



System Development and Life-Cycle Management (SDLCM) Methodology

Subject Environment Change	Type	Procedure
	Identifier	P-1601
	Effective Date	December 1999
	Revision No.	

Approval

C E Fitzgerald

CISSCO Program Director

1. PURPOSE

This procedure establishes the mechanism for requesting and effecting changes to the NRC hardware and software environment for both infrastructure and applications support.

2. APPLICABILITY

This procedure applies to all requests for changes to the NRC hardware and software environment, including (but not necessarily limited to) the following elements:

- Platform hardware (server or desktop)
 - ♦ Processor
 - ♦ Communications
 - ♦ Storage
 - ♦ Memory
- Platform Software (specific version, release, and patch)
 - ♦ Operating system (desktop, server, or host)
 - ♦ Compilers and interpreters
 - ♦ Groupware
 - ♦ Database Management Systems
 - ♦ User interfaces, including images
 - ♦ Transfer Protocol Software
 - ♦ Utilities
- Application Development and Maintenance Tools
 - ♦ Vendor software (specific version and release)
 - ♦ Add-on software (specific version and release)
 - ♦ Libraries (shared code, call libraries, DLL's, etc.)
 - ♦ Reusable components

The NRC Environment Configuration Control Board (CCB) may consider requests for changes to other environmental elements not specifically itemized in the list above.

SDLCM Methodology Procedure P-2501 (Configuration Control Board) defines the activities of the NRC Environment CCB (and all other NRC CCBs). The interface between this procedure and the CCB procedure is defined herein.

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Any NRC personnel and any personnel from NRC contractor organizations may submit an Environment Change Request (ECR). ECRs propose additions, deletions, or modifications to the current environment¹.

3. REFERENCE PUBLICATIONS

The following publications contain related information:

- *SDLCM Methodology Handbook*
- SDLCM Methodology Form F-1601, Environment Change Request Form
- SDLCM Methodology Procedure P-2501, Configuration Control Board
- NRC Technical Reference Model, NRC/OCIO

4. PROCEDURE

4.1 Data Flow Diagram

The Environment Change procedure has the five major steps identified in the data flow diagram shown in Figure 1601-1.

4.2 Entry Criteria

This section identifies the inputs and triggers.

The following input is necessary to begin this procedure:

- A recognized need for an addition, deletion, or modification to the NRC environment

Any of the following events may trigger this procedure:

- A failure of the environment to support a functional requirement
- An opportunity for process improvement
- The introduction of new technology
- Cessation of vendor support

¹ In a future revision to this procedure, the phrase "current environment" will be changed to "baselined operational environment."

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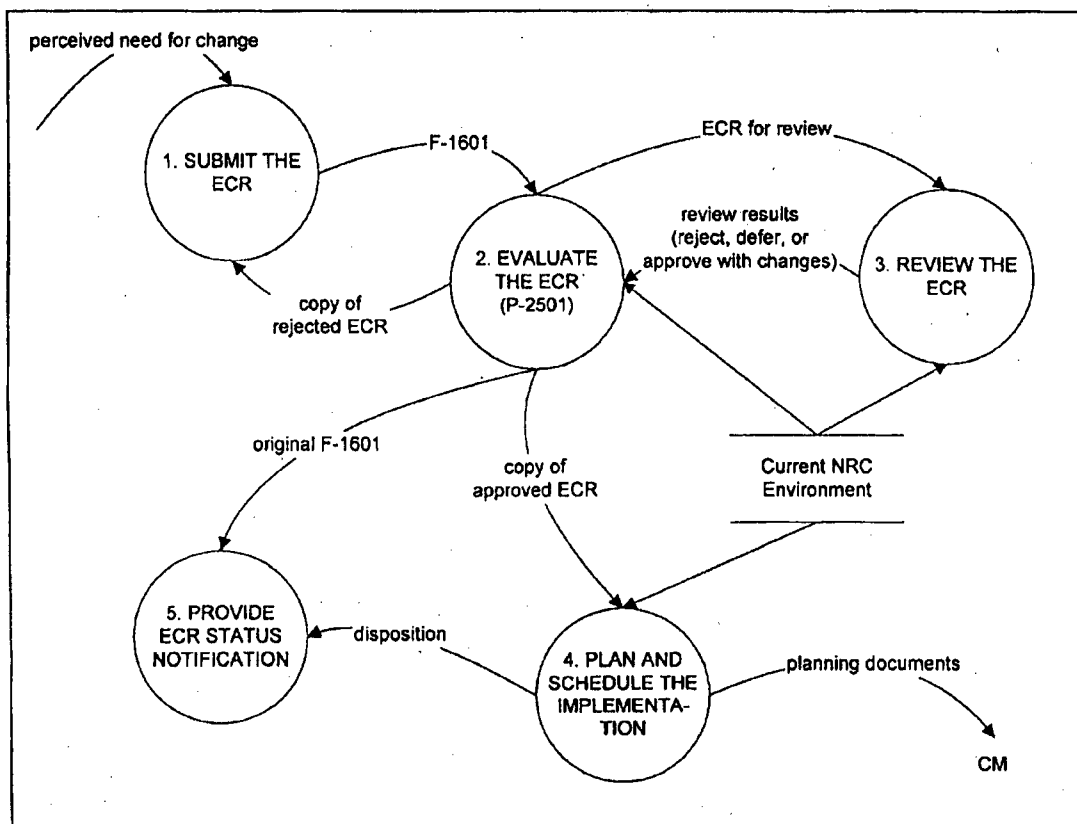


Figure 1601-1. Environment Change Data Flow Diagram

4.3 Steps

This section provides details of the steps shown in the data flow diagram (Figure 1601-1) and the data items that flow among the steps. The Step-Role table included in Section 4.6 clarifies which roles are responsible for performing which steps.

Perform the following steps:

1. Submit the Environment Change Request

Any NRC personnel and any personnel from NRC contractor organizations may submit an ECR. ECRs propose additions, deletions, or modifications to NRC's current environment².

To request a change, use SDLCM Methodology Form F-1601, Environment Change Request Form. Complete all blocks under "Originator Information" and "Change Information." Attach additional pages as needed to provide the required details, and use the form as a cover sheet to submit the request.

² See first footnote.

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ECR Form Instructions

Originator Information

- Complete fields for Originator's Name, Organization, Location, Telephone Number, and Date Submitted.
- Provide the printed name of the Originator's Supervisor. Obtain the signature and date after completing the Change Information portion.

Change Information

- **Responsible NRC Organization.** Specify the NRC organization responsible for the environmental element to be changed.
- **Scope.** Check the applicable box.
- **Priority.** Check the applicable box. For a time-critical change, specify a deadline. For time-critical and urgent changes, provide a justification and state the effect of a delay in Part A, Items 6 and 7 (see below).
- **Brief name.** Provide a brief identification of the new hardware or software technology to facilitate references to your ECR.
- **Details.** Provide information that addresses each of the items in Parts A, B, and C, as applicable.

Part A. Enter the following information directly on the form or provide an attachment labeled "Part A." If an item does not apply, justify why not and specify "N/A."

 1. Vendor Name
 2. Complete name of new or expanded technology, including version, release, and patch identifiers, if applicable
 3. Number of copies that will be needed
 4. Number of desktops that will be affected by the presence of either the vendor product or the output generated by the vendor product (for example, run-time modules)
 5. Source of funding to satisfy Items 3 and 4
 6. Justification for Time-Critical or Urgent priority
 7. Consequences of rejecting this request from the requestor's perspective (for example, a failure to meet an agreed-upon delivery date for a system as promised to the Commission)
 8. Compatibility with the NRC's Technical Reference Model (Preferred or Target)
 9. Required operating environment (hardware, operating system, or other products)
 10. Intended functionality that this product, upgrade, or patch will offer
 11. Summary of distinguishing features of the product, upgrade, or patch
 12. Technological benefit to the NRC
 13. Applicability of the product for other users, systems, platforms, etc. (for example, can others benefit from the change?)
 14. Availability of a competing (or comparable) technology product already in the NRC environment (for example, for a new product request, is there a similar product already installed?)

Part B. Provide an attachment to the form labeled "Part B."

Using the criteria listed below, provide a comparative evaluation of the requested new or upgraded technology with at least two competing products. (If the answer to Part A, Item 14 is "yes," one of these must be the currently available product.)

For each of the criteria, rate each product numerically from 1 to 4 as follows: (1) Does not satisfy requirements, (2) Partially satisfies requirements, (3) Satisfies requirements, and (4) Exceeds requirements. Indicate not applicable (N/A) where appropriate. The first criterion (specifically required functionality) shall be weighted higher than the other criteria. Use a table or narrative as appropriate for your ECR. Provide any explanatory information needed to support your

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evaluation. Conclude the comparison with a cost-benefit analysis that supports the Environment Change Request.

- a. Specifically required functionality
- b. Documentation support
- c. Y2K compliance
- d. Ease of installation, setup, and use
- e. On-line help
- f. Vendor training (specify costs if separate from purchase price)
- g. Vendor stability
- h. Product Stability
- i. Licensing requirements and issues (specify costs and whether site licensing is available)
- j. Upgrade to earlier version already in the environment

Part C. Optionally, provide an attachment to the form labeled "Part C" to present any other information in support of your Environment Change Request.

Submit the completed ECR form to the originator's supervisor for approval. **The supervisor submits the form to the CISSCO Configuration Management organization for processing** as defined in SDLCM Methodology Procedure P-2501, Configuration Control Board. CM processing includes reviewing the package for completeness, assigning an ECR number if complete, packaging the ECR along with other ECRs, and submission to the CCB. Review for completeness includes confirming the presence of all applicable information in Part A and a comparison of at least three products in Part B.

2. Evaluate the Environment Change Request

The NRC Environment CCB reviews the ECR (see Procedure P-2501).

In accordance with Procedure P-2501, the members review the ECR (or a package of ECRs) prior to the actual CCB meeting. Each CCB member's review includes, at a minimum, assessment of any effect on the member's area of responsibility. (For example, is there any effect on other environmental elements or any need for other upgrades to support the current change request?)

The CCB shall forward the ECR to the Change Review Committee to review its potential effect on the current environment³ (Step 3). This technical review will normally be completed prior to the scheduled CCB meeting so that the CCB members will be prepared to vote on the disposition of the ECR during the meeting.

If the CCB rejects the ECR, the form is annotated with the justification for the rejection, and the CM organization provides a copy of the ECR form to the originator.

If the CCB approves the ECR, CM forwards a copy to the Change Implementation Committee (Step 4).

The CCB may also decide to defer action until a future CCB meeting date, possibly to permit additional review by the Change Review Committee (Step 3).

³ See first footnote.

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ECR Form Instructions

CCB Action

- Select one box to indicate the disposition of the ECR. Justify a rejected ECR in the Comments field. Specify a date for a deferred ECR.
- Provide the printed name and signature of the CCB Chairman. Indicate the date the ECR is signed.
- Comments. If applicable, provide comments from the CCB as feedback to the originator or for the record; attach additional pages if necessary.

3. Review the Environment Change Request

The Change Review Committee reviews the request for its potential effect on the current environment⁴. The committee members may request additional information from the originator. The committee documents its recommendations (including any possible implementation alternatives) and returns the ECR to the CCB for further evaluation (Step 2).

4. Plan and Schedule the Implementation

The Change Implementation Committee develops a plan, including a schedule, for implementing approved ECRs. If necessary, the committee members consult with a person or group possessing the necessary expertise or experience (possibly the originator). A copy of the reviewed and approved plan is placed under CM control.

5. Provide Environment Change Request Status Notification

The Chairman of the Environment CCB sends an e-mail notification to all personnel within the Office of the Chief Information Officer and to the members of the Information Technology Business Council announcing the nature of the change and the schedule for implementation.

The CM organization notifies the requester of the final disposition of the ECR.

The CM organization maintains the status of all ECRs; ECR status is available for review by any personnel throughout the environment change process.

4.4 Exit Criteria

The outputs of this procedure are:

- A completed Environment Change Request Form maintained by CM
- All information required to update the environment if the request was approved
- Information necessary to update the applicable NRC inventory

The results of the procedure are:

- The ECR is approved; a plan and schedule have been prepared and placed under CM control.
- Alternatively, the originator understands why the change request was rejected

⁴ See first footnote.

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4.5 Verification

Quality Assurance personnel verify that this procedure is followed and that all outputs are filed.

4.6 Roles

Table 1601-1 depicts the roles responsible for each step in the Environment Change procedure.

Table 1601-1. Environment Change Step-Role Table

Steps	Roles:	Change Request Originator	NRC Environment CCB	Change Review Committee	Change Implementation Committee	CM
Submit the ECR		P				R
Evaluate the ECR			P			S
Review the ECR		S	A	P		S
Plan and Schedule the Implementation		S	A	R	P	S
Provide ECR Status Notification			P			P

Legend: P=Performs, R=Reviews, A=Approves, S=Supports

Note: The NRC CIO (or his or her designee) appoints the members of the NRC Environment CCB. The chairman of the Environment CCB appoints the members of the Change Review Committee and the Change Implementation Committee.



OPERATIONS CONFIGURATION CONTROL BOARD (OPS CCB) CHARTER

Purpose:

The purpose of this document is to delineate the responsibilities and processes for changes to the operational infrastructure at the U.S. Nuclear Regulatory Commission (NRC).

Reason:

(b)(2)High

Applicability:

(b)(2)High

Configuration Control Board process:

- ☐ (b)(2)High
- ☐ The TCR will be submitted to the Configuration Manager for inclusion on the OPS CCB agenda.
- ☐ (b)(2)High
- ☐ Minutes of the OPS CCB will be prepared and distributed at the following meeting.
- ☐ A matrix of approved changes will be published and maintained on the IT CSB intranet homepage.
- ☐ (b)(2)High

Meetings:

The OPS CCB will meet every Wednesday. An agenda will be distributed before the meeting. Representation at the OPS CCB will include at a minimum ITID/IDIB, ITID/CSB, ADD, and the Regions. The Chief, IT Customer Services Branch will chair the meeting.

APPROVED:

James B. Schaeffer
Director, ITID

Arnold (Moe) Levin
Director, ADD

OPERATIONS CCB CHANGE CHECKLIST

- ☐ Has the contents of the change been identified?
- ☐ Has the impact of the change been identified? (i.e., agencywide, floor xx, internet services, etc.)
- ☐ Has the change been coordinated with all affected parties?
 - ☐ ADAMS
 - ☐ STARFIRE
 - ☐ ADD
 - ☐ Operations
 - ☐ Customer Support Center
 - ☐ Regions
 - ☐ Customers

Communication:

- ☐ Has the network bulletin been prepared?
 - ☐ Does the bulletin go agencywide or HQ only
- ☐ IT Coordinators/regions notified/coordinated with?

Test Results:

- ☐ Has the change been tested? (functionality, test lab)

Documentation:

- ☐ Users guide prepared?
- ☐ Operational Support Guide prepared?

Deployment Strategy:

- ☐ Phased deployment?
- ☐ Public workstations accounted for?
- ☐ IT Coordinator multiple logins accounted for in regions?

REMOTE ACCESS

Background

The U.S. Nuclear Regulatory Commission (NRC) has a mission support requirement for nuclear inspectors and others to be able to access the NRC wide area network (WAN) remotely. Ext

(b)(2)High

1.1 Remote Access (RA)

RA refers to an ability to connect to the NRC WAN from a location which does not have a permanent connection. The NRC WAN includes NRC HQ, the four ROs, the Technical Training Center (TTC), and the RISE sites. Users working at these locations are local users, and are not using remote access. The term remote always refers to the computer that is not physically connected to the NRC WAN.

The primary group of RA end-users is NRC staff working from home or on travel. The Remote Access System (RAS) also provides backup connectivity for RISE sites.

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2.0 Scope

The Remote Access System (RAS) has six components and defining the scope of what should be supported in an RA environment is challenging. This section will clarify what will be considered part of RA support.

2.1 Scope of the Remote Access System

Figure 1 illustrates the Remote Access System (RAS) components and how these elements are connected. The six components are listed below:

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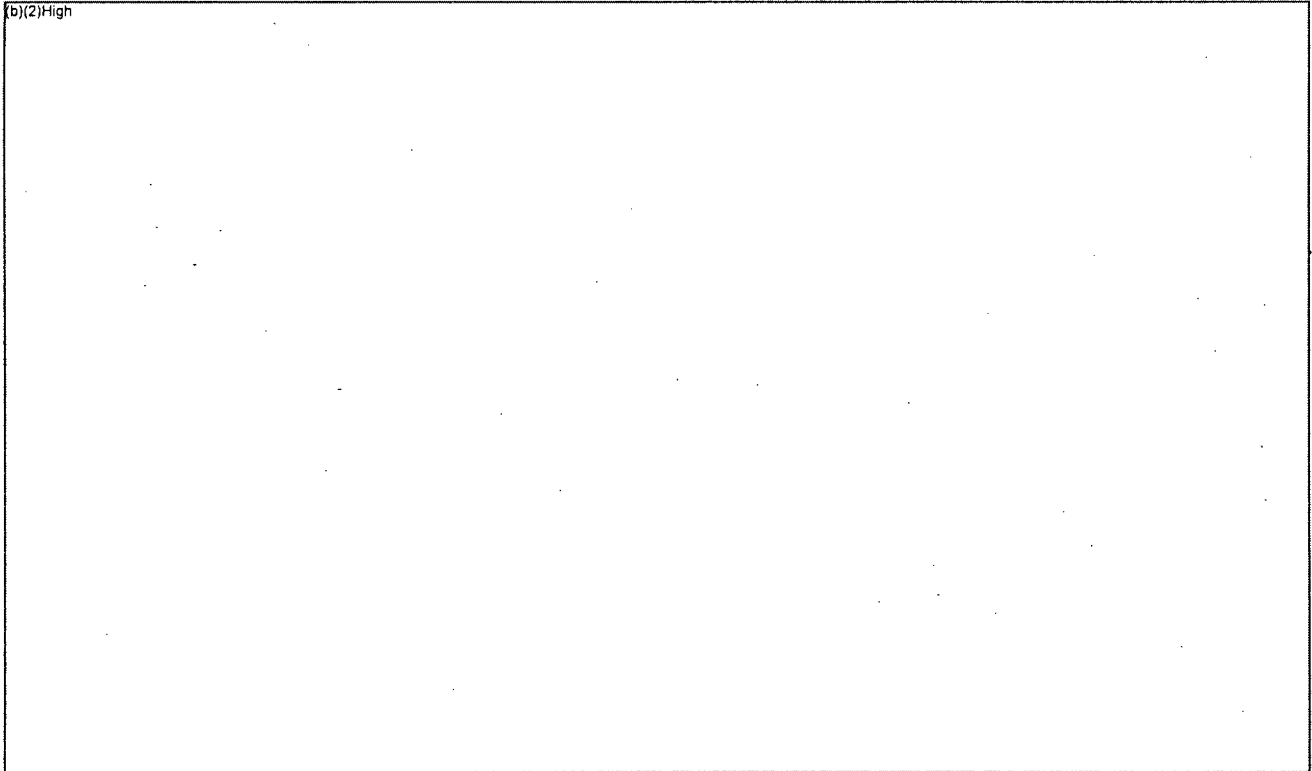
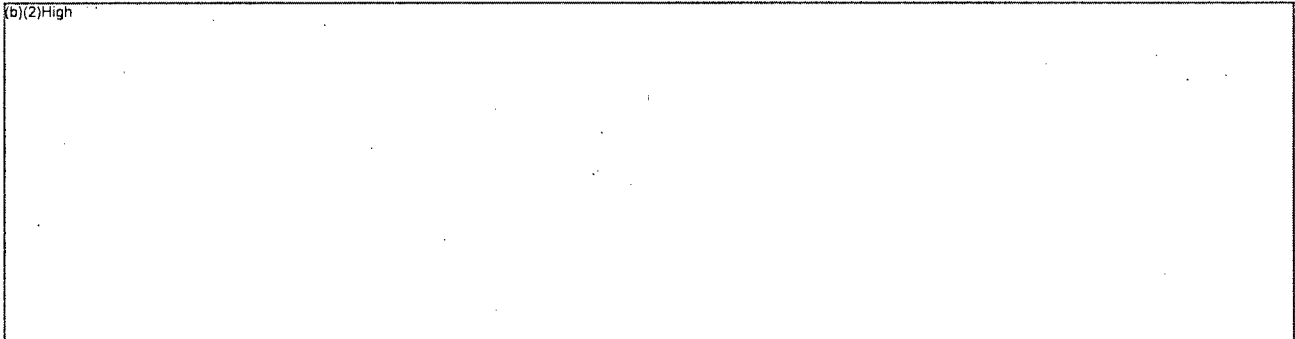


Figure 1: Remote Access System Components

2.1.1 Remote Computer or Laptop

The first component of the RA system is the remote computer or laptop (client). An end-user initiates the connection sequence by dialing in from a remote computer via a telephone line using a modem. The minimum hardware and software requirements are listed below:

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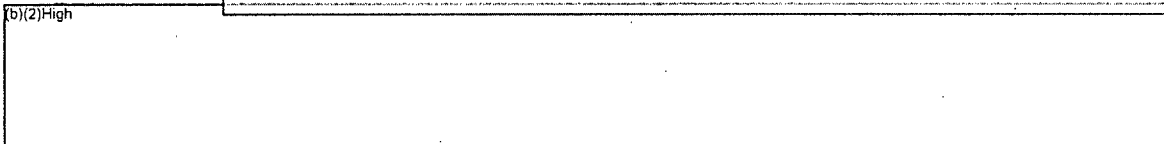


2.1.2 Telecommunications

The second component of the RA system is the telephone circuit (Figure 2). An end-user initiates the connection sequence by dialing in from a remote computer via a telephone line using a modem.

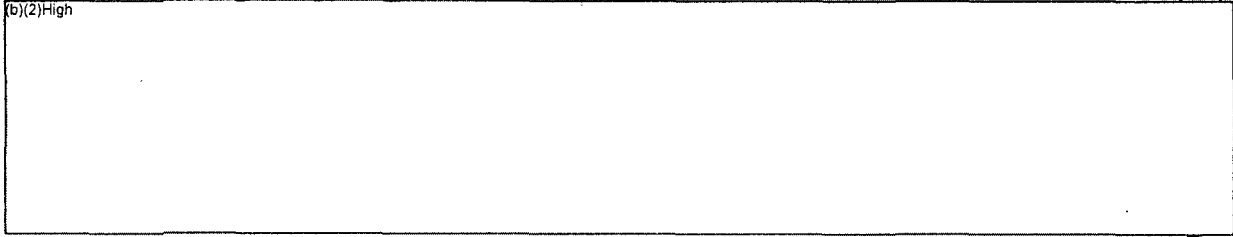
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2.1.5 CITRIX MetaFrame Server

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2.1.6 NRC Wide Area Network

The sixth and final component of the RA system is the NRC Wide Area Network (WAN). The WAN software contains standard applications (e.g., Corel Suite, GroupWise, etc.), Agency applications (e.g., ADAMS, RPS, etc.) and end-user data.

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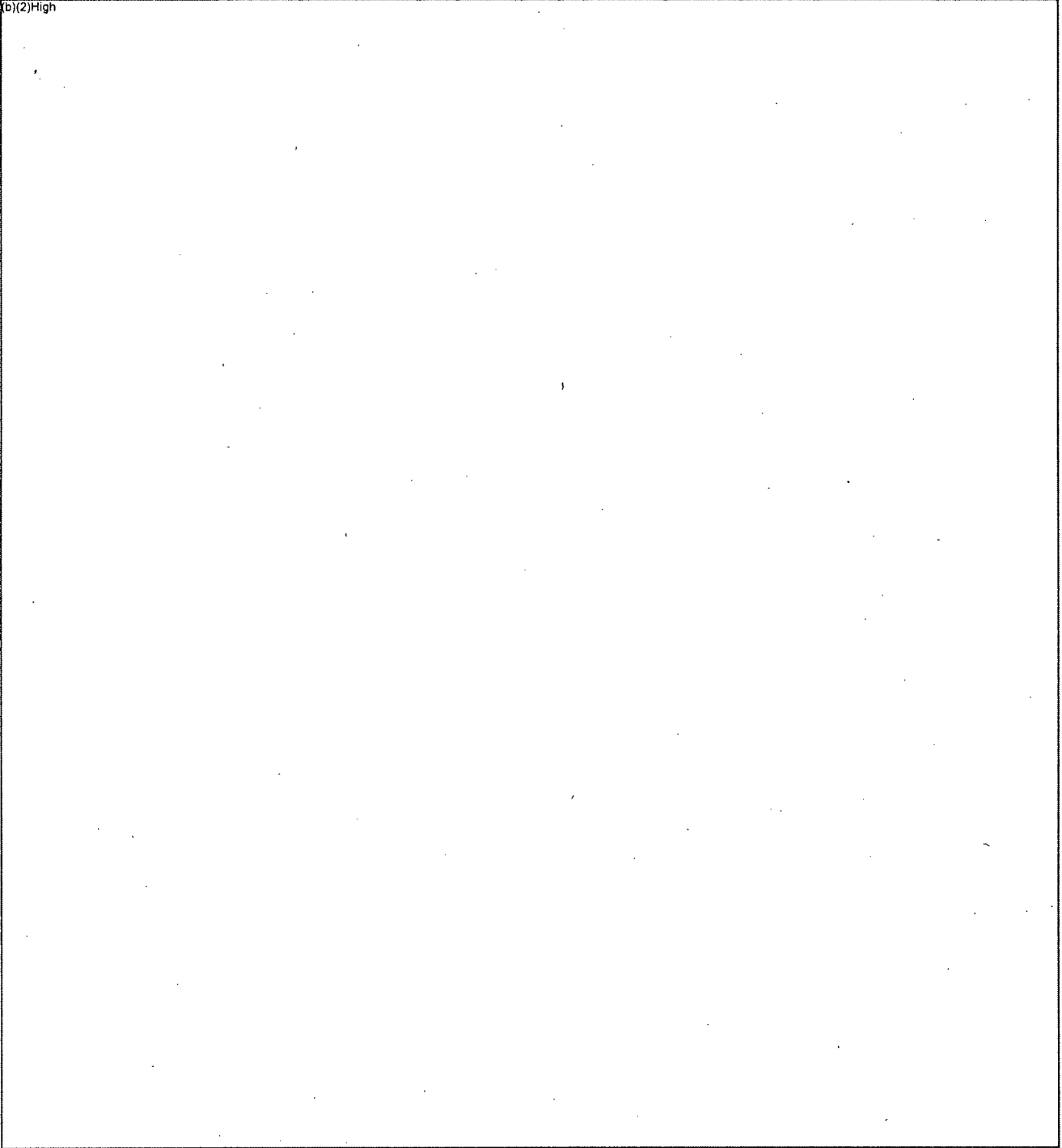


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- E42
- OCIO staff and contractors must have the capability to monitor backup completion status to ensure the backup system is functioning properly.
 - Periodic restorations are performed to validate backup system functionality

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(b)(2)High

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Issues:

(b)(2)High

Solution:

Tape drive capacity issues can be resolved with either increasing the tape drive capacity of the system by:

- Investing in additional hardware to increase current capacity
- Using the "StorageTek" tape silos, an existing system in the data center to perform data backups.
- Change backup schema from full nightly to incremental.

3.0 NT

Environment:

(b)(2)High

4.0 Unix

Environment:

Currently, all Headquarters Unix systems are backed up by individually attached tape systems and are incremental with a monthly full backup.

Statistics:

- Hard disk Capacity = 7GB
- Tape Backup Capacity = 2GB
- (b)(2)High
- Anticipated Annual Growth = 10%

cut 2

Other Supported Agency Applications ([see hyperlink for more detail](#))

- MS Office Professional (Word, Access, Excel, Powerpoint)
- MS Front Page
- NEXIC
- Visio
- Internet Explorer

User Support Services

Metric/Measurement	Measure
CALLS	
Number of Calls	daily/weekly/monthly/ yearly reports
Number of Calls per hour	peak/non-peak intervals
Number of calls or email requests during off-hours	daily, weekly, monthly
Average answer time per calls	peak/non-peak intervals
Calls answered and abandoned	peak/non-peak intervals
HELP DESK	
Number of Tickets Opened	daily, weekly, monthly, quarterly
Percentage of tickets resolved on first contact	peak/non-peak intervals monthly/quarterly
Top 10 Tickets by Category Type	daily, weekly, monthly, quarterly
Distribution of Tickets by Office	monthly
Satisfaction Surveys	monthly/quarterly reports
ACCOUNTS	
Number of user accounts on network (# of seats)	weekly, monthly
Number of accounts added, deleted	daily, weekly, monthly
Amount of network space available to each user	daily

Non-Network Components

Metric/Measurement	Measure
COMPONENTS	
Inventory by device (pc, scanner, laptops, etc)	monthly
Number of Hardware Installs	weekly/monthly/yearly reports
Number of Maintenance tickets	weekly/monthly/yearly reports
Problem rate by device	average downtime per type unit / MTBF* (annual report)
Hardware failures within a time period	weekly, monthly
Response time to repair	
Number of repeat calls from user for same problem	Daily, weekly, monthly
Loaner equipment (laptop computers, PDAs, etc.)	semi-annual reports

* MTBF = mean time between failure

Network - Components/Connectivity/Performance/Productivity

Metrics	Measure
AVAILABILITY	
Network Availability	Monitor up/down status of network to ensure that it's available and accessible (up/down connectivity-HQ & regions).
Remote Access Availability (devices)	Monitor the availability of all remote access devices and lines to maintain reliable remote access to the network. Poll every minute.
File, Print and Application Server Availability	Monitor all LAN servers to ensure they are available and accessible (% up time). Poll every minute.
Server Disk Availability	Monitor disk availability on all LAN servers to ensure disk space is not exhausted. Poll every minute.
LAN Hardware	Monitor all LAN hubs and switches to ensure they are available and accessible. Poll every minute.
LAN Segments	Monitor all LAN segments to ensure they are available and accessible. Poll every minute.
Electronic Performance Monitoring, Incident Detection and Diagnostic Service	
Network Utilization	Monitor network utilization to maintain reliable performance.
WAN Link Utilization	
Network Performance	Identify/monitor average and peak utilization of network bandwidth, network servers, and high performance systems.
Network throughput	Usage rate: % bandwidth used at a given time
Remote Access Capacity	Monitor the usage on each of the remote access devices to maintain reliable remote access to LAN devices. Poll every minute.
Server Performance	Monitor all LAN servers to ensure high performance, including time between receiving requests to responding with data.

Metrics	Measure
Router performance	Monitor if router is overloaded and starting to drop packets. Track router CPU utilization and dropped packets (graphs depicting daily statistics) Average and peak utilization of individual router interfaces and percentage of errors (high utilization and high error rates result in poor network performance).
Gather RMON statistics from hubs and switches	Run an RMON report to show if utilization is high.
Response Time	Server Performance: time between receiving request to responding with data. Network performance: total transaction network time. Round-trip performance: end-to-end delay for a single packet. Transaction response time: end-to-end response time from end of submit at user's PC to a fresh PC screen.
CPU Utilization On All Servers	Monitor the CPU utilization on all LAN servers to maintain reliable performance
Ethernet LAN Segments	Monitor the utilization on each Ethernet LAN segment to maintain reliable access to LAN devices. Poll every minute.
Server Virtual Memory Utilization	Monitor the virtual memory utilization on all LAN servers to maintain reliable performance. Poll every minute.
Server Physical Memory Utilization	Monitor the physical memory utilization on all LAN servers to maintain reliable performance
Network Bandwidth	Bandwidth per user, application and service
Network Data Loss	Loss rate
Ethernet Error Rates	Monitor the error rates on each Ethernet LAN segment to maintain reliable access to LAN devices
Ethernet Collision Rates	Monitor the collision rates on each Ethernet LAN segment to maintain reliable access to LAN devices.
Network Traffic Patterns	

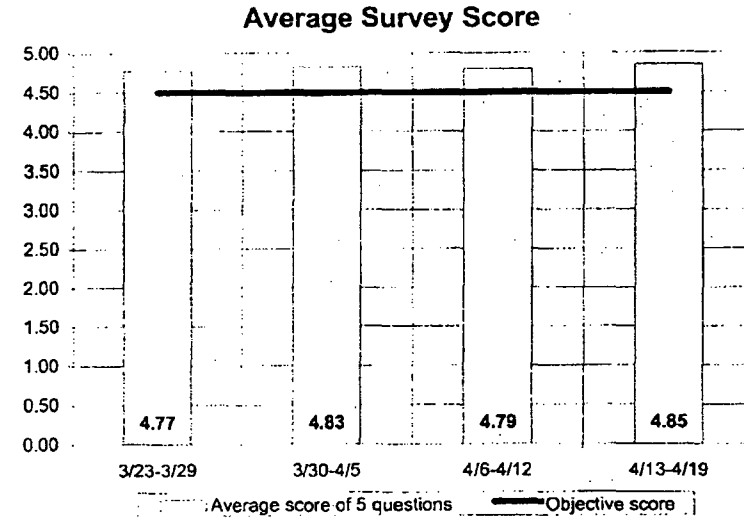
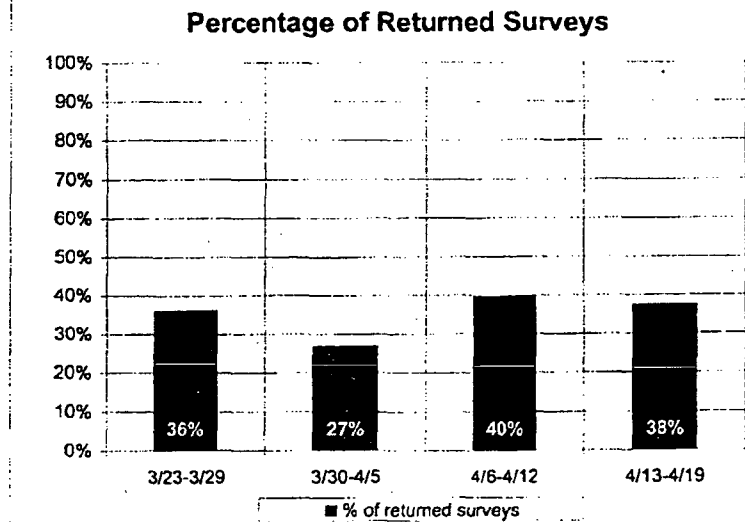
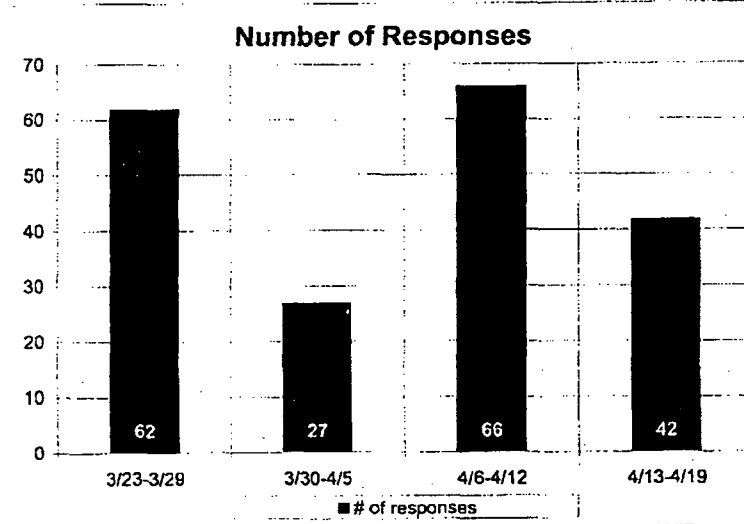
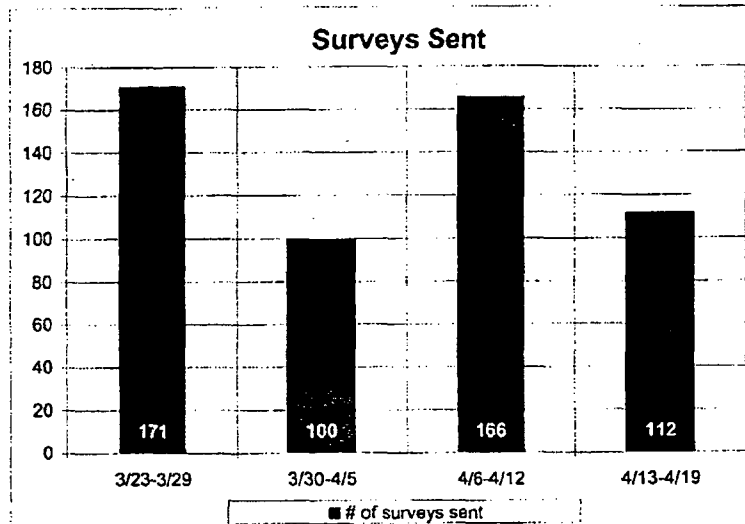
Metrics	Measure
Identification of Bottlenecks	
Electronic Notification Service	Components which are powered up, operating, and network connected.
Alarming	Percentage of time an event occurs and successful notification is received within a specific time period.
Electronic Software Distribution	Components which are powered up, operating, and network connected.
Software Maintenance on network	% upgrades executed on schedule. % upgrades successfully completed within a specific time period.
Software Management – Version Control	
Electronic Topology/Configuration Management	Configuration Management for all DCE components: Current description of image, current configuration of hardware and software, current location . Accessible by NRC.
Performance Analysis and Tuning	Components which are powered up, operating, and network connected.
Network Performance Trending	
Baseline for Network Performance	
Network File Backup	
Local Drive Storage Backup to Network	Data files in Standardized Directory only for components that are powered up, operating, and connected to the network.
Shared Network Storage Data File Backup	
Disaster Recovery Shared Network Storage Data File Backup	
Backup Media Rotation and Media Retention	Percentage of tasks completed on schedule
Server Back and Restoration	Percentage of time hosting vendor can complete the task within a predetermined time period
Response to Complete File Restores	Percentage of time hosting vendor can complete the task within a predetermined time period
Growth management projections for media backup	Measure storage, usage by user and servers
OTHER	
External Web access to firewall and through firewall	

Metrics	Measure
Network Security	Encryption Key Management Effect on performance
Network Service and Support	Support contacts Response time Network outages Service upgrades and revisions
Baseline for Network Performance	
SERVICE LEVELS	
User Account Management (create, modify, delete user accounts - access privileges)	Percent of requests completed within a specific time.
Electronic Messaging Services Management (create, modify, delete user mailbox)	Percentage of requests that are completed within a defined time period.
Printer Management/ Administration	Percentage of requests that are completed within a defined time period.
Mean Time to Service Provisioning	Time from receiving order and availability of service.
Mean Time to Service Restoration	Time from receiving trouble ticket until return of service.

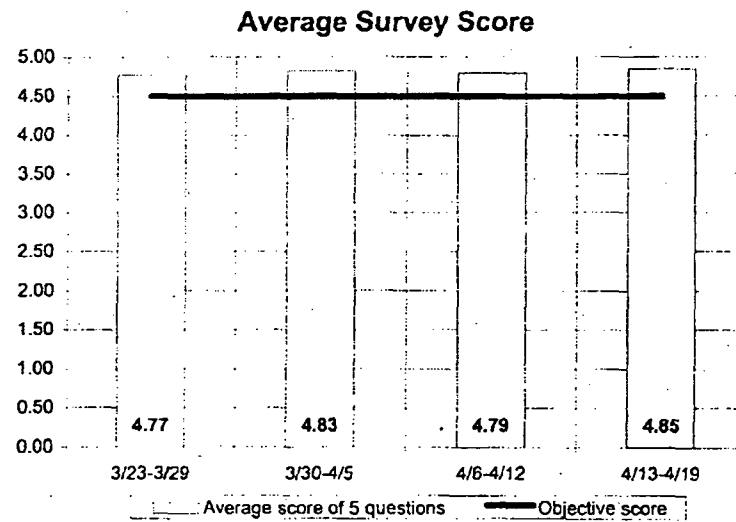
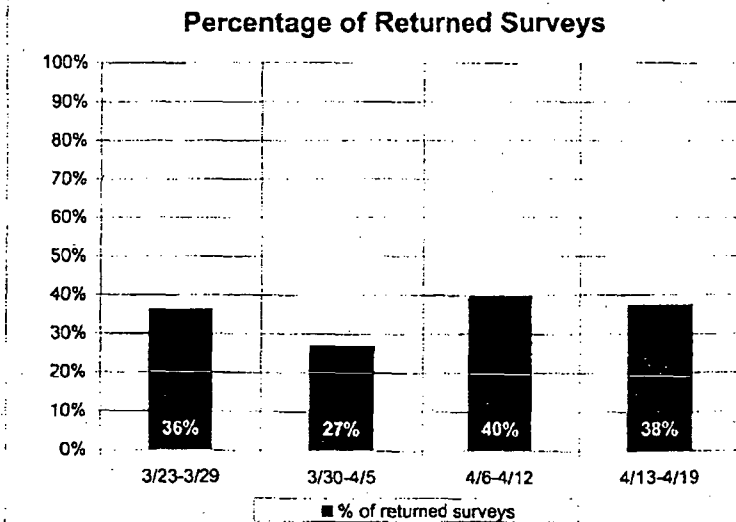
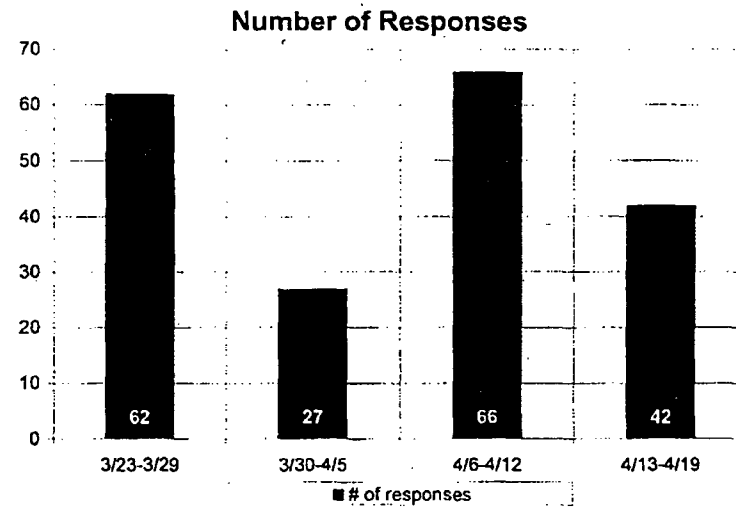
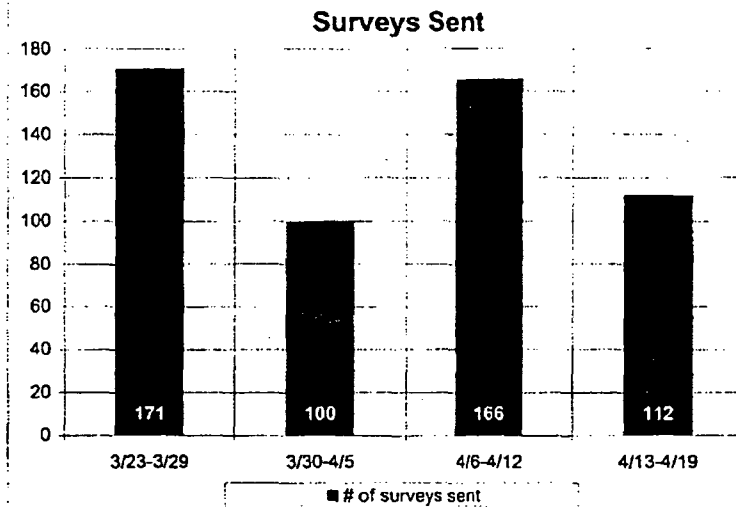
Software/Applications

Metrics	Measure
Time-Frame for Application Availability	
Throughput (e.g., end-to-end measure of e-mail messages)	Average peak throughput in transactions, packets, or Kb per second
Per-site Application Availability	Ratio of time application is available to total time per month warranted time. Total cumulative uptime or downtime in the monthly interval of warranted application availability.
Security	Control or limitations such as password protected, virus scanning, etc.
Response Time	Server Performance: time between receiving request to responding with data. Network performance: total transaction network time. Round-trip performance: end-to-end delay for a single packet. Transaction response time: end-to-end response time from end of submit at user's PC to a fresh PC screen.
CITRIX (Remote Access)	# of users
Remote access usage	
Disk Space Used by Mail System	
Number of ADAMS calls to Help Desk	semi-annual reports
Number of STARFIRE calls to Help Desk	semi-annual reports
Number of Software Packages Installed	weekly/monthly/yearly reports

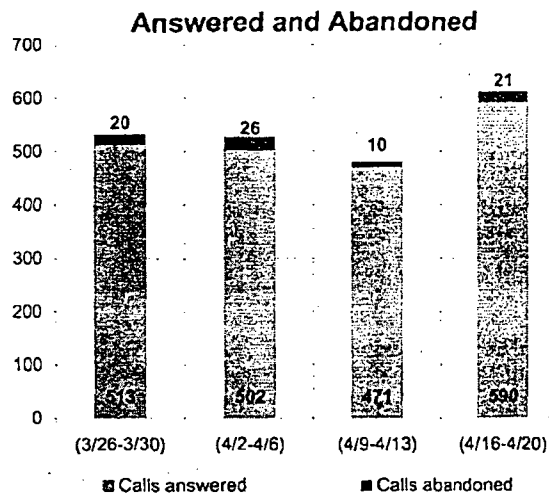
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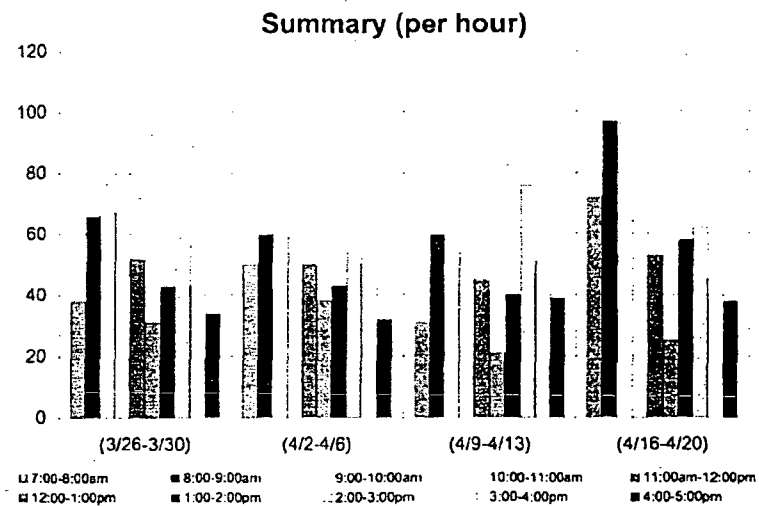
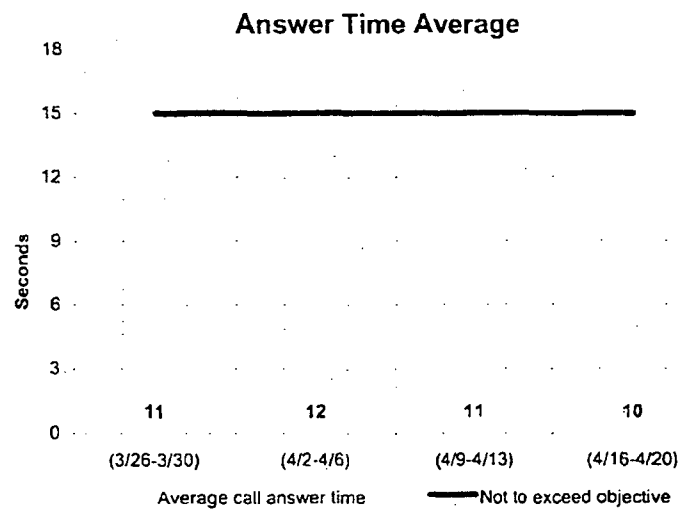
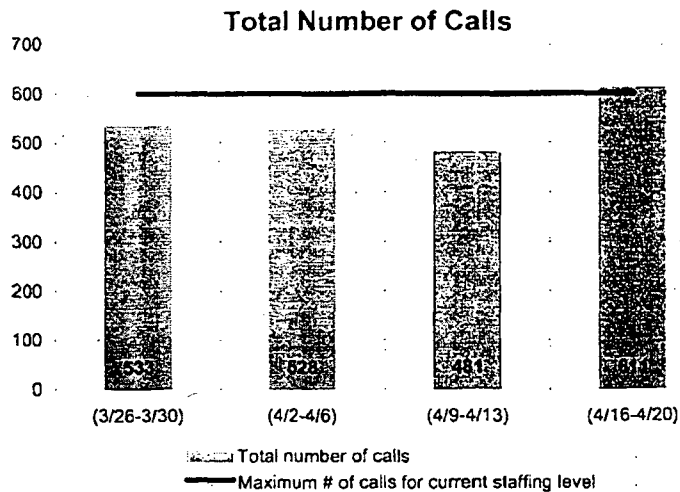
CSC Survey Statistics (a/o 4/23/01)



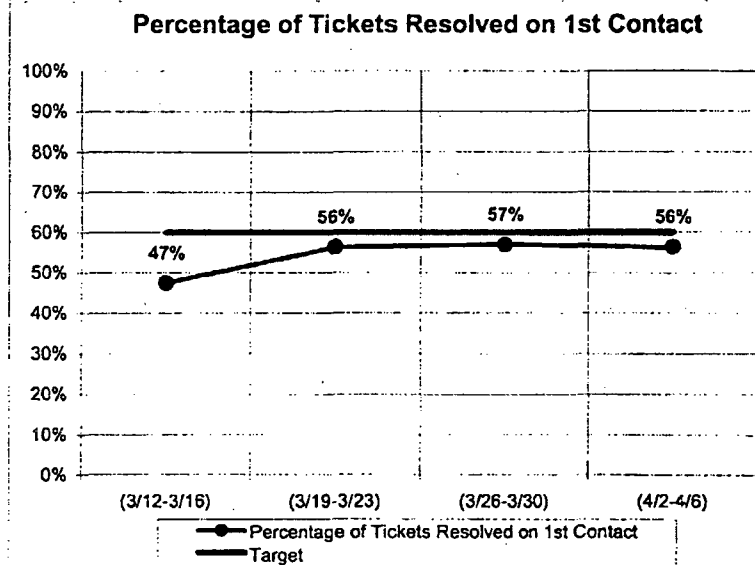
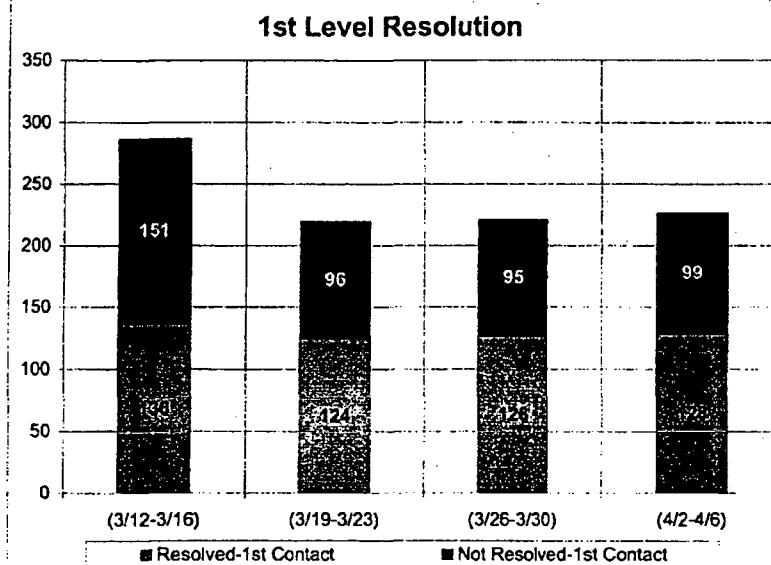
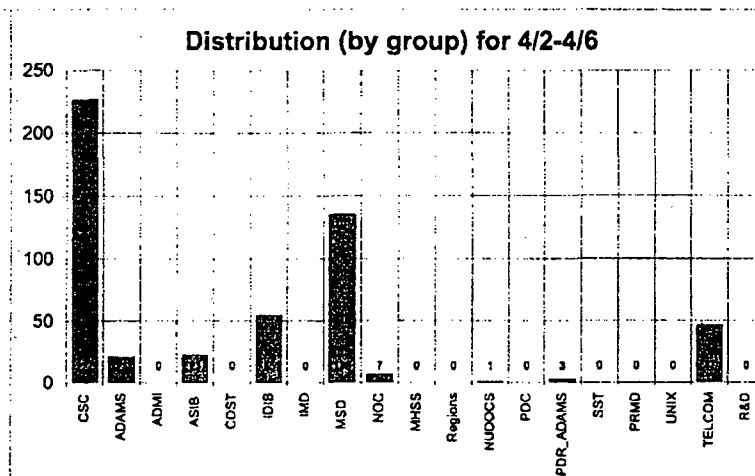
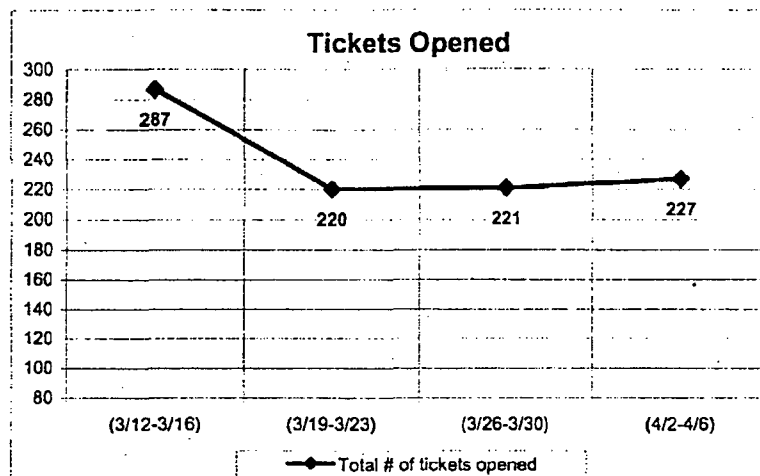
CSC Weekly Call Statistics (a/o 4/30/01)



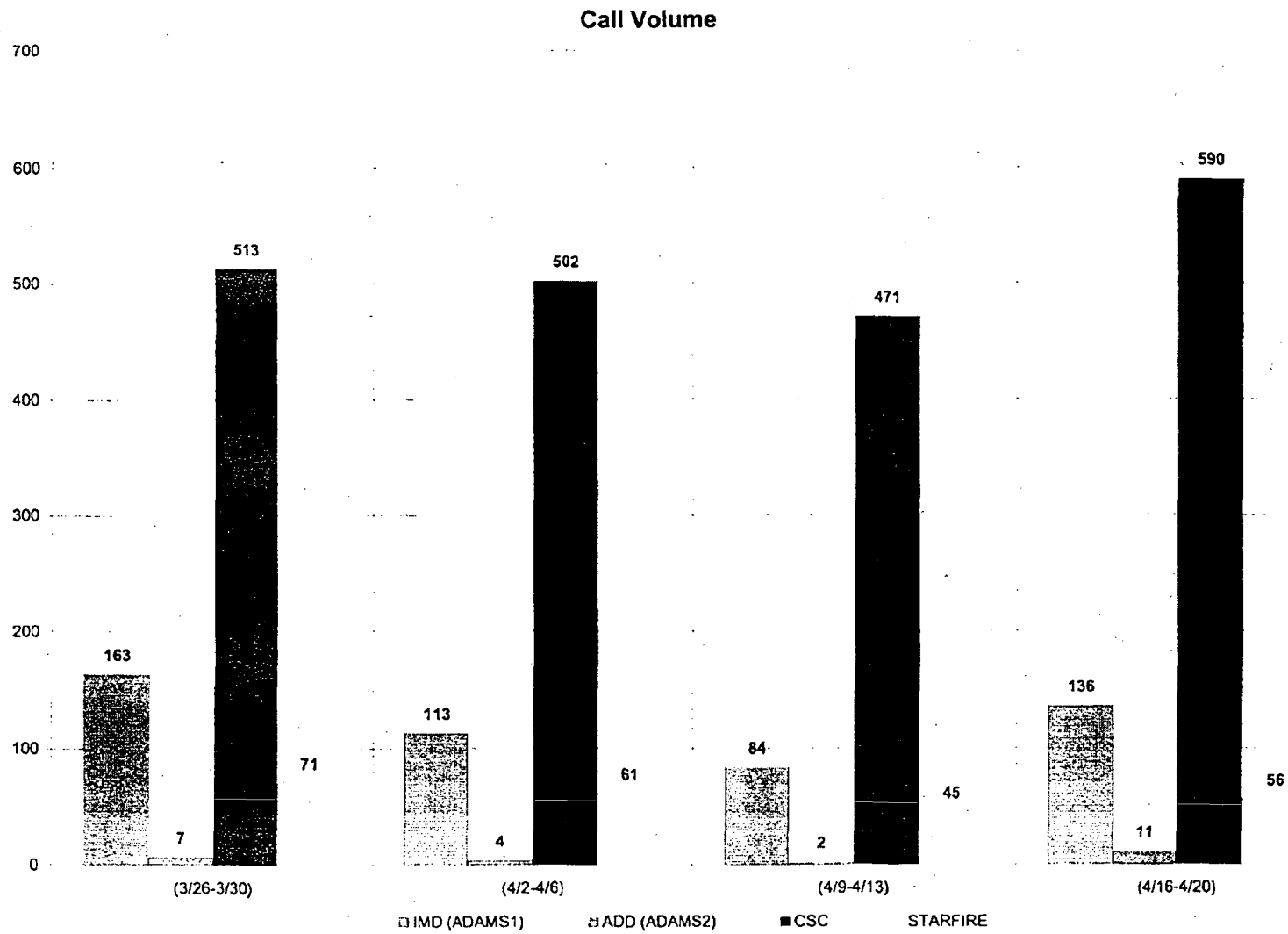
Calls Answered:	
3/26-3/30:	96%
4/2-4/6:	95%
4/9-4/13:	98%
4/16-4/20:	97%
Avg. Call	
Abandon Time	
3/26-3/30:	:29
4/2-4/6:	:12
4/9-4/13:	:08
4/16-4/20:	:14



CSC Weekly Ticket Statistics (a/o 4/16/01)

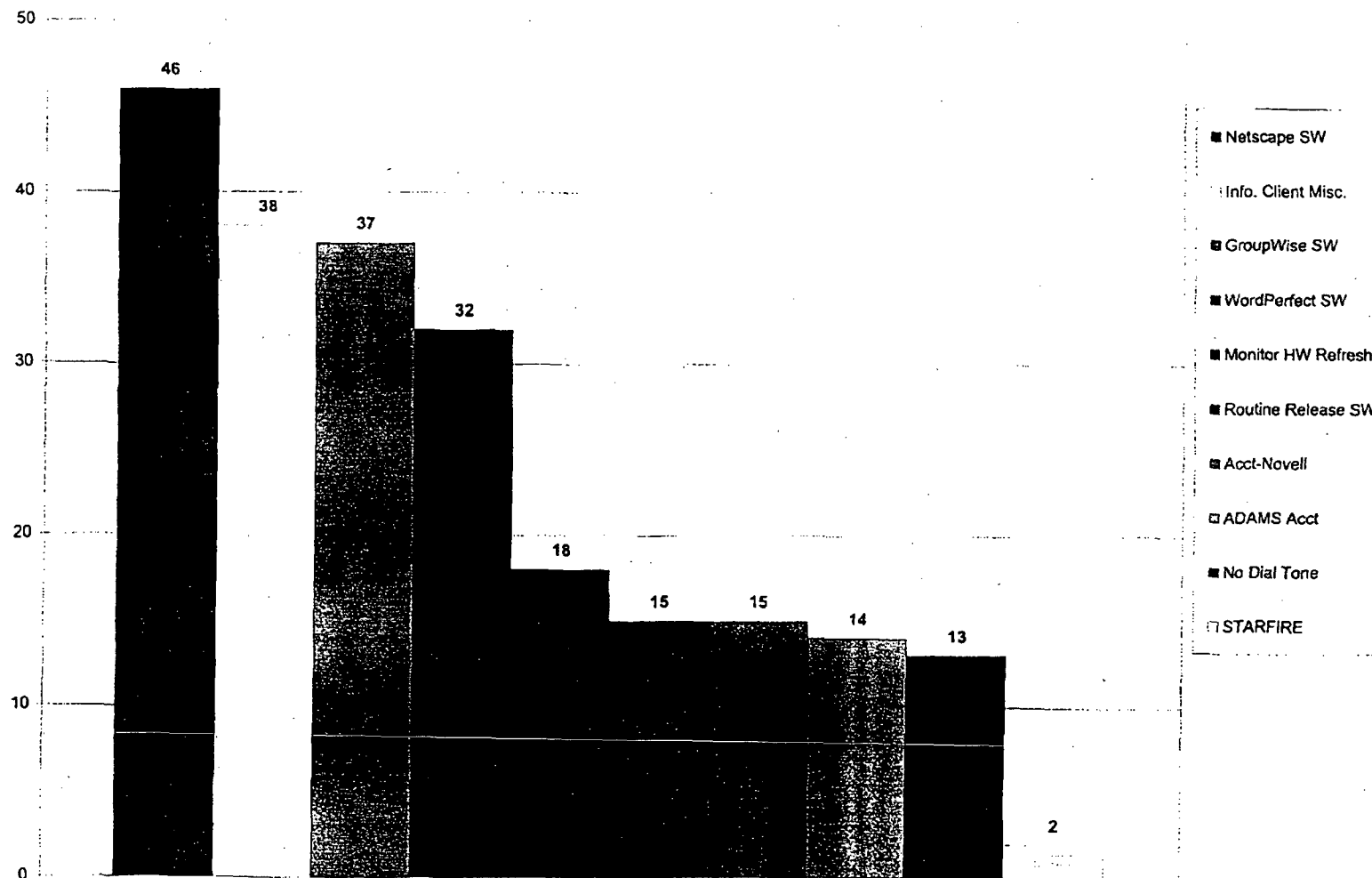


Lucent CMS Weekly Call Statistics (a/o 4/30/01)



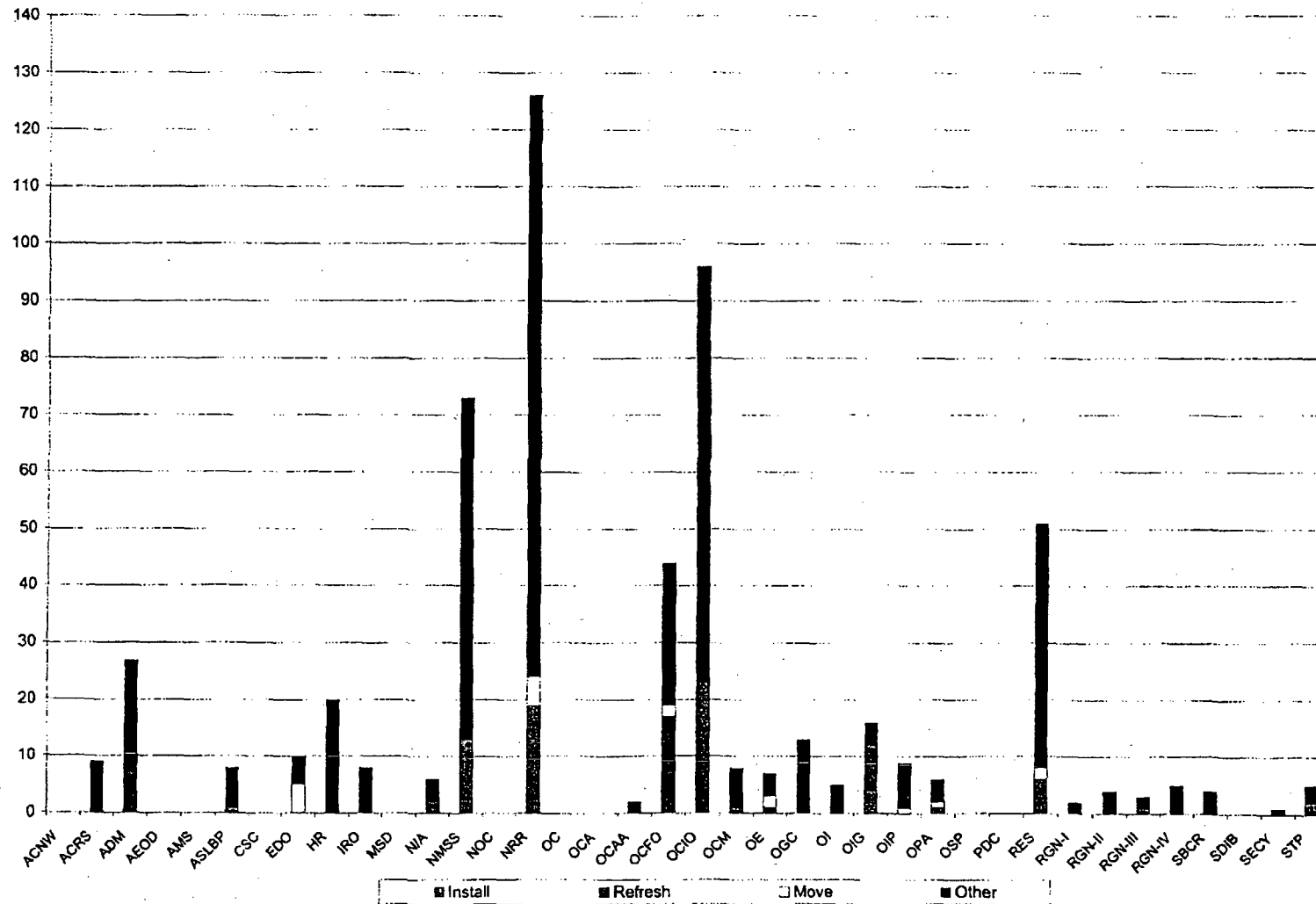
CSC Weekly Call Statistics (a/o 4/30/01)

Top Ten Ticket Category Breakdown (by type) 4/16-4/20

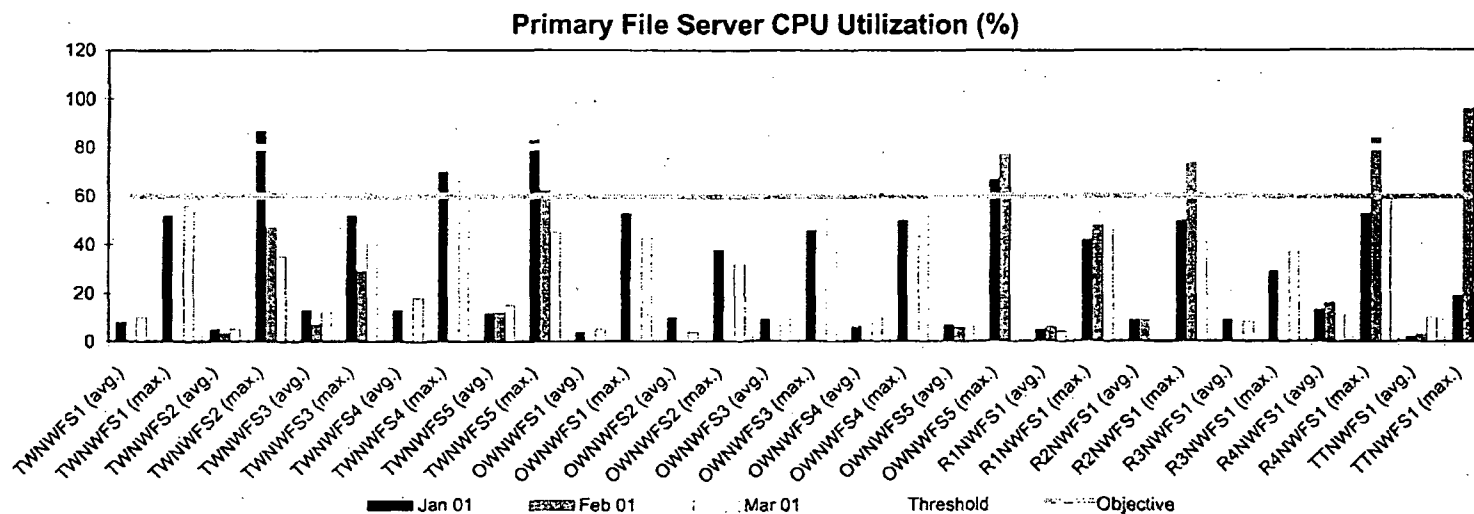
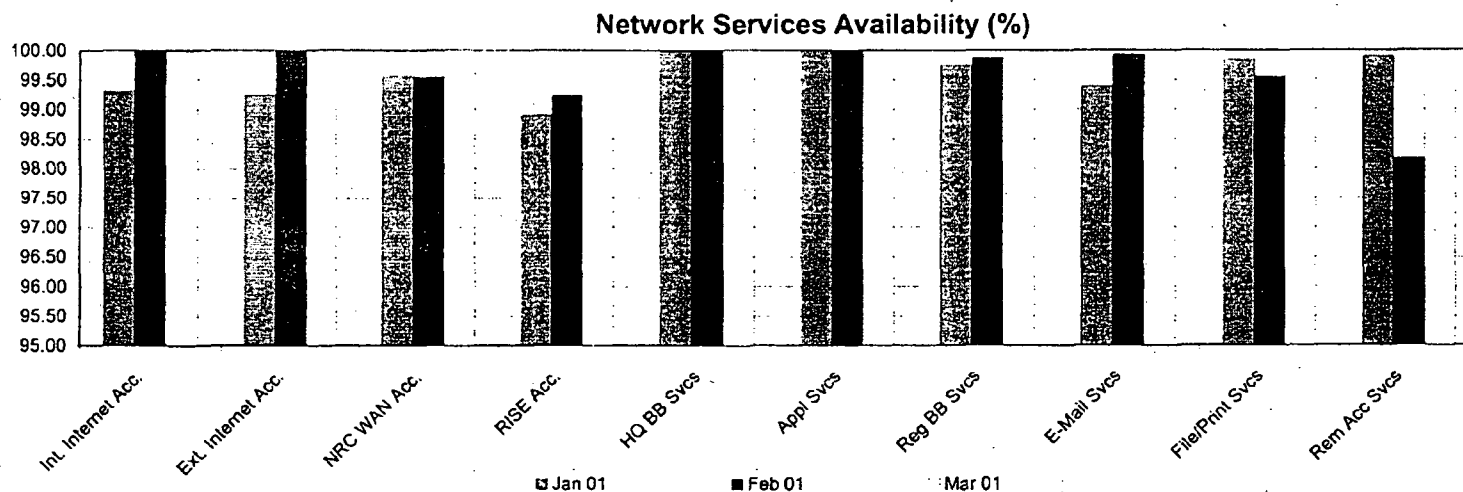


CSC Weekly Ticket Statistics (a/o 4/30/01)

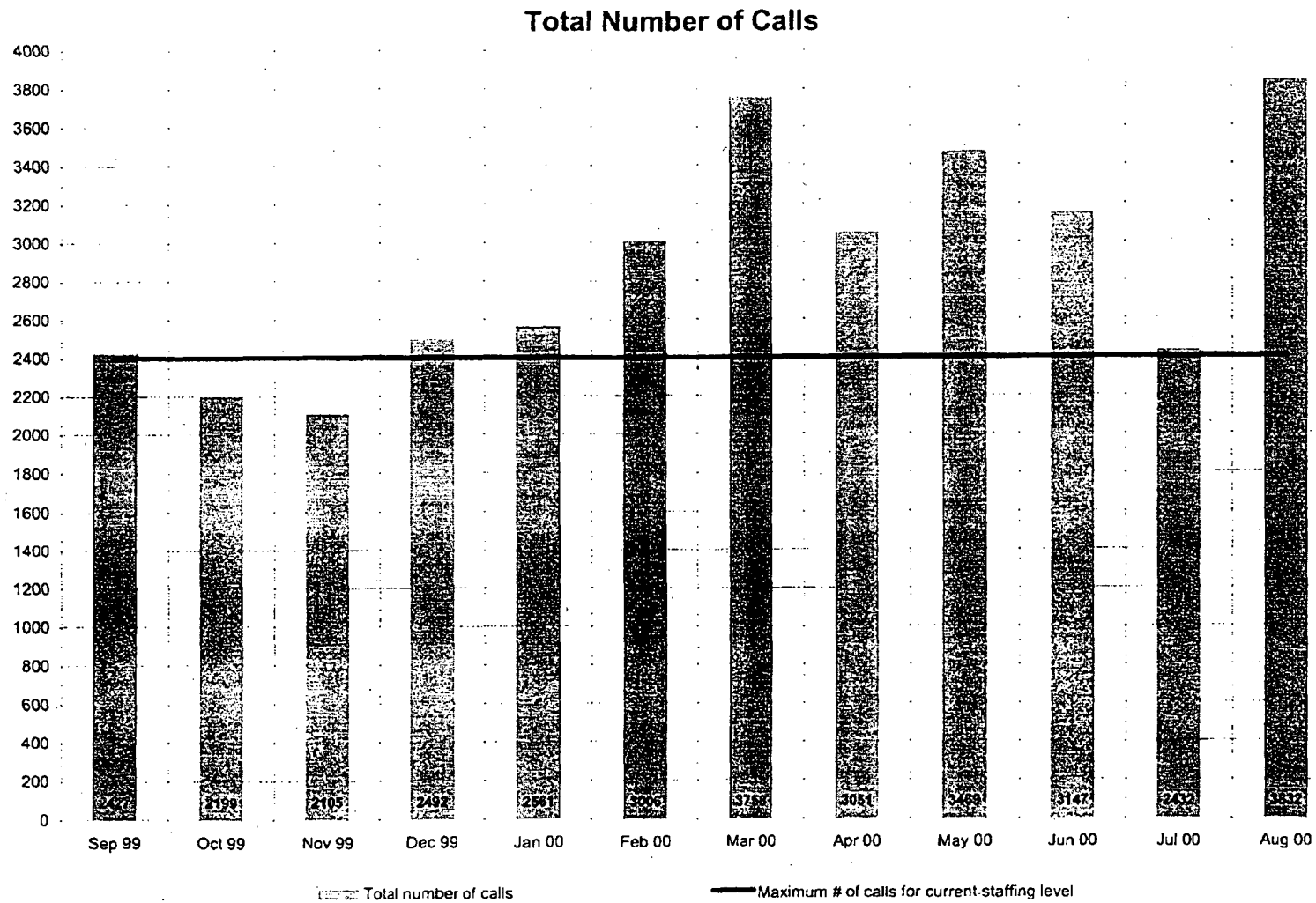
Ticket Type by Department (4/16-4/20)



NOC Monthly Statistics (January, February, and March 2001)

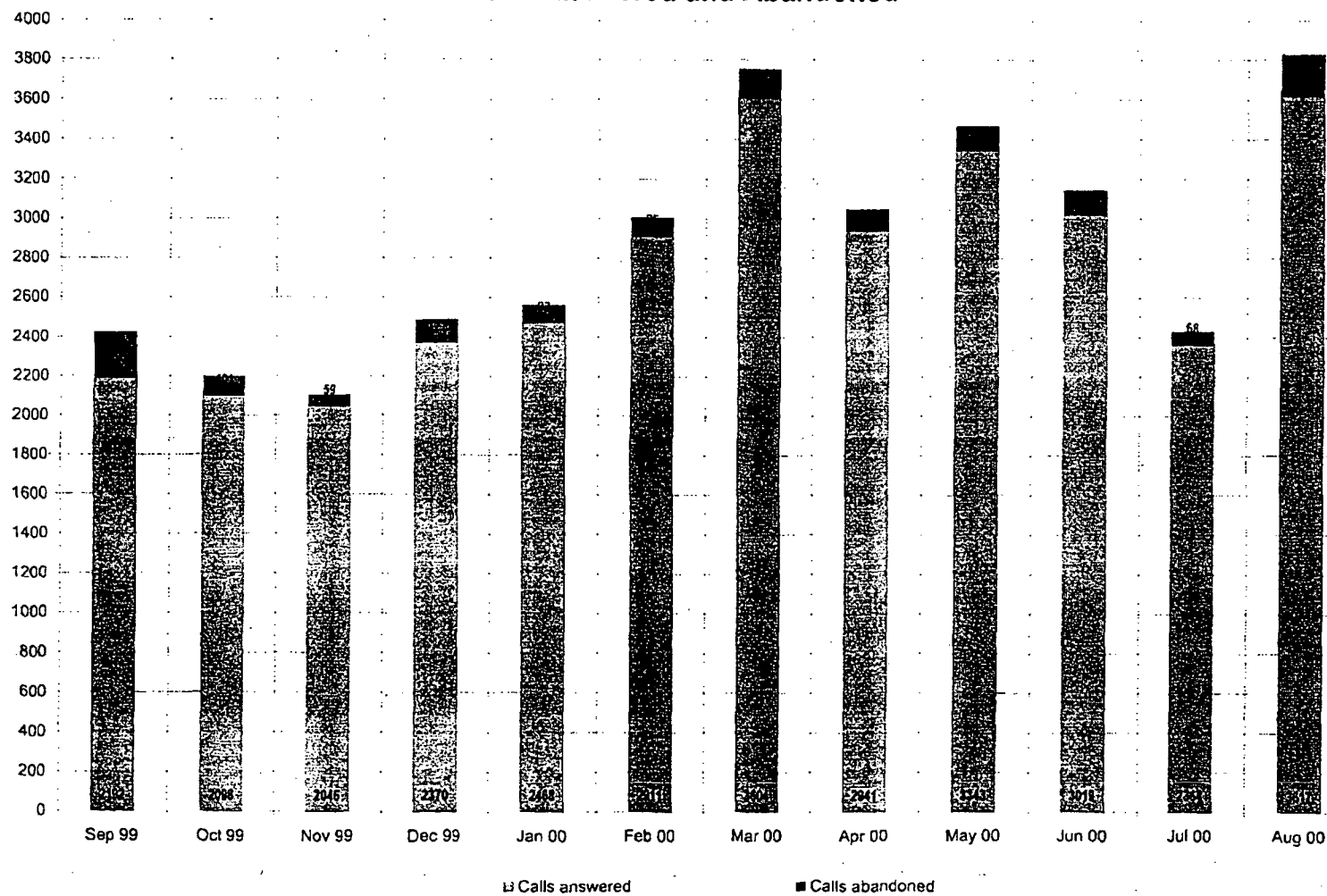


CSC Yearly Call Statistics (September 1999 to August 2000)

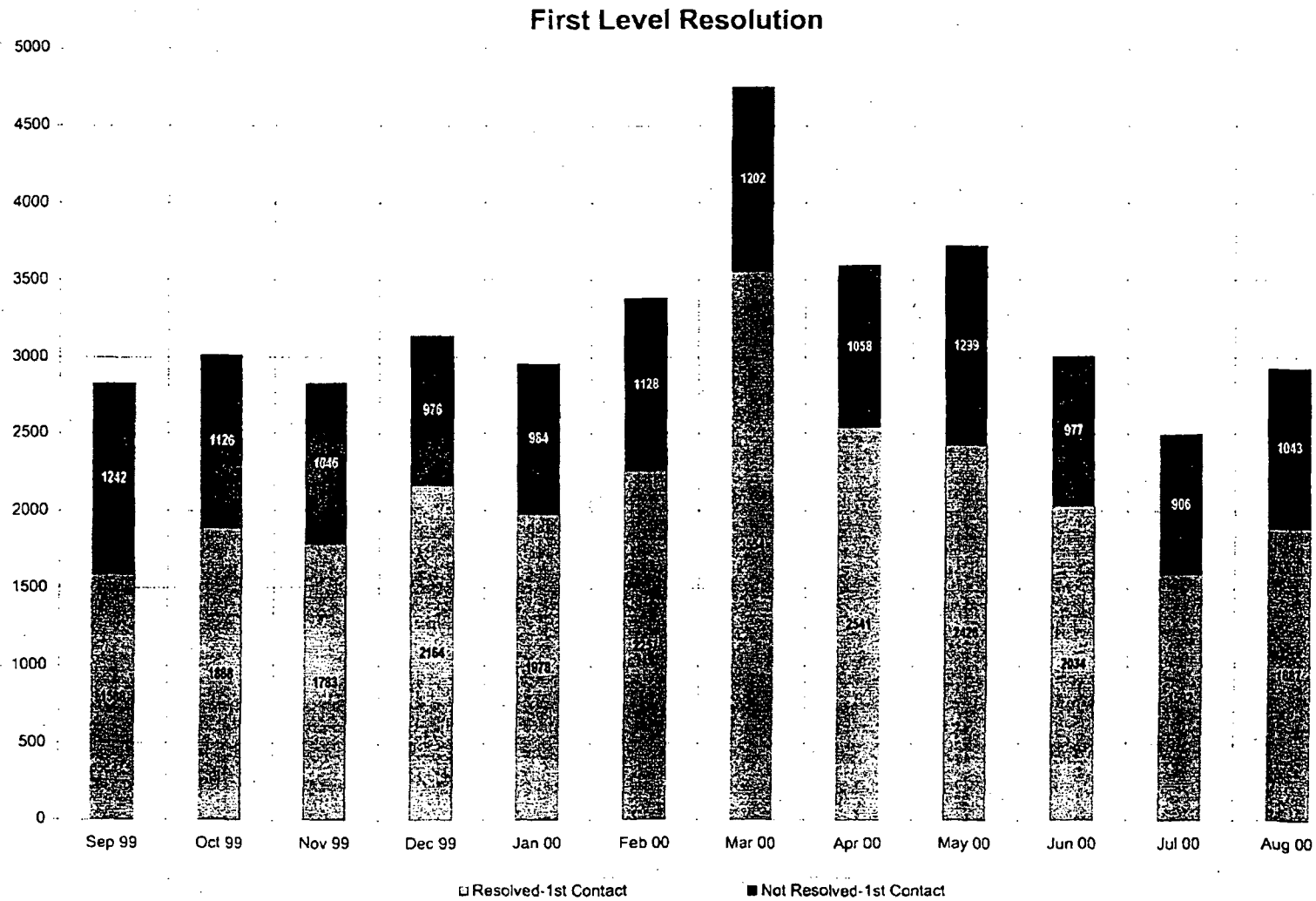


CSC Yearly Call Statistics (September 1999 to August 2000)

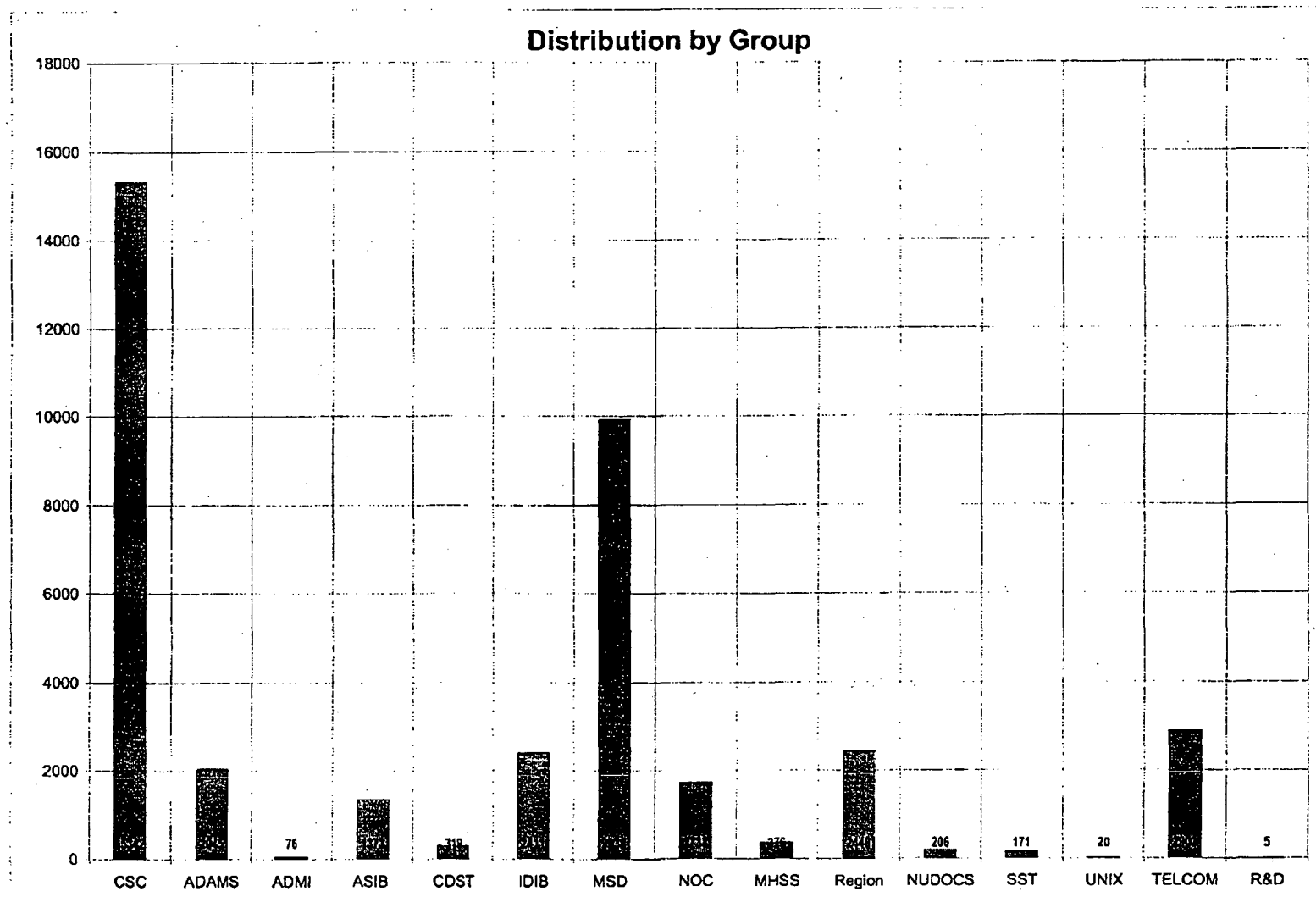
Calls Answered and Abandoned



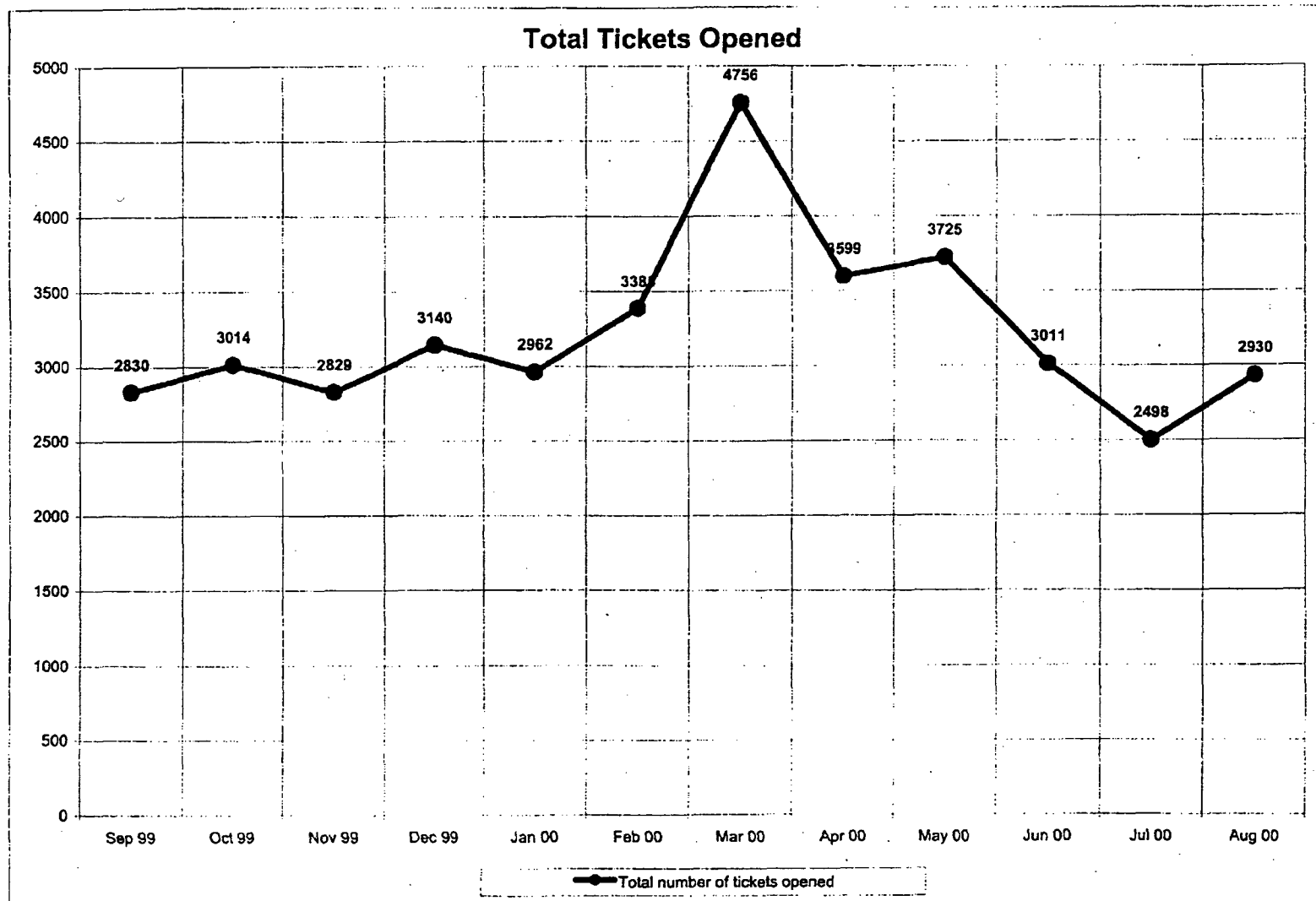
CSC Yearly Ticket Statistics (September 1999 to August 2000)

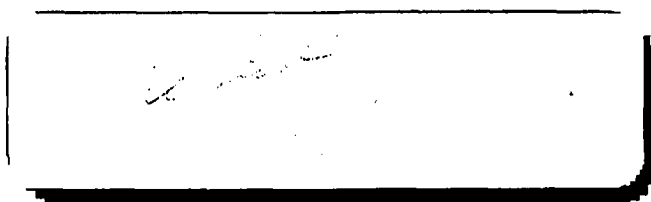


CSC Yearly Ticket Statistics (September 1999 to August 2000)



CSC Yearly Ticket Statistics (September 1999 to August 2000)





Release Management Process Overview

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1.0 Background

Sytel, Inc. of Bethesda, MD is the successful offeror on the U.S. Nuclear Regulatory Commission's (NRC), "Next Generation Network" contract. With its subcontractor, CEXEC, Inc., Sytel will be supporting the NRC's existing Agency Wide Network (AWN), while designing, developing, and installing the Agency's Next Generation Network (NGN).

2.0 Purpose

Release Management (RM) provides a process by which changes made to the Production Operations Environment (POE) can be made effectively and efficiently. The process enhances the effectiveness of the Infrastructure Development Process Model (IDPM) by providing the specific mechanism by which the properly developed, tested and integrated new technologies, developed in accordance with the IDPM, can be most efficiently implemented within their full scope. Release Management has the greatest impact upon Agency-wide software components of the NRC's network and is very tightly coupled to Configuration Management (CM). RM is an iterative process that has two entry points and exit points on the linear IDPM. This coupling ties the Operations and Support Phase of the IDPM back to the Transition and Implementation Phases of the IDPM enhancing the support phase by providing a mechanism that enables a continuous improvement process for POE components. RM also provides a mechanism for new technology just developed in the IDPM to be released into the POE in a controlled and well thought out manner.

3.0 Approach

The intent of the IDPM is to provide not only a methodology to develop new technology, but to form a framework for all other POE and development processes to plug into. RM is a process that plugs into the IDPM framework, an enhancement to be used with the IDPM, not a tool to skip IDPM steps or a work around to the IDPM. This document defines the process of RM, but also provides specific entry points and exit points on the IDPM, the interfaces, and inputs and outputs expected from the processes involved. RM, in the form as presented here, is not meant to be a complete stand alone process and therefore does not include many elements that a stand alone process would contain. The main goal in this approach is to avoid developing any excessive processes and to keep the amount of documentation and the complexity to a minimum.

4.0 Overview of Release Management

Release Management will coordinate the release of, primarily, new software components and fixes into the POE. It will provide for the development of the policies, procedures, roles, and responsibilities required to control this release. As with the IDPM, RM will be described as a series of process steps or phases. The requirement for a release is always generated in an IDPM phase and enters the RM process at that point. RM will then review the requirement and it will pass that requirement to the group responsible for revising the product or to Release Management depending on the nature of the product to be released. There will then be a combined testing, integration and acceptance phase. New technology passing directly to Release Management will be the initial release of a new technology and will not pass through the combined testing phase as that aspect will have been covered by previous IDPM steps. Release Management will determine the form of release, either stand alone or image based,

depending on the business needs of the NRC and the needs of the network. Nothing will be processed for release without going through the Release Management group, a subset of the POE Provisioning group (Tier 3). The Configuration Manager is the single point through which anything and everything must pass before it is released on the NRC network.

5.0 Release Management

The Release Management Process will be described in two parts. The first will be a detailed description of each RM step or phase. Following that will be a description of the interfaces of RM to other processes and finally, the inputs and outputs expected at those interfaces. There is also a process flow drawing (please see Figure 1 on the next page) to provide a quick reference to the RM process and its relationship to other POE processes and the IDPM and Configuration Management.

Candidates for release into the POE, or Release Candidates (RCs), can follow a number of finite paths through the Release Management Process (RMP) as several phases have two distinct, separate, mutually exclusive sub-processes. Each of these sub-processes will be detailed in the appropriate order. The exact process an RC will take will depend on the nature of the RC. It can be anything from a minor bug fix to a completely new unreleased Agency-wide application.

As the name implies, Release Candidates are just that, candidates for release. Having designed some new technology, performed a bug fix or upgraded an existing system does not qualify anything for release into the POE without the proper controls and processes in place. Although highly unlikely, an RC could be blocked at this stage from release depending on the findings of the Release Manager. The Release Manager is the final safety checkpoint before anything can be released into the POE and therefore, since the responsibility of the POE's safety is in his hands, so must the authority to stop an RC from being deployed if there is reason to believe that the stability, supportability or reliability of the POE is at risk.

The possible tracks that an RC can follow will result in the RC becoming a stand alone release or an image release. A stand alone release will be a deployment of the RC as an implementation package unto itself. The image release will be a deployment of the RC along with other RCs incorporated into the standard workstation or server image. Eventually, even a standalone release will be integrated into the image, the stand alone release will have some quality that warrants releasing it on an individual basis rather than with other RCs.

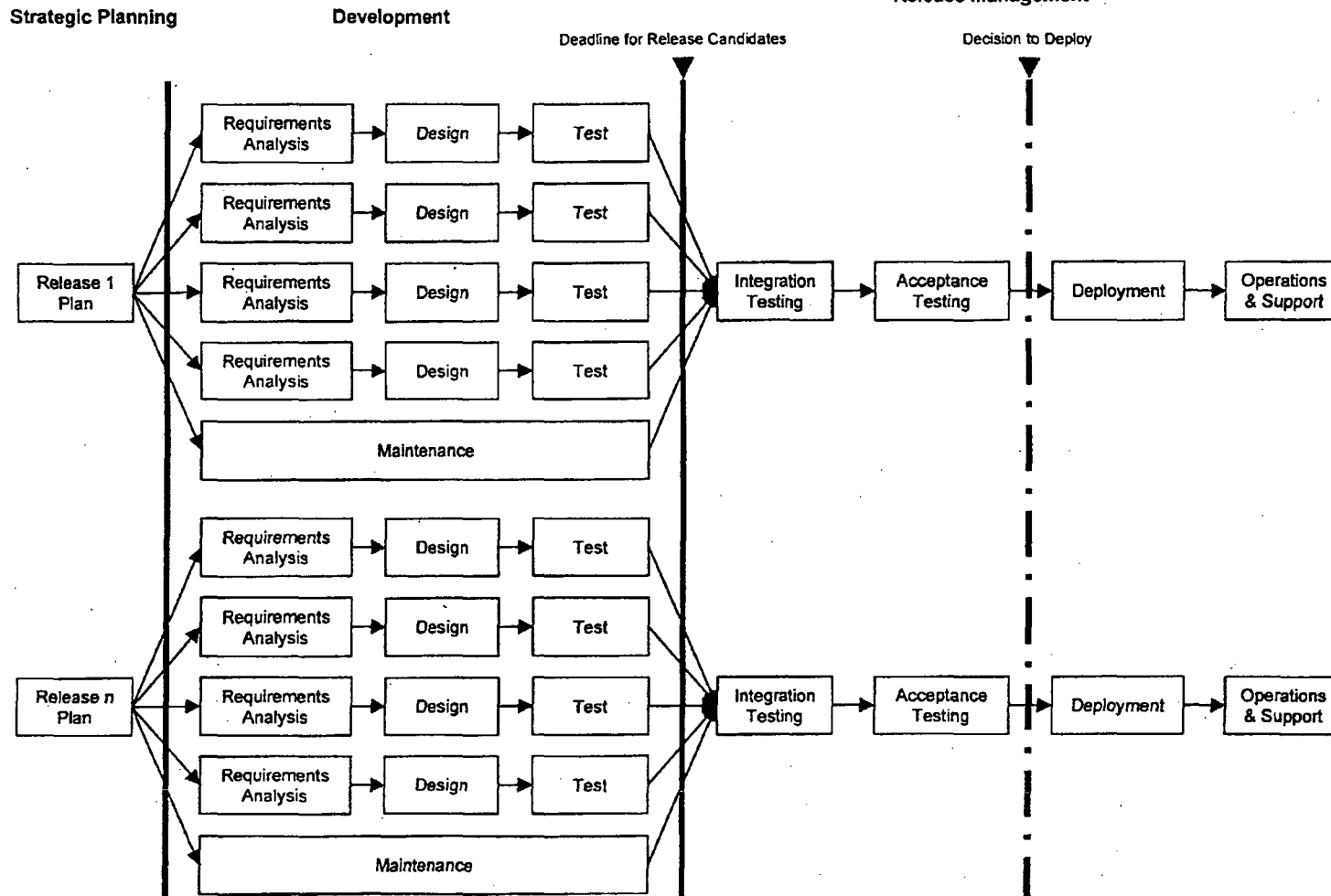
5.1 Release Management Phases

5.1.1 New Revision Requirement Analysis

Whenever a new requirement for new functionality, a correction to a deficiency, a change to a server component, such as a database, etc. arises, the first step will be to analyze the requirement. In the case of a deficiency or bug, the bug must be documented completely and testing must be done to determine the extent of the deficiency. The requirement could also be part of a contractual agreement between the NRC and a developer to deliver subsequent versions of a package developed for the NRC POE. Regardless of the origin or initiation of this phase, the documentation should be complete so that it is understood by all stakeholders,

exactly what is included in the new release. This phase is initiated from outside of release management and is the phase that defines the basic contents of most Release Candidates.

Release Management Overview



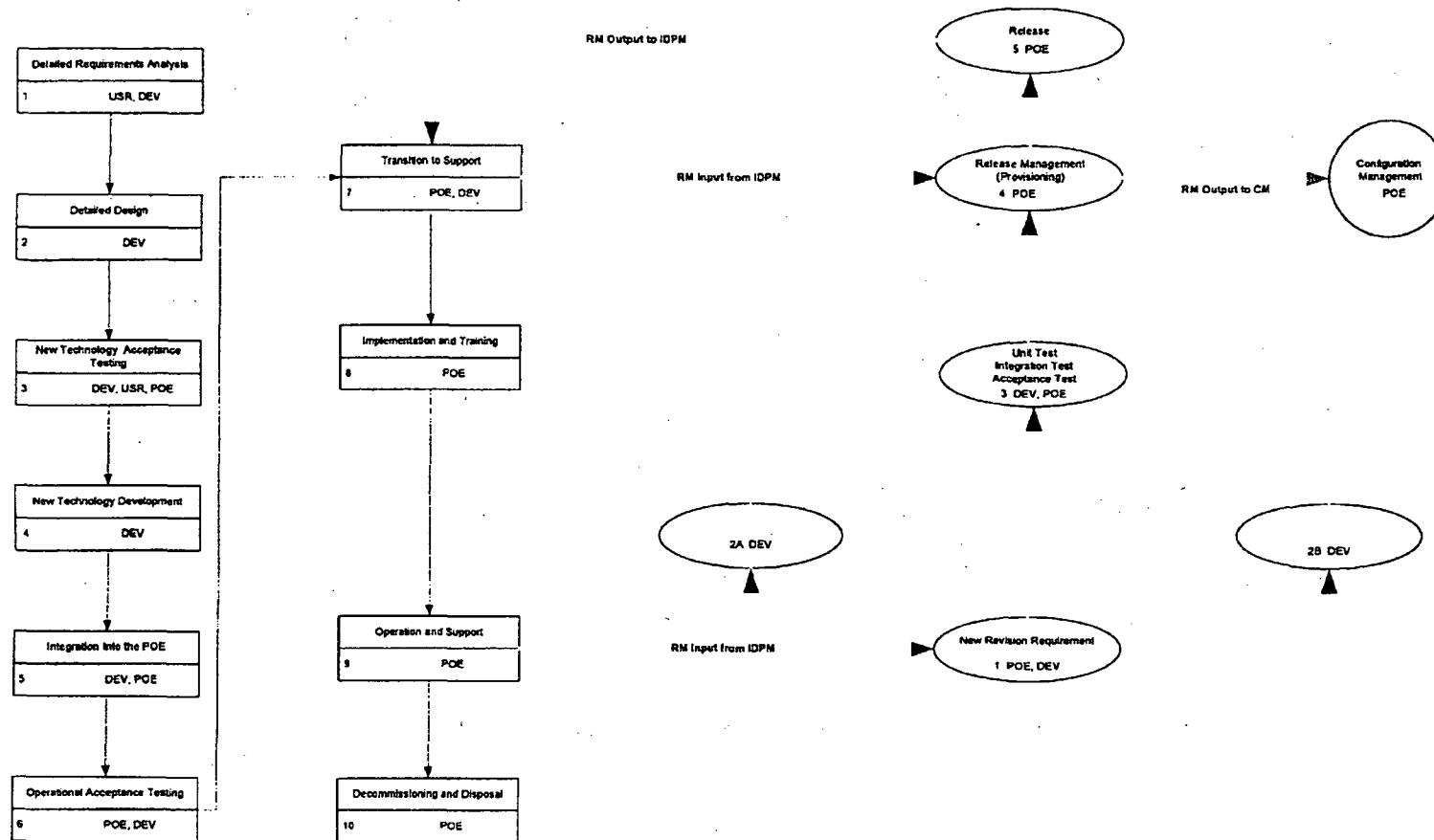


Figure 1

5.1.2 Release Identification Phase

This phase consists of two mutually exclusive sub-processes, categorized as significant or ancillary. The two processes are defined by the level of complexity, and the amount of documentation necessary for the provisioning of the candidate. A major distinction between the two is the nature of the work involved by the developer. The distinction is made to explicitly assert the responsibilities of the developers and the deliverables required with the RC to proceed to the Release Management (Provisioning) Phase.

- A. The ancillary process phase - This is the simple case of an RC that can be deployed into the POE or a part of the POE that does not require any new or changed documentation. It will not require any training for users or that any other major work be performed. The simplest example of an RC that fits this category is a bug fix to repair a minor deficiency in a part of the POE that slipped past the rigors of the IDPM. The deliverables that the developer is to provide with this RC will include a complete description of the reason this RC has been developed and a complete description of what it does and how it is to be integrated. For the example of the bug fix, this would be the complete bug description, the complete documentation on what parts of the bug are corrected and the preferred method for integrating or applying the patch.
- B. The significant process phase - This case is the complex case of the second Phase. The development of this RC will require the re-release of documentation, major user interface changes, changes to a server image (server image changes are never considered trivial and therefore will always be considered in this sub-process only), re-training of users, or a major disruption of POE services. The deliverables required for an RC that fits into this classification are more extensive and require more effort to complete. The testing of the RC will also be more in depth and require more resources. The POE provisioning group will be more involved in the testing and acceptance process than with the previous case. An example of this case would be a minor revision of deployed software to add functionality or to correct major deficiencies that slipped by the IDPM processes. It is important to note that a major revision or a new module to be added to an existing POE system should follow the appropriate IDPM stages before reaching an RM interface.

5.1.3 Combined Testing Phase

This phase is a combination of all of the testing done in the IDPM. In either of the previous cases, the changes are not extensive enough to warrant the full IDPM process of testing, integration and testing. A test plan must still be written by the developer and approved by at least the release manager or the POE Provisioning group. The tests should be performed and data recorded as in the IDPM testing processes and all stakeholders should be notified and attend the testing where applicable or desired. The POE Provisioning Group will be in attendance during any acceptance testing and must be satisfied, as in the IDPM, that the RC has passed all tests, performs as it is intended, and poses no threats to the POE. Copies of all test data will accompany the RC to the Release Manager to be placed in the OPs groups records.

5.1.4 Release Management (Provisioning) Phase

This is the main phase of the Release Management process and requires a high level of coordination. It is therefore necessary that this phase be actively monitored and guided by a dedicated resource. This resource is the Release Manager. The Release Manager is the focal point of each release cycle whether it is an image type or a stand-alone type of release. The responsibility of the Release Manager is to ensure that all RCs that are received are accompanied by the required documentation and that the RC will not cause any harm or disruption to the POE. The Release Manager has the final authority over the RC and its final disposition. Each release cycle will have an associated Release Manager assigned to it. The release cycle itself will be divided into sub-processes as follows:

1. Collection
2. Integration
3. Testing
4. Approval

The collection process will be the time in which a developer can submit an RC for release during that cycle. After this period, the RC may not be accepted for incorporation into the release, even if the RC has been scheduled for release in that cycle. The integrity of the POE and all of its associated applications, services and functionality, must be considered above any single application. By not setting strict deadlines and requirements for submission, the integrity of the POE is put at risk. The integration of the various RCs into an image based package follows the collection process. This process will be considerably easier in the case of a stand-alone release. It is important to note that this is strictly the integration of the release package. Any integration work for the RC to function correctly in the POE should have been performed, tested and proven long before this process. Following the integration process is the testing process. Again, this is a test of the release to the target workstations or servers, not a test of any specific RC. The approval stage is the final authorization by the NRC Operations management to proceed with release. This phase and its sub-processes are shown in the sample schedule in Attachment A.

5.1.5 Release Phase

Release is the final phase of RM. It is simply the release of the software into the POE. The Release Manager monitors the release to ensure that it is executed without incident. The Release Manager should coordinate any responses required in the event of a failure of the release package. Otherwise, the details of the release are left to the IDPM and its appropriate phases and processes.

5.2 Release Management Interfaces, Inputs and Outputs

The interfaces to Release Management are confined to two phases of the IDPM: the Transition to Support Phase and the Operations and Support Phase. In most cases, the main interface for output from the IDPM to the RM process will be from the Operations and Support Phase. The only output from the IDPM that will not come from this phase of the IDPM will be the case of a brand new release of new technology, a new module for an existing POE system, or a major revision to a POE system. To put it in other words, any process that was initiated in and

followed the IDPM will fall into this latter category while RCs generated due to operational or contractual issues will be the former case.

1. **Input: IDPM Operations and Support Phase to RM New Release Requirement Phase**

During the course of a system's life cycle, if it is found to have some deficiency, lack of functionality, unanticipated effect, or similar problem, the problem will be reported to the proper group by the Operations group. The problem will be completely documented with all known information and the results of the tests done to confirm the problem as well as any subsequent testing or findings. An appropriate tracking number should be assigned so that the problem can be documented and tracked properly.

2. **Input: IDPM Transition to Support Phase to RM Release Management (Provisioning) Phase**

As new technology proceeds through the IDPM, there will come a point where deployment of the new technology is required. To properly manage the deployment and create a deployment package, the new technology will be released into the Release Management (Provisioning) phase of the RM process. This will give the Release Manager the time to review all of the requirements for the release and make the final release decision before the new technology moves into the IDPM Implementation and Training Phase.

3. **Output: RM Release Management (Provisioning) Phase to Configuration Management**

Once the new technology becomes an approved release candidate and the release manager has certified it for release into the POE, the appropriate Configuration Management Process must be started to document the changes to the POE to reflect the addition of the new technology. The entry point into Configuration Management will be through the Change Management Process.

4. **Output: RM Release Phase to IDPM Transition to Support Phase**

This is essentially the release of the new technology back to the IDPM for deployment. The RC and all of the required deliverables will have been checked and found appropriate for release into the POE. The release methodology has been determined, deployment is scheduled, and all required approvals have been obtained.

Attachment A - Sample Schedule

**Release Management
Procedures**

Draft

November 8, 1999

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1	Define Release Life Cycle Dates	1
2	Identify Release Candidates (RC)	1
3	Update/Upgrade, or Maintenance RC Requirements Review	2
4	IDPM Requirements Analysis Review	2
5	Assign Target Release Date	2
6	IDPM Design Phase	2
7	IDPM Test Phases	2
8	RC Documentation Submitted to CM	3
9	CM Documentation Review and Acceptance	3
10	Release Assignment	3
11	RM Acceptance of Release Candidates	3
12	Standalone Release	3
13	RC Integration into Release Package	4
14	Release Package Testing	4
15	Release Package Pilot Testing	4
16	Rejected Package Review	4
17	Release Package Transition to Support	4

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Procedural steps are numbered to match Figure 1, found on page 7.

1 Define Release Life Cycle Dates

Deadlines must be defined to implement the management of release candidates (RC) into the POE. The strategic planner, configuration manager (CM), and release manager (RM) define and publicize the following dates:

Step	Deadline	Definition
2	Initial RC notification	Final day the CM may be notified of an RC item for potential assignment to a release.
5	RC target date assignment	Last day an RC may be assigned a target release date for the package.
8	RC documentation submittal - <i>IDPM candidates only</i>	Last day completed RC IDPM documentation may be submitted to CM.
11	RC acceptance date	Final date RC may be accepted by RM, last day control of RC may pass from CM to RM. All documentation has been reviewed and accepted by CM.
13	Completion date for integration into the release package	Date RC must pass integration testing.
14	Release package testing	Date release package must pass individual package testing.
15	Release package pilot testing	Date package must pass pilot testing and release to IDPM phase 7, transition to support.
17	Release package transition to support	Date package is sent to IDPM phase 7, transition to support.

These dates are to be publicized along with points of contact for each deadline. The CM carries prime responsibility for the coordination and timing of the releases as a group. Should a release package become delayed, the CM will determine whether or not to continue with the delay or to integrate the entire release into the next cycle.

2 Identify Release Candidates (RC)

Once a Release Candidate has been identified, written notification (e-mail or paper copy) must be sent to the CM no later than the due date for this task. Notification will consist of a brief statement of work, and will include a high-level description of what the RC is, the purpose, an estimation of work effort, priority ranking, and the source point of contact of the RC.

The CM assigns a release candidate number to each RC. Coding of the RC will be a concatenation of the release designation, year, candidate type, and the iteration. This number will be assigned based on the year the candidate is identified, and is not changed through the life cycle of the candidate. The CM is responsible for tracking the submissions and assigned

candidate numbers. A log will be maintained and made available to any member of the contract or the NRC.

<i>Release Designation</i>	<i>Year</i>	<i>Candidate Type</i>	<i>Iteration</i>	<i>Sample Release Candidate Assignments</i>
RC	00, 01, etc.	W (workstation)	001, 002, +1	RC00W001
RC	00, 01, etc.	S (server)	same	RC01S213
RC	00, 01, etc.	I (infrastructure)	same	RC01I050

3 Update/Upgrade, or Maintenance RC Requirements Review

RCs in this category may not require significant documentation. The CM is responsible for defining the documentation needs. Each RC will require varying levels of detail; for example, a bug would need only the bug report. Review of the documentation is done by the CM. Step 4 is skipped, continue to Step 5.

4 IDPM Requirements Analysis Review

Completed analysis of an RC from the IDPM life cycle is submitted to the CM for review. The CM is responsible for conducting any review meetings he/she feels are necessary before moving to the next procedure, assigning a targeted release date. If the analysis is not complete, the CM can reject the release candidate, returning the candidate back to the analysis phase of the IDPM.

5 Assign Target Release Date

The CM assigns a targeted release date to the RC. Coding of the targeted release date will be a concatenation of the release type, year, and release number within the year. The CM is responsible for tracking the submissions and assigned target dates so that they are available to any member of the contract or the NRC.

<i>Release Type</i>	<i>Year</i>	<i>Release Number</i>	<i>Expected Frequency</i>	<i>Sample Release Number Assignments</i>
W (workstation)	00, 01, etc.	Q1, Q2, Q3, Q4 or SA01, SA02, SA03, etc.	Q - quarterly SA - stand alone, incremented +1	W00Q1, W00SA01
S (server)	00, 01, etc.	V1, V2, etc.	as needed, expected semi-annually	S00V1, S00V2
I (infrastructure)	00, 01, etc.	V1, V2, etc.	as needed, expected annually	I00V1, I00V2

6 IDPM Design Phase

Refer to the IDPM. All documentation is to be included in step 8.

7 IDPM Test Phases

Refer to the IDPM. All documentation is to be included in step 8.

Begin Release Acceptance Phase

8 RC Documentation Submitted to CM

All documentation through Phase 7 of the IDPM; to include analysis, design, test plans, and test results, are submitted to the CM by the deadline defined in step 2. Missing or incomplete documentation may be returned to development for completion before the CM accepts the RC as a candidate for integration into its scheduled release.

9 CM Documentation Review and Acceptance

The CM documentation review is an assurance check done to prevent introducing items into the production operation environment that do not meet the standards necessary to assure a smooth transition into the release phase. The CM will review all documentation and conduct any review meetings he/she feels are necessary. The CM will make the final decision whether to release the RC into the targeted release, or to reassign it to a subsequent release. Should the documentation review result in a rejected RC, the CM will return the RC to development for revision. Only the CM may change the release assignment. The CM is responsible for maintaining logs for each RC to include review dates, status, issues, and release assignment number.

10 Release Assignment

The CM assigns the RC a release number, determining if the targeted release date can be met. Control of the RC and all documentation is passed to the Release Manager (RM) of the assigned release.

Begin Provisioning Phase

NOTE: *At the completion of each testing phase, the RM must review and pass each test iteration before it may continue to the next step. The RM can, at any point in the provisioning phase, reject a candidate and return it to the IDPM development cycle. IDPM support staff participate in this phase.*

11 RM Acceptance of Release Candidates

Release candidates must be accepted by the RM no later than the deadline defined in step 2 to be included in a release package. The RM reviews all documentation and assigns test plan writing and execution to staff members. Test plans and their results are to be written, reviewed, and accepted at all three stages of testing: package integration, package testing, and pilot testing. The RM is responsible for management and control of the release package through the provisioning phase.

12 Standalone Release

Standalone releases will be required when there is a need to implement the release as soon as possible. A standalone package does not require integration release package testing (step 13), but must go through release package testing and pilot testing.

13 RC Integration into Release Package

Each RC will be integrated into the release package and tested to assure the compatibility between RC items. Integration of each RC into the release package requires a written test plan. Test plan and results are reviewed by the RM. The RM tracks the status of each RC as integration is completed. Control of any RC that fails the package integration is returned to the CM, and the RC is removed from the package. Passing this phase is a requirement before the package moves to package testing in step 14.

14 Release Package Testing

The final package is tested on clean workstations of varying varieties. Test plan and results are required. The RM reviews the test results before passing the package on to pilot testing, step 15. If the package fails, the CM is given control of the package.

15 Release Package Pilot Testing

The package is pilot tested on current user workstations. Test plans and results are reviewed by the CM, with the go/no go decision made by the CM to pass the package on to the transition to support phase of the IDPM.

16 Rejected Package Review

The CM reviews and may redefine the requirements of a package that fails the pilot test. Control of the package and these requirements are then returned to IDPM development. The RCs of the package are then re-evaluated and assigned a new release date.

17 Release Package Transition to Support

Control of packages that have passed the pilot testing is passed to Phase 7 of the IDPM, Transition to Support.

Action Plan Checklist

RM Release Manager

RC Release Candidate

CM Configuration Manager

RP Release Package

IDPM Infrastructure Development Process Model

Step	Task	Responsibility	IDPM Phase
1	Determine deadlines for release	CM, RM, strategic planner	-
	Publicize deadlines	CM	-
2	Identify and submit RC to CM	Client, development staff	1
	Assign RC number to each candidate	CM	1
	Create and maintain RC log	CM	1
3	Define documentation requirements for update/upgrade or maintenance RC	CM	9
	Assignment of documentation writing	CM	9
	Review and approve documentation		9
4	Submit IDPM analysis to CM	developer	1
	Conduct review meetings	CM, others as needed	1
	Approve analysis documentation	CM	1
5	Assign target release number	CM	-
	Notify development staff of analysis documentation approval and target release number	CM	-
	Create and maintain RP log	CM	-
6	IDPM Design Phase	development	2
7	IDPM Testing Phases	development	4 & 6
8	Submit RC and all IDPM documentation to CM	development	7
	Verify sufficient documentation submitted for review	CM	-
9	Conduct documentation review for each RC	CM and others	-
	Approve RC as complete and ready for release management	CM	-
	Reject any incomplete RC, return control to development for revision	CM	-
	Create and maintain RC review log	CM	-
10	Assign final release number to RC	CM	-
	Pass control and documentation of approved RCs to RM	CM	-

Step	Task	Responsibility	IDPM Phase
11	Review RC documentation to gain familiarity and understanding	RM	-
	Assign test plan writing and execution	RM	-
	Maintain activity progress log for RP	RM	-
12	Pass Stand-Alone package to package test step	RM	-
13	Integration test plan documentation is written	Provisioning staff	-
	Test plan approved	RM	-
	Integration test is completed	Provisioning staff	-
	Test results are reviewed	RM	-
	RP approved for package testing	RM	-
14	Package test plan documentation is written	Provisioning staff	-
	Test plan approved	RM	-
	Package test is completed	Provisioning staff	-
	Test results are reviewed	RM	-
	RP approved for pilot testing	RM	-
15	Pilot test plan documentation is written	Provisioning staff	-
	Test plan approved	RM	-
	Pilot test is completed	Provisioning staff	-
	Test results are reviewed	RM	-
	RP approved for deployment	RM	-
	RP rejection sent to CM	RM	-
16	Review rejected package	CM	-
	Redefine requirements	CM	-
	Return control to IDPM for correction	CM	-
17	Release package to IDPM transition support	CM	7

