tr>
<tr>
<td>Document/Secure Results of Inspection</td>
<td>2</td>
<td>Steve Ca</td>
<td>7/6/200</td>
<td>7/6/200</td>
<td>No</td>
<td>Low</td>
<td>Closed</td>
<td>Document/Secure Results of Inspection</td>
</tr>
</tbody>
</table>

---

**Enforce Task Dependency**  
Error

**Buttons**
Create New Tasks  
Select Predefined Tasks  
Cancel Task  
View  
Refresh  
Save  
Print Change Request  
Close
April 30, 2014

Wednesday

- From Mar 17: 3401 Walnut Lighting Project - Schedule Update Notification
- From Mar 28: CHANGE FREEZE PERIOD - Critical Business Process for Admissions Notification - Admitted Student Decisions Reply Due Date
- From Apr 21: CHANGE FREEZE PERIOD - Critical Business Process for Human Resources - PennWorks Salary Increase Program Notification
- From Apr 21: CHANGE FREEZE PERIOD - CRITICAL BUSINESS PROCESS for Spring Semester END-OF-TERM COURSE EVALUATIONS
- From Apr 25: CHANGE FREEZE PERIOD - GPAR Implementation
- From Apr 29: Removing nexus luns from sevmfspi07-09
- From Apr 29: CHANGE FREEZE PERIOD - Ben Financials Month End Closing
- EMERGENCY CHANGE - EMERGENCY MAINTENANCE FOR DHCP
  - HOST29 re-boot
  - ISC-SEO Software Upgrade *apps.upenn.edu cert on F5 for all fastapp URLs
  - Last day of Classes
Strategic Milestones
Through 2007

- Introduce severity assessment criteria into the environment.
- Implement solutions management across Computer Operations. (Sharepoint integration is in progress)
- Manage the integrity of Data Center Assets via a combination of Change Management and Asset Management (December 2006)
- Determine if product will be supported internally or externally and at what level.
- Implementation of Event Monitoring, automated notification, and mainframe automation. (June 2007)
- Integrate BMC Remedy Service Desk with Enterprise Automation (Spring 2007).
- Implement more sophisticated, analyzed metrics into the management reporting stream. (May 2007)
- Continuously audit the processes and functions for efficiency opportunities.
- Continuously identify actual and opportunity cost savings.
Continuous Improvement

Despite the lack of IS/C interest for installation and execution of a CMDB, Operations continues to configure its operational tools and posture the asset and configuration information they own (University record) for an eventual CMDB implementation. Work performed traditionally by higher dollar (SE) resources continues to move to Operations. Automation and compliance methods continue to progress.

**2012**

- FISMA compliance (NIST800-53) - Maintain
- Project Management following PMI Methodology
- Online Reporting (Print Elimination) (Start)
- VTL - Phase II
- TSM Upgrade/Support moves to Operations
- CMDB Install (under Pennscope) - Deferred by Remedy Team
- Increased SNMP Automation/Predictive Analytics
- Storage Management Automation (Hitachi Monitor) - Deferred
- Bridge Data Center Build (Start)

**2013**

- Remedy 8 Upgrade - Complete
- CMDB in Production (PAIR Database)
- PennScope Upgrade (ProactiveNet9) - Complete
- Data Center Modernization - Execution (cont'd) - Complete
- Data Center Automation (DCM) - On hold
- FISMA compliance (NIST800-53) - Maintain
- ISO 9001:2008 - Maintain/Recertification
- Zen Replaces Zeke - Deferred for redefinition strategy
- OLAs with Facilities and other 3rd party providers - Deferred to 2014
- Scanning Service sunset - Deferred to 2014

- Data Center Modernization - Trustee Approval/Execution
- Remedy 8 upgrade (Start)
- Implement Discovery Tool (TADDM)
- RFID Technologies (End/Maintain)
- PWC Audit
- ISO 9001:2008 - Maintain/Recertification
- SSL/Certificate Management moves to Operations
- Sprint Mobile Wireless Management moves to Operations

- ISO 20000:2011 Preparation
- Increased SNMP Automation/Predictive Analytics
- PWC Audit
- Online Reporting Complete
- PennBox Implementation/SharePoint Replacement - Complete
- Monthly Mainframe Sub-capacity Report Submission to IBM
- Site Scan Upgrade - In progress
- Bridge Data Center Build (End) - Complete
- Virtual Command Center - In progress
- Z/OS upgrade (O/S and ancillary software) - Complete
While redefinition efforts continue to be refined, Operations continues to progress current initiatives, and begin efforts to determine cloud based options for the infrastructure, executing where possible.

### 2014

<table>
<thead>
<tr>
<th>Incident, Problem, Asset, Configuration, Change Management program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Now Evaluation - Complete</td>
</tr>
<tr>
<td>CMDB in Pennscope (PAIR/TADDM/AssetVue) - Planning</td>
</tr>
<tr>
<td>Pennscope Upgrade (ProactiveNet9) - Complete</td>
</tr>
<tr>
<td>Data Center Automation w/ Sitescan via SNMP/BMC - In Progress</td>
</tr>
<tr>
<td>FISMA compliance (NIST800-53) - Maintain</td>
</tr>
<tr>
<td>ISO 9001:2008 - Maintain/Recertification</td>
</tr>
<tr>
<td>Replace Job Scheduling Tool – Deferred</td>
</tr>
<tr>
<td>OLAs with Facilities and other 3rd party providers – In Progress</td>
</tr>
<tr>
<td>Scanning Service sunset (Source or Term/Re-eralt cost) – In Progress</td>
</tr>
<tr>
<td>ISO 20000:2011 Certification - Complete</td>
</tr>
<tr>
<td>Increased SNMP Automation/Predictive Analytics – In Progress</td>
</tr>
<tr>
<td>PWC Audit – In Progress</td>
</tr>
<tr>
<td>Online Reporting (PH II Parking Lot activities/automation) - Hold</td>
</tr>
<tr>
<td>(User) ID creation/maintenance workflow automation – Pending SE</td>
</tr>
<tr>
<td>Evaluate CCO Sourcing Options – In Progress</td>
</tr>
<tr>
<td>Alarmpoint Cloud Instance – In Progress</td>
</tr>
</tbody>
</table>

### 2015

<table>
<thead>
<tr>
<th>Additional goals pending organizational realignment/direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 20000:2011 Maintain</td>
</tr>
<tr>
<td>ISO 9001:2008 – Maintain/Recertification</td>
</tr>
<tr>
<td>FISMA compliance (NIST800-53) – Maintain</td>
</tr>
<tr>
<td>Transition additional services to Operations from SE</td>
</tr>
<tr>
<td>Additional technology initiatives. TBD</td>
</tr>
<tr>
<td>Cloud/Archiving - support expansion</td>
</tr>
<tr>
<td>Increased SNMP Automation/Predictive Analytics (App Layer)</td>
</tr>
<tr>
<td>Application Layer Discovery (TADDM)</td>
</tr>
<tr>
<td>PWC Audit</td>
</tr>
<tr>
<td>Energy Initiatives/Rebates/Grants</td>
</tr>
</tbody>
</table>
Final Thoughts

- Implementing ITIL is not for the faint of heart.
- Begin with the building blocks of ITIL.
- Formulate an ITIL steering committee.
- Develop each of the disciplines separately, then integrate.
- Be prepared to uncover your deficiencies (and deal with them).
- Continuously audit the processes and functions for efficiency opportunities.
- Evolution is the key – this program never officially “ends” – annual strategic planning is necessary; operational plans assessed quarterly.
Questions?

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