Internal Audit Report

ITS CHANGE MANAGEMENT PROCESS

Report No. SC-11-11

March 2011

UC SANTA CRUZ

March 31, 2011

MARY DOYLE
Vice Chancellor – Information Technology

Re: Internal Audit Report No. SC-11-11 – ITS Change Management Process

Dear Mary:

Internal Audit & Advisory Services has completed a review of the ITS change management process to determine that changes to the IT resources that ITS is responsible for are adequately managed. A copy of the report is attached.

The ITS change management process was generally effective in managing the IT change process. This process is expected to further mature as more services implement the process and with the replacement of the current Change Request Tool with a more robust application later this year.

Opportunities were identified for improving the change management process as the current metrics included in management reports did not adequately reflect the change management process and ITS had not established configuration management to enable the full maturity of ITS's change management process. In addition, information about the change management process contained on the ITS website was out of date.

ITS management and staff were responsive in acknowledging and working through observations identified. Agreement was reached on all of the report's recommendations. Normal followup activity will be performed to verify completion of the agreements.

We would like to specifically express our appreciation to your Security and Client Services Director and Change Management manager and staffs for their cooperation and assistance throughout this engagement.

Sincerely,

Barry Long, Director
Internal Audit & Advisory Services

Attachment

Mary Doyle
March 31, 2011
Page Two

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ITS CHANGE MANAGEMENT PROCESS

Report No. SC-11-11

March 2011

Approved:

James Dougherty
Principal Auditor

Barry Long, Director
Internal Audit & Advisory Services

UC SANTA CRUZ

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I.   EXECUTIVE SUMMARY

Internal Audit & Advisory Services has completed a review of the ITS change management process by testing controls to ensure that changes to the IT resources that ITS is responsible for are adequately managed.

The ITS change management process was generally effective in managing the IT change process. This process is expected to further mature as more services implement the process and with the replacement of the current Change Request Tool with a more robust application later this year.

The following opportunities were identified during the review for improving the change management process:

A.   *Current metrics included in management reports do not adequately reflect the change management process; they are mainly focused on changes that follow the outage process phase of the change management process. Consequently, ITS management cannot monitor the change management process comprehensively.*

B.   *ITS has not established configuration management, a component of ITIL's service support. As all the components of service support are meant to cooperate with each other, configuration management will enable the full maturity of ITS's change management process.*

C.   *Information about the change management process on its website is out of date.*

Our observations and related management corrective actions are described in greater detail in section III of this report. A description of ITIL Service Support Components is included in Appendix A. Appendix B contains the COBIT Change Management Goals & Metrics and Maturity Model.

II.   INTRODUCTION

A.   Purpose

The purpose of this review was to evaluate the effectiveness of the Information Technology Services (ITS) change management process.

B.   Background

In November 2008, ITS established a change management process. The purpose of this process was to ensure changes to IT resources that ITS is responsible for occur quickly, with minimal service disruptions, and are aligned to the goals of

the campus. This is accomplished through the use of standard methods and procedures.

The change management function is included in the ITS Client Services & Security unit. It consists of a change manager who is primarily responsible for filtering, accepting and classifying all requests for changes as well as reviewing these requests to ensure that upfront planning has been achieved and that scheduling is appropriate.

The standards that ITS has adopted are from the Information Technology Infrastructure Library (ITIL), a widely acknowledged comprehensive set of best practices for managing and delivering IT services. Change management is included in the ITIL discipline "service support" along with service request management (the service desk), incident management, problem management, release management and configuration management. Service support focuses on the user/client of IT services and is primarily concerned with ensuring that clients have access to the appropriate services to support the business functions. See Appendix A for a description of the components of ITIL service support.

The ITS change management process has three phases: the outage process, release readiness, and the complete change management process. The **Outage Process** requires all planned and unplanned outages to be communicated to clients and to an e-mailing list. The e-mailing list includes the Support Center staff, the communication manager and the change manager. The outage is then added to the ITS Maintenance Calendar so that it is visible to the campus. The outage process applies to the entire ITS Division, including the academic and administrative divisions. **Release Readiness** primarily means all changes are tested, scheduled and communicated before implementation. Impact and risk mitigation are paramount. The **complete change management process** defines a lifecycle of change from idea to post implementation review. Ideas are evaluated, prioritized, selected to be built, designed, built and tested, and then they follow the release readiness process. These three phases of the change management process align to the specific "pain points" and problem areas that ITS has routinely faced. They also represent a roadmap for service maturity: outages represent the most obvious and easily managed impact to the client; while release readiness attempts to manage all change to a service, not just service outages that impact the client. The complete process is valuable after the service is successfully and efficiently mitigating client and technical impact due to changes, as its focus is primarily on aligning changes to client and campus priorities.

The ITS change management process employs a tracking and reporting application, JIRA, that is referred to as the **Change Request Tool (CRT).** The

CRT is a tool for internal ITS staff tracking changes to their service. Therefore, it differs from the Support Center's IT Request, which is designed as a client-facing ticket tracking tool for all incoming incidents and service requests. ITS plans to replace IT Request and CRT with a new application, **Service-now**, that will integrate the client-facing ticket tracking function with the internal change management function, as well as provide other capabilities. The CRT includes all the steps in the change management process that lead up to a request for change (RFC); the review and approval of the RFC; communication among members of service teams and between teams and the change manager and communication manager; and the post-implementation review. Initially, two services were on-boarded into the CRT; now there are 24 services and more are planned for on-boarding.

Review and approval of a request for change is provided by the change authority. This role is assigned to the change manager who may delegate approval authority to a lead at the service team level. Depending on the level of impact that a change will have, the change manager will include the Change Advisory Board in the review and approval process.

C.   **Scope**

We developed an audit program following a risk assessment of the ITS change management process. The main risk areas we identified were changes that occur outside the change management process; changes not properly prioritized or categorized; changes not adequately reviewed or authorized; changes not adequately communicated; and the reoccurrence of change incidents. We examined the controls within the change management process that mitigate such risks by interviewing ITS management, including the director of Client Services and Security, the current and previous change managers, and the director of Academic Support Client Relationship Management. We reviewed documentation describing the process, including the ITS change management policy, system-wide change management policy, training materials, and ITS units'IS-3 self-assessments of their change management. We reviewed samples of email and web-based communication of IT changes, change management metrics and reports, and the ITS Maintenance Calendar. We also obtained an account for the Change Request Tool and reviewed samples of change projects. We compared the ITS change management process with standard models of change management, particularly ITIL's change management and ISACA's COBIT framework for IT governance and control.[1]

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[1] ISACA is the Information Systems Audit and Control Association. COBIT is the Control Objectives for Information and related Technology.

D.   Observations of Noteworthy Practices

Aside from the opportunities for improvement mentioned below, we found that the management controls within the ITS change management process adequately addressed the main risk areas from our risk assessment. Of particular interest to us was how services are brought into the change management process, especially in the distributed IT environment of the campus.

The change manager demonstrated steps to help determine what services and changes to include in the change management process and the phases of that process that apply. The steps are: 1) decide what applications/services are onboarded into the Change Request Tool, as this helps drive standardization and broader visibility; 2) discussions that include best practices by service teams, including routine changes ripe for pre-approval, and discussions of grey areas with users as part of the learning curve; 3) onboarding teams as a preventative measure after unintended consequences of changes that caused service disruptions; and 4) documenting conditions of changes in the CRT and including it in the summary provided to service teams.

We learned from the director of Academic Support Client Relationship Management and division liaison for BAS and Student Affairs that division liaisons generally copy the Support Center emailing list if a change such as a reboot is worth communicating to a client. Consequently, the change manager is informed of these changes. Although division liaisons work with a large variety of systems, servers, software packages and diverse sets of clients that involve a wide scope of changes from the very simple to the complex, they are moving their staffs and systems towards the ITS change management process. We observed a divisional change management procedure document draft authored by the change manager and contributed to by division liaisons that is being produced for this purpose.

III.   OBSERVATIONS REQUIRING MANAGEMENT CORRECTIVE ACTION

A.   Metrics for Monitoring Change Management

Current metrics included in management reports do not adequately reflect the change management process; they are mainly focused on changes that follow the outage process phase of the change management process. Consequently, ITS management cannot monitor the change management process comprehensively.

Metrics in management reports should be expanded to provide an effective change management monitoring process.

Comments:
Metrics are essential to determine status and trending of various aspects of services and the process itself. They also allow decisions to be made from established data benchmarks and targets. *ITS Change Management Process*, Chapter Nine "Metrics" stated there would be 13 metrics reported. Five of the 13 metrics were included in reports to management; these were mainly concerned with the outage process. As management of the outage process was the first priority of the change management process, this was appropriate. However, the process has matured and attention to the release readiness and the complete change management process should be addressed by adding appropriate metrics. Many of these metrics are tracked, but not reported; reporting should be added to the process.

The metrics from the list of 13 that should be considered by management for inclusion in its reports are:

1. Total changes submitted – by Service, Month, Quarter, Year
2. Successful changes – by Service, Month, Quarter, Year
3. Percent of rejected changes – by Service, Month, Quarter, Year
4. Urgent changes – by Service, Month, Quarter, Year
5. Unauthorized changes – by Service, Month, Quarter, Year
6. Percent of changes causing incidents (*percentage of total changes rather than total outages*) - by Service, Month, Quarter, Year
7. Planned RFC turnaround time (from submitted to response in CRT)
8. Urgent RFC turnaround time (from submitted to response in CRT)

We found additional metrics for ITS management to consider for its reports; they are the COBIT change management goals and metrics and the COBIT maturity model. Refer to Appendix B for these.

Agreement:
In consultation with the director of Client Services & Security, the change manager will improve monitoring of the change management process by adding metrics that comprehensively address the process, consistent with the services/systems that have been onboarded by May 1, 2011.

B.   Configuration Management

ITS has not established configuration management, a component of ITIL's service support. As all the components of service support are meant to cooperate with each other, configuration management will enable the full maturity of ITS's change management process.

Configuration management functionality should be incorporated into ITS's client support functions.

Comments:
Configuration management includes a configuration management database that contains details of the organization's elements (configuration items) that are used in the provision and management of its IT services. Among other functions, the database is used to record bench marks for each configuration item. When items are bench marked, it is possible to review for any changes and identify unauthorized changes. The database is also used to track the expected lifespan of hardware and record maintenance history. This concerns the understanding of the serviceability status of IT assets and their components to maintain the highest level of serviceability. The goal is to ensure that operations are not disrupted due to the asset or its components overrunning limits of planned lifespan or below quality levels. To the extent that evaluation of the serviceability of IT assets and components is weak, there is the risk of unplanned outages/service disruptions. Further, the database can record all the clients that are affected by configuration items to enable efficient notification of changes that may affect them.

ITS is aware of the advantages of configuration management, but does not have the resources to establish it. This could change in part with acquiring Service-now, which includes a configuration management database. This acquisition does not address staffing issues, which may remain given present and expected budgetary constraints.

Agreement:
When Service-now is deployed, the director of Client Services & Security will evaluate establishing ITS configuration management, including time-frame and resources required by October 31, 2011.

C.   **Change Management Website**

Information about the change management process on its website is out of date.

As the change management website is an important introduction to the change management process, it should be up to date.

Comments:
Much of the information on the change management website was provided by the November 2008 document, *ITS Change Management Process.* While much of this information is still valid from a theoretical perspective of change

management, there are practical aspects that are now dated. For example, the website states: "RFCs (requests for changes) are primarily being created by two services (CruzMail and Web Services) and consequently the volume is low at this time." That was accurate in 2008, but now 24 services have been added to the Change Request Tool and the number is growing. Also, meetings of the Change Advisory Board are not conducted now as described on the website. Further, there is a training module on the website that is 102 minutes long and records training given to a live audience. There are Q&A sections of this training that are not audible and dead space related to exercises. This detracts from the learning experience and makes the recording unnecessarily long. The replacement of the current Change Request Tool with Service-now will require changes to the website and will provide an opportunity to update other information and reassess the training module.

Agreement:
The ITS change manager will update the change management website and make the change management training module more user-friendly by July 15, 2011.

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APPENDIX A: DESCRIPTION OF ITIL SERVICE SUPPORT COMPONENTS

The principal point of contact for clients requesting IT services or reporting incidents is the **service desk**, called the Support Center by ITS. The primary functions of the service desk are incident control and communication that informs clients of progress and advising on workarounds. The first function of the service desk is to create a ticket for client requests for IT services. The ITS Support Center uses **IT Request**, a web-based service, to record this activity and generate a ticket number. Service desk personnel will either directly respond to the request or refer the ticket to other ITS service support teams for a solution. The ITS change manager is alerted to change requests by email. This alert can be provided by Support Center personnel, by personnel in other ITS units dealing directly with requests for changes, or directly from the CRT. The change manager enters events in the ITS Maintenance Calendar, such as changes that will or could result in outages.

Incident management aims to restore normal service operations as quickly as possible and minimize the adverse effect on business operations. **Problem management** aims to resolve the root cause of incidents and thus to minimize the adverse impact of incidents and problems on business that are caused by errors within the IT infrastructure, and to prevent recurrence of incidents related to these errors. **Change management** aims to ensure that standardized methods and procedures are used for efficient handling of all changes.[2] This will enable minimal disruption of services, reduction in back-out activities, and economic utilization of resources involved in the change. **Release management**, called release readiness by ITS, ensures that changes to production systems and services are ready to implement. **Configuration management** is the implementation of a database that contains details of the organization's elements (configuration items) that are used in the provision and management of its IT services. This is more than an asset register, as it will contain information that relates to maintenance, movement and problems experienced with the configuration items.

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[2] Change management is not typically responsible for overseeing changes that occur within the development project management methodology. However close liaison between development project managers and the change manager is expected when the development project is ready for release into the production environment. A development project is the development of a new application or service, rather than a change to an existing one.

APPENDIX B: COBIT CHANGE MANAGEMENT GOALS & METRICS AND MATURITY MODEL

COBIT Change Management Goals and Metrics[3]

Goal	Metrics
IT goals: • Respond to business requirements in alignment with the business strategy. • Reduce solution and service delivery defects and rework • Ensure minimum business impact in the event of an IT service disruption or change. • Define how business functional and • control requirements are translated into effective and efficient automated solutions • Maintain the integrity of information and processing infrastructure	**IT goal metric:** • Number of disruptions or data errors caused by inaccurate specifications or incomplete impact assessment
Process goals: • Make authorized changes to the IT infrastructure and applications • Assess the impact of changes to the IT infrastructure, applications and technical solutions • Track and report change status to key stakeholders • Minimize errors due to incomplete request specifications	**Process goals metrics:** • Amount of application rework caused by inadequate change specifications • Reduced time and effort required to make changes • Percent of total changes that are emergency fixes • Percent of unsuccessful changes to the infrastructure due to inadequate change specifications • Number of changes not formally tracked, reported or authorized • Number of backlogged change requests.
Activity goals: • Defining and communicating change procedures, including emergency changes and patches • Assessing, prioritizing and authorizing changes • Scheduling changes • Tracking status and reporting on changes being maintained	**Activity goals metrics:** • Percent of changes recorded and tracked with automated tools • Percent of changes that follow formal change control processes • Ratio of accepted to refused change requests • Number of different versions of each business application or infrastructure

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[3] COBIT 4.1 Section AI6 Manage Changes

	• Number and type of emergency changes to the infrastructure components • Number and type of patches to the infrastructure components

COBIT Maturity Model[4]

Management of the change management process that satisfies the business requirement for IT of responding to business requirements in alignment with the business strategy, whilst reducing solution and service delivery defects and rework is:

0 Non-existent when

There is no defined change management process, and changes can be made with virtually no control. There is no awareness that change can be disruptive for IT and business operations, and no awareness of the benefits of good change management.

1 Initial/Ad Hoc when

It is recognized that changes should be managed and controlled. Practices vary, and it is likely that unauthorized changes take place. There is poor or non-existent documentation of change and configuration documentation is incomplete and unreliable. Errors are likely to occur together with interruptions to the production environment caused by poor change management.

2 Repeatable but Intuitive when

There is an informal change management process in place and most changes follow this approach; however, it is unstructured, rudimentary and prone to error. Configuration documentation accuracy is inconsistent, and only limited planning and impact assessment take place prior to a change.

3 Defined when

There is a defined formal change management process in place, including categorization, prioritization, emergency procedures, change authorization and release management, and compliance is emerging. Workarounds take place, and processes are often bypassed. Errors may occur and unauthorized changes occasionally occur. The analysis of the impact of IT changes on business operations is becoming formalized, to support planned rollouts of new applications and technologies.

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[4] COBIT 4.1 Section AI6 Manage Changes

4 Managed and Measurable when

The change management process is well developed and consistently followed for all changes, and management is confident that there are minimal exceptions. The process is efficient and effective, but relies on considerable manual procedures and controls to ensure that quality is achieved. All changes are subject to thorough planning and impact assessment to minimize the likelihood of post-production problems. An approval process for changes is in place. Change management documentation is current and correct, with changes formally tracked. Configuration documentation is generally accurate. IT change management planning and implementation are becoming more integrated with changes in the business processes, to ensure that training, organizational changes and business continuity issues are addressed. There is increased coordination between IT change management and business process redesign. There is a consistent process for monitoring the quality and performance of the change management process.

5 Optimized when

The change management process is regularly reviewed and updated to stay in line with good practices. The review process reflects the outcome of monitoring. Configuration information is computer-based and provides version control. Tracking of changes is sophisticated and includes tools to detect unauthorized and unlicensed software. IT change management is integrated with business change management to ensure that IT is an enabler in increasing productivity and creating new business opportunities for the organization.

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