APPENDIX G

Networx Enterprise Program

Contract Number TQC-JTB-05-0002

AT&T Labs
Operational Support Systems (OSS)
Change Management (CM)
Plan

March 5, 2007

REVISION HISTORY

DATE	VERSION	REVISION/CHANGE DESCRIPTION
10/24/05	1.0	Initial release
03/05/07	1.1	Final Proposal Revision

Document Approvals

The AT&T Labs Project Manager identified for this project is responsible for obtaining approval from the stakeholders for use.

Document Distribution

This document is distributed to the following:

- Stakeholder Team.

Document Review Plans

This document will be reviewed or inspected and updated, as defined below:

- As required to correct or enhance information content
- Following any process re-engineering or change control activities.

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1   PURPOSE, SCOPE AND OBJECTIVES

2   CHANGE MANAGEMENT (CM) CONTROL

This document describes Change Management (CM) standards and responsibilities for the ███████ Change Control process at the AT&T Labs. This document describes the events occurring during a particular system release on a specific date and time, and includes the following items:

- *Hardware, software, and documentation*
- *Test cases, software, and documentation used to verify requirements*
- *Planning and procedural documents*
- *Requirements, design, testing, and training documents.*

The objective of this Change Management Plan is to define the approach for identifying, preparing, assessing, delivering, controlling, and verifying the change(s).

This section addresses the following issues:

- Identifies and/or references the work products to be placed under Change Control
- Assigns responsibility for establishing and maintaining the baseline library
- Identifies who authorizes the establishment of baselines built from the baseline library
- Identifies who reviews and authorizes changes to the baseline.

2.1   Identification of Change Items

This section identifies projects and environmental and/or operational work products to be placed under CM control. These work products primarily include: requirements, specifications, interface agreements, designated

development work products, all customer or contract deliverables, supplier agreements, verification and validation work products, integration and system code, and current and previous baselines and operational configurations (including support documentation). **Table 2.1-1** lists the format used for identification of the projects.

PROJECTS	FEATURE DESCRIPTION
PXXXX	
PXXXX	
PXXXX	
PXXXX	
Production MR	*Description*
XXX	
XXX	
XXX	
XXX	

Table 2.1-1: Project Identification. *An assigned number identifies all work products placed under CM control.*

This section identifies or references the following: all naming conventions, rules for use, and/or standards used to identify change items, units, components, builds, and releases.

2.2   Change Control Board (CCB)

The CCB has been assigned responsibility for establishing software and systems engineering baselines, reviewing and authorizing changes to those baselines, and authorizing creation of products from the CM baseline library (e.g., software builds/releases or products). These responsibilities are assigned to members of the CM Group, the Modification Request Review Board (MRRB), and to representatives of the various functional roles (e.g., Systems Engineers, System Developers, and System Testers), depending on the work product(s) to be placed under Change Management control and the product lifecycle stage. The individual(s) assigned represent the interests of their functional areas as well as the overall interests of the Project and Release Managers. It is the responsibility of the CM Manager and Project

Manager to make sure all team members are aware of and are accountable for their CM responsibilities. Authorization and creation of work products from the CM Library are shown in **Table 2.2-1.**

WORK PRODUCT TYPE	WHO CREATES	WHO AUTHORIZES CREATION/CHANGES
Code during Design, Coding ,and Unit Testing	System Developers	System Developers are responsible for managing and controlling their own code and using the Change Management system, as appropriate.
Code during Integration Testing	System Developers	System Developers and Testers use the MR process to manage and control changes.
Code during System Testing	System Developers	System Testers, Integration Testers, System Developers, MRRB, and CCB.
Code Released after System Testing	System Developers	MRRB and CCB: For emergency procedures, refer to Section 5.
Software Builds	Build Coordinator	CCB or MRRB, as appropriate.

Table 2.2-1: Authorization and Work Product Creation. *Each functional representative has a key responsibility for creating a specific work product type.*

For documentation, the Project Plan or this plan identifies specific documents that are version and change controlled using an identified CM tool. Management of changes to work products is performed according to the AT&T Labs ▮▮▮▮▮▮▮Project Change Control Process.

The MRRB is responsible for submitting, tracking, reviewing, implementing, and closing modification requests (MRs). MRs can be initiated from customer found issues, system test, integration test, and lifecycle issues. The MRRB participates in and provides input into the CM process.

2.3 Authority to Create Baselines and Changes to Baselines

The various types of code and builds created during the lifecycle of the release, along with the role or roles of those who can authorize such establishment and the point at which those work products are placed under CM control, are governed by the CCB. Builds for testing and for release to the customer are created only from items stored in the CM library.

3   CHANGE MANAGEMENT (CM) GROUP

The CM Group is responsible for coordinating and implementing all CM activities for the project. **Table 3-1** lists the roles and responsibilities for the key personnel in CM activities.

NAME	FUNCTIONAL ROLE	RESPONSIBILITIES
	Change Control Manager	• Establishes and maintains CM Plan • Plans and manages activities related to CM, including schedule and budget • Serves as point of contact for CM requirements for projects • Manages implementation of CM and related standards and procedures • Establishes and controls CM audits, CM library, Configuration Items (CIs), and baselines • Reviews change status accounting information with project management • Presents change status accounting information to team members on an as-needed basis • Develops, monitors, and manages project change control processes • Trains all members of project team in their roles within CM, including change control activity processes including the use of CM tools • Acts as CCB Secretary • Gathers, analyzes, and reports CM metrics • Defines project's CM process.
	Change Control Board (CCB)	• Using input from the MRRB, evaluates all proposed changes for impact on technical, development, and operational requirements; cost and schedule interfaces; and support activities, including documentation • Assigns individuals to draft Request for Change for submission to higher level CCB • Assigns individuals to develop solutions to those changes accepted as valid • Reviews dispositions/waivers • Approves release of capabilities, products, and changes for project use • Confirms proposed changes are likely to accomplish their intended purpose • Confirms only approved changes are incorporated into controlled products • Assigns priorities to approved changes • Identifies emergency change authority • Dispositions approved changes to responsible parties for resolution and implementation.

NAME	FUNCTIONAL ROLE	RESPONSIBILITIES
	CCB Chair	• Schedules regular CCB meetings • Schedules ad hoc CCB meetings, as required, to meet project needs and schedules • Obtains inputs from CCB members as to the impact of proposed changes • Grants/refuses authorization to commit project resources to resolve changes from higher level CCBs • Approves/disapproves incorporation of proposed modifications into baseline • Approves/disapproves quick fix modifications • Determines schedule for updates/releases to baseline(s) under CCB control • Proposes schedule for installation of baseline software.
	CCB Secretary	• Performs change request database administration • Prepares CCB agendas, packages, and minutes • Maintains status log of all baselines and baseline change requests • Tracks action items.
	Modification Request Review Board	• Evaluates all proposed MR changes for impact on technical, development, and operational requirements; cost and schedule interfaces; and support activities, including documentation • Provides input to CCB • Participates in CM Review Boards.
	Release Manager	• Manages/monitors system releases • Participates on CCB.
	Project Manager	• Provides management oversight of the CM function • Assigns overall responsibility and authority to CM Manager • Allocates resources • Specifies metrics • Assesses impact of proposed changes • Reviews CM reports and results and then resolves issues emerging from the reports.
	Project Team Members	• Submits requests for changes • Provides input to CCB • Directs CM to establish baselines by promotion of software files • Implements changes • Works in conjunction with system, service, network tester to perform verification and audits.
	System Tester, Service Tester, Network Tester, OSS Change Control Manager	• Submits requests for changes • Provides input to CCB • Participates in CM Review Boards • Performs verification and audits.

NAME	FUNCTIONAL ROLE	RESPONSIBILITIES
	Infrastructure Team	• Provides oversight on projects for compliance with Concept of One.
	Security Manager	• Oversees entire change process to ensure Security needs are accounted for.

Table 3-1: Roles and Responsibilities of Key CM Personnel. *The CM Group Coordinates All Tasks for CM Activities.*

3.1 Stakeholder Identification and Inter-Group Communications

This section identifies the relevant stakeholders and their level of involvement in CM activities. This informs stakeholders of changes to work products and obtains their buy-in and signoff. The stakeholders are identified at a project level for each project or MR (**Table 3.1-1**).

For the Networx contract, the approval process is as follows:

Modification Request Review Board (MRRB) – performs the initial review of the proposed change. After performing a gross assessment of the change, provides approval for the change to continue through the process. All requests go to the MRRB first.

Change Control Board (CCB) – takes the approved changes from the MRRB and performs the next stage of review. This team schedules the changes and communicates this to the larger team. This team actually funnels the work out and manages it.

Operational Support Systems (OSS) Change Control Manager – Learns about the changes from the CCB. If the changes affect Networx, they will notify the Government. If the Government has concerns, the OSS Change Control Manager will take them back to the CCB.

Government – Works with the Networx OSS Change Control Manager to review and approve changes.

For Networx, the specific requirements and procedures for Government notification, involvement and information flow regarding potential changes, final decisions, and status through to closure are as follows:

If a change will impact the OSS used to support the Networx contract, the OSS Change Control Manager will notify the Government with the details, impact and schedule for the change. This will give the Government the opportunity to evaluate the impact of the changes on their operations and to notify us of any concerns.

When the OSS Change Control Manager notifies the Government of proposed changes that impact Networx, the Government can ask the OSS Change Control Manager to coordinate testing of the changes prior to installation.

The Government will learn about planned changes through the OSS Change Control Manager within the CPO. Whenever a change occurs that impacts Networx applications, the OSS Change Control Manager will send out a formal notification to the Government advising them of the specific changes that may impact their process.

STAKEHOLDERS	TITLE/ORGANIZATION/CONTACT NUMBER

Table 3.1-1: Identification of Stakeholders. *Buy-in and Signoff Occurs when Stakeholders Keep on Top of CM Activities.*

3.2   Consistency Check

This section documents the strategy and plans to confirm that work products remain consistent and traceable (e.g., necessary changes to code are reflected by changes to requirements, architecture, design, specification, test documents, and code). Traceability is normally achieved by referencing the MR or MRs causing changes to occur in the document or work product change history section. Change management forms must include actions for estimating the

impact of the work, potential re-planning, corrective action, and associated document modifications. Verification of consistency can be audited.

4 ESTABLISHING THE CM ENVIRONMENT AND PLANNING CM ACTIVITIES

4.1 Planning CM Activities

CM activities and deliverables can be documented in this section and integrated into Project Plans and Project WBS schedule. Each CM activity and deliverable has estimated resources, effort, and schedule commitments identified. Criteria for when change items are placed under control must be documented. Examples of criteria include: stage in the product or process lifecycle, degree of control desired, customer requirement, and when the product is ready for test.

For small project teams, CM activities can be combined and/or use other functional teams and resources, as necessary, to meet project constraints and commitments. Some key CM activities and deliverables are listed below and are included in the CM plans or Project Plans:

- Create CM Plan and associated Work Breakdown Structure (WBS)
- Ensure CM Plans and Schedules are integrated and consistent with overall program and project plans
- Perform review of CM Plans and Schedules
- Select CM tool for managing configurations
- Establish CM environment and operational needs
- Establish CM baseline library
- Establish CM procedures
- Establish CM management, plans, and procedures in supplier agreements
- Establish methods to ensure data is complete, consistent, and managed

- Identify and involve CM stakeholders
- Establish CM teams (CM Group, CCB, and MRRB) and individual responsibilities
- Train project team members and other associated teams in CM tool use and procedures
- Identify composition of and scheduling of CM baselines
- Develop standard CM reports for all stakeholders
- Schedule and perform CM audits
- Develop and implement inter-group coordination processes and procedures for management, control, and synchronization of development, test, training, operational, and other system configurations and environments
- Identify and implement key indicators for CM process
- Monitor, analyze, and report key CM process indicators
- Distribute CM status and reports
- Collect process improvement feedback, monitor, and improve CM processes.

4.2   Establish the CM Operational Environment

This section describes the CM environment, including operational, system, and software configuration design. It also describes how the CM environment is managed and maintained throughout all lifecycle phases. It considers the following items:

- CM environment and operational needs
- Any special CM needs
- How directory structures (e.g., source file repository directories, installation directories) are established

- Development of procedures for using and maintaining the tool and its environment

- Procedures for verifying the consistency and integrity across multiple CM environments

- How to support the CM environment and resolve troubles

- Describe how the content and status of work products is known and maintained.

4.3 Identify CM Tool Selection, Setup and Configuration

This section describes CM tools, provides a description of how and why the tools were selected, and how tools can be included. It considers the following issues:

- CM tool(s) used

- What customizations of CM tool(s) have been done

- How to access CM tool(s)

- How to customize and upgrade CM tool(s)

- How to install and/or make CM tool(s) operational

- How user accounts are set up

- How user accounts are maintained, including removal of expired accounts

- How CM tools generate unique names for software work products and how baseline(s) to which a work product belongs is specified. (If this is performed manually, describe this in Section 4.2.)

- How the CM tool(s) allow check-in and check-out of code

4.3.1 Configuration Management of CM Tools

This section describes how the configuration of tools is used to create software (compilers, change management tools, etc.) and how it is managed. This section identifies the category and level of control to be used for CM tools.

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4.4　Builds, Integration and Baselines

This section describes builds, integration, and baselines. A baseline delivered to the customer is typically called a release. A baseline for internal use is typically called a build.

4.4.1　Full and Incremental Build Criteria

This section identifies the criteria for determining whether to perform full or incremental builds. Some items to consider include urgency and pending change status.

4.4.2　Build and Integration Procedures

This section describes the procedures for performing full or incremental builds and integrations. Information to be considered includes the following:

- Scheduled builds as part of the overall release schedule
- On-demand build request procedures
- Build verification
- Determining build contents
- Incorporating configuration items, components, and units from baseline library
- Handling of build exceptions (e.g., compiler failures)
- How manufactured components are integrated with third-party components.

4.4.3　Baseline and Change Management Procedures

This section describes the procedures for establishing software and/or system baselines and managing changes to those baselines. Information to be included is listed below:

- Criteria for determining what code or components are reviewed
- Activities that must occur before an item is placed under CM
- Items placed under CM before being included in a baseline

- Description of required baseline content and status information for CIs and units
- Description of how changes to software-related work products and code will be tracked when changes are made to the software requirements
- Description of how software-related work product defects are tracked
- Description of how reviews and/or regression tests are performed to implement changes without any unintended effects.

4.4.4   Returning to a Previous Baseline Procedure

This section describes the criteria and procedures for backing out or reverting to a previous baseline.

4.4.5   Hand-off Procedures

This section describes how builds and releases are handed off. It indicates to whom the release is delivered and how delivery is accomplished. This section lists any supporting tools and documentation to be produced and also provides address verification, validation, and distribution of these items. The supporting documentation to be delivered to the Government is listed.

4.5   MR Strategy

This section provides a description of the MR management strategy.

4.6   MR Lifecycle

This section describes the typical lifecycle for all MRs. This description should include MRs, transitions, triggers, approvals, and side effects, as appropriate. If the release follows a common MR lifecycle, a reference to a separate document can be used, but any exceptions and customizations must be noted.

MR	TRANSITIONS	TRIGGERS	APPROVALS	SIDE EFFECTS

Table 4.6-1: Typical Lifecycle for Modification Request. *Tracking the Lifecycle of MRs Provides Factual Information.*

4.7   CM Baseline Audits

This section identifies the CM baseline audits for the release. The purpose of a CM baseline audit is to promote consistency of the CM library (both software and stored work products) and between the CM library and the outstanding baselines. These audits verify the integrity of software baselines, the integrity of change management tools (or their manual equivalents), and the completeness and integrity of the tool contents. The CM Baseline Audit Checklist Template must be used to perform and record the results of the audit. The audit procedure is provided on the cover sheet for the template. Audits are typically performed by the System Team Manager. However, results must be recorded, reported, and all findings must be tracked to closure. The Project Manager provides the oversight verification of final audit closure.

5   EMERGENCY CM PROCEDURES

This section describes how development and production emergency changes are made to work products under change management. This section includes the following information:

- Criteria for determining if a change is an emergency
- Who has authority to approve emergency changes
- What procedures are used for generating emergency changes
- Contact list for emergencies to help expedite resolution of code, document, or CM tool emergencies.

6   CM REPORTING

This section provides information on contents and frequency of the mandatory CM Baseline Audit Report used to document the results of the baseline audits described in this plan (Table 6-1). It identifies and describes

other reports to be produced and retained, relating to the status of CM items/activities and CM-related measurements.

REPORT NAME	DESCRIPTION	CONTENTS	FREQUENCY
CM Baseline Audit Report	CM Baseline Audit conducted for Project Name and Release on mm/dd/year	Audit Results	Per Project Schedule
MRRB Status Report			
CCB Status Report			
CM Key Indicators Trend Chart	CM process measures and/or metrics		

Table 6-1: CM Reports Have Specific Content and Frequency. *When Needed, CM-Related Items Are Documented.*

7   ESCALATION PLAN

This section outlines the procedures for the escalation plan and the path to follow in the event issues need to be escalated. It contains a list of email addresses and phone numbers.

8   CONTINGENCY PLAN

This section outlines the fallback plan in the event of a failure or if unusable code is encountered.

9   ADDITIONAL INFORMATION

This section addresses any additional information pertaining to CM activities and procedures for the release.

10   ACRONYMS

TERM	DEFINITION
CCB	Change Control Board
CI	Configuration Item
CM	Change Management
CMMI	Capability Maturity Model Integrated
MR	Modification Request
MRRB	Modification Request Review Board
OSS	Operational Support Systems
WBS	Work Breakdown Structure