2008 Deployment Best Practices Resource Guide

INTEGRATED TESTING, CERTIFICATION AND REPORTING METHODS FOR CISCO UNIFIED COMMUNICATIONS MANAGER

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Published: January 4, 2008

Executive Summary

Enterprise testimonials prove that committing to a comprehensive, enterprise wide strategy to migrate to a true IPT environment enhances communication and creates efficiencies in revenue generation. Whether your organization comprises of 100 employees or 100,000, the decision to commit to IP telephony is a clear indication that you rely on innovative strategies to impact the bottom line and enable growth.

More often than not, IPT adopters lack the full time resources necessary to orchestrate corporate voice initiatives and therefore seek domain experts to take project responsibility. Transferring project management to experienced firms allow executives to focus on their core competencies while leveraging best practices that prove a faster return on investment.

To answer the demands of the rapid IPT adoption, Clarus Systems has consistently invested in engineering solutions that accelerate deployments and prove results ahead of expectation. Our Certification Services are leveraged by customers that demand an earlier return on investment on enterprise-wide IPT deployments. Our domain experts have facilitated various project phases, supporting a majority of CUCM projects of all size, configuration, and complexity. As a result, best practices have been developed for customers to experience significant key project indicator benefits:

- Reduction in post deployment (Day 2/ongoing operations) end user reported issues
- Increased customer satisfaction from project acceleration including an increase in the number of devices and locations deployed during a project phase
- Allowed management to focus on core competencies by reducing the required field resource personnel and hours
- Reduction of problem identification, isolation, and resolution intervals which also resulted in a reduction in the required support personnel to support each project
- Reduction in change orders for equipment deficiencies and configuration issues discovered during device deployment phase

This Best Practice guide is intended to provide a standardized set of processes and methodologies to leverage throughout the deployment and ongoing operations of Cisco Unified Communications Manager (formerly CallManager). Adopting these strategies can enable the successful execution and completion of CUCM Deployment projects based on a hybrid approach that bridges Cisco's PDIOO methodology with the Information Technology Infrastructure Library (ITIL) standards.

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About Clarus Systems, Inc.

Clarus Systems, Inc. provides integrated management, testing and monitoring solutions for IP Communication and Contact Center deployments, upgrades and transformations. Privately held and based in Redwood City, Calif., Clarus Systems is widely recognized for its award-winning application, ClarusIPC®, which maximizes system availability and performance through automated, end-to-end testing, monitoring, reporting, troubleshooting, and operations management. With over half a million devices tested, Clarus Systems' solutions ensure ongoing, validated telephony environments that can serve as the foundation for unified communications. The company attributes its success to its roster of elite Global 2000 enterprises, system integrators, and managed service providers within the financial services, aerospace & energy, and public sector & education market segments.

Clarus Systems premier applications, ClarusIPC® and ClarusIPC® Plus+, are leveraged by enterprises, systems integrators and managed service providers to support the lifecycle of Cisco Unified Communications, from deployment through ongoing operations, service availability and performance. ClarusIPC® is scalable and offers remote certification, configuration analysis, and troubleshooting - further validating operational integrity while building the foundation for a Unified Communications network.

The features within ClarusIPC® allow the performance of complex validation and testing scenarios, ensuring the IP Communications application is fully functional, tested, and documented to ensure operational readiness prior to transferring support responsibility. ClarusIPC® utilizes a unique approach to ensure the IP Communications application functions as configured and expected by the end user. By automatically validating all user functionality, the best-of-breed application suite is the only solution that provides end-to-end testing of every IP Telephony device on a network.

CUCM Deployment Certification Approach

Clarus Systems has developed comprehensive Best Practices with proven methodologies and processes that align with the Cisco accepted CUCM Deployment and Management PDIOO methodology, which in turn, is consistent with the ITIL Lifecycle.

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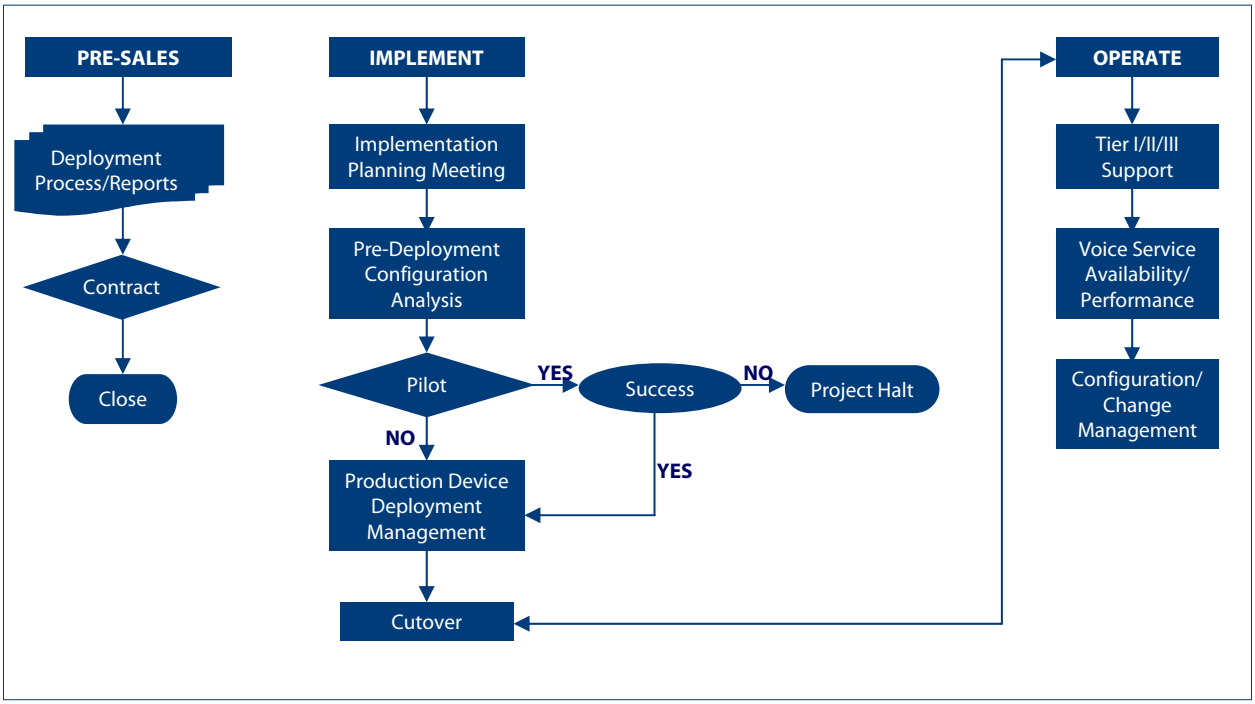

- **Pre-Sales/Planning**
  - Pre-Sales Requirements
    - Comprehensive Process for all Project Phases
    - ClarusIPC® CUCM Configuration and Certification Reports
- **Implement**
  - Implementation Planning Meeting post requirement approval
    - Implementation Objectives
    - Test Plan Specifications
    - Problem Management
    - Final Customer Acceptance
  - Pre Deployment Configuration Analysis
  - Production Device Deployment Management
    - Device Registration Management
    - System/Location/Device On Net Certification
    - Device Deployment Problem Management
  - System/Location/End User Cutover
    - System/Location/Device Off Net Certification
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    - Final Customer Acceptance
- **Operate**
  - Tier I/II/III Support
  - Voice Service Availability/Performance Monitoring
  - Configuration/Change Management

Pre-Sales/Planning Phase

In the early stages of engaging with a potential customer there are a series of critical best practice elements which can be introduced into the pre-sales/planning process which addresses requirements and potential customer questions and concerns.

Many of Clarus Systems customers have introduced the following best practice elements during this phase which has instilled confidence with potential customers that the project will be managed effectively and delivered to meet their business and technical needs.

Comprehensive Process Management for all Project Phases

Project team presents detailed process flow to business and technical teams a detailed process for each phase of the lifecycle. This approach is a key differentiator in each project as it allows cross-functional, comprehensive process visibility, uncovering potential issues before they can impact end users.

The following phases of the project should be included in the detail process presentation:

- Customer/User Survey
- System Design
- System Deployment
- System/User Certification
- Final Customer Acceptance

ClarusIPC® CUCM Configuration and Certification Reports

To supplement the System Deployment, System/User Certification and Final Customer Acceptance phase discussion present the customer with sample ClarusIPC® CUCM Reports:

- ClarusIPC® CUCM Configuration Reports
    - Support Pre-Deployment design/configuration analysis
    - Final Customer Acceptance "As built" documentation
- ClarusIPC® CUCM Certification Reports
    - Support both System Deployment and Final Customer Acceptance phases of the project

Implementation (Day 1)

This is a critical phase that ensures a project efficiently moves from pilot to production when executed properly. A detailed step-by-step approach is mapped within this project phase which details critical success factors and key objectives, including:

- Customer Involvement
    - Communication and collaboration through continuous knowledge transfer
    - Include in test plan development and execution steps
    - Provide constant status, configuration, certification reports
- Certification/verification steps will occur multiple time throughout this phase
- Final Customer Acceptance is critical and for large multi phase project assume it occurs after each phase and not only at the end of the project

Implementing the following steps will ensure your project garners high customer satisfaction, efficient resource/cost utilization, and significant reduction in post deployment (Day 2) user issues.

Implementation Plan Meeting

Prior to the start of the implementation phase, a planning meeting is scheduled to discuss the following:

- Implementation Objectives
- Test Plan Requirements
- Problem Management
- Final Customer Acceptance

Implementation Objectives

A key step in the process is to establish objectives and requirements for each engagement. With the use of ClarusIPC® throughout your deployment, you can establish a comprehensive set of objectives which will meet/exceed your customers' expectations.

Pilot Phase

Customers benefit from incorporating a pre-deployment pilot phase into their strategy as a way to gradually introduce Cisco IP Telephony to their end users. This project phase is critical to the overall success and needs to be managed closely to document requirements and analyze end user acceptance. In most cases, the responsible deployment team will provide a significant portion of post-deployment support regardless of the agreed to support model. The objectives typically established for the pilot phase of the project leverage ClarusIPC® include:

- Establishing pilot success criteria with definitive milestones and requirement objectives focused on the end users experience and expectations
- Complete certification of all systems, applications, and end users
    - Utilize ClarusIPC® automated testing and remote hands to perform a complete and comprehensive certification of the entire deployed environment
    - Benefits:
        - Significant cost reduction for on-site resources used to perform manual testing on a small sample of devices
        - Standardized certification process which ensure the same quality level of testing throughout the project
        - Establishes system baseline related to availability and performance
        - Provide to customers a complete series of certification reports which establishes the system, applications and end user processes were validated and configured as designed
        - Identifies problems prior to putting the system/end users into service, significantly eliminating post deployment (Day 2) issues and reduction in help desk ticket escalations
- Establishing a comprehensive change management process
    - ClarusIPC® scheduled tasks allow for daily synchronization to the required CUCM clusters, and the generation of a comprehensive series of ClarusIPC® configuration reports.
    - For changes related to devices and directory numbers, enable track changes in the sync and create a daily series of change tracking reports which will provide the details of the daily changes
    - Benefits:
        - Incorporating comprehensive change management processes early on in a project reduces issues that traditionally arise from improperly managed changes.

        - Allows changes to be properly managed and changes documented within ClarusIPC® reports, which can help in the event the change did not have the expected result and the change needs to be reverted to the original configuration
        - Configuration reports can easily be distributed to all key personnel on the project
- CUCM Post Deployment Management
    - Implement Tier I/II/III Support using Remote Hands and Help Desk (only available in ClarusIPC® Plus+)
    - Implement service availability and performance monitoring for all calls using Voice Monitor (only available in ClarusIPC® Plus+)
    - Benefits:
        - Help Desk and Remote Hands functionality allow Tier I support staff to troubleshoot end user reported issues with limited involvement of the user. This significantly improves the end user experience
        - Voice Monitor allows the creation of rules to monitor all aspects of the critical elements of their CUCM System, which include:
            - Failed calls
            - Misdialed calls
            - Misrouted calls
            - Poor voice quality
        - Voice Monitor alert notification enables support personnel to have complete visibility into the system service availability and performance and does not rely only on end user reported issues, which enables a proactive approach to support

Production Phase

Following the successful completion of the pilot phase, it's recommended to set up a meeting with the customer to establish implementation objectives for the production phase. In most cases, the deployment model utilized during the pilot can not be used for the production phase since the resources required to support do not scale. The production phase objectives should include the following:

- # Devices/#Location deployed for each phase
    - ClarusIPC® leverages a centralized, standardized process utilizing automated testing, remote device control, and problem management
    - Benefit:
        - Increase the number of devices and location which can be completed during each phase
- Test coverage for system, application, location, device/user
    - ClarusIPC® provides the ability to execute a wide variety of tests, both automated and manual from a centralized location which enables the appropriate level of coverage to ensure proper functionality for system, applications, locations, and devices/users
    - Benefit:
        - Execution of the appropriate level of testing for all components of a CUCM system will result in a significant reduction of post deployment end user reported issues

TEST PLAN REQUIREMENTS

Test Plan requirements will be based on several factors for a CUCM Deployment project. By leveraging ClarusIPC® Plus+, Clarus Systems has developed the following guidelines to ensure an appropriate level of testing is completed for all components of a CUCM System. The following is the testing formula which would be discussed in the Implementation Planning meeting:

Test Type	Recommended Device Guidelines
System tests	**10-20%**
Application tests	**10-20%**
Location tests	**20-30%**
Call routing tests	**20-30%**
Device/user tests	**100%**

PROBLEM MANAGEMENT

A critical success factor to any deployment project is effective problem management. Clarus Systems provides a comprehensive problem management approach which ensures problems are reported, identified, resolved, and verified in a timely manner so as not to impact end users during business hours.

To ensure problems are managed properly during this project phase, it is suggested to take the following approach:

- **Deployment**
  - Automated test execution
    - 100% of deployed devices are tested
    - Certification performed following any configuration updates
    - Certification performed following any change of device registration status
  - Problem isolation, resolution, closure verification
    - Remote Hands should be used to report problems in real time
    - Communicate the steps to reproduce and problem description to the designated support personnel
    - Work with support team to reproduce the problem
    - Verify problem is resolved and close issue with support team

- **Post Deployment (Day 2)**
  - Tier I/II/III Support
    - Help Desk should be used to access the device/users configuration to perform detail analysis
    - Remote Hands should be utilized to take remote control of the reported trouble phone to perform the steps to reproduce the reported problem
    - If problem can not be resolved, include the current configuration data and steps to reproduce the problem in the ticket and escalate to the next level of support
  - Voice traffic availability and performance
    - Voice Monitor should be utilized to establish a series of policies to monitor the following conditions:
      - Failed calls
      - Misdialed calls
      - Network congestion, overflow, alternate route, and call routing
      - Improper call handling, call forwarding
      - Suspicious/malicious calls
      - Poor voice quality

Final Customer Acceptance

As mentioned in previous section, Final Customer Acceptance is a critical phase to the success of all projects. To alleviate any questions and concerns by our customers, Clarus Systems performs a final customer acceptance as follows:

- Single phase project: after all changes and configuration updates have been completed
- Multiple phase project: after all changes and configuration updates have been completed for each phase and at the completion of the total project

Components:

- Complete series of configuration documents which will be delivered to the customer as "As Built" documentation
- Complete series of certification reports for the final customer acceptance tests plans which were executed
- Issue list with status of all reported problems

Pre-Deployment Configuration Analysis

Following the customer/end user survey and CUCM provisioning, ClarusIPC® should be used to generate a series of reports which can be used to perform:

- System design verification: ensure the System has been provisioned to meet design requirements and objectives
- Device inventory: ensure all required devices, including device models are properly provisioned and assigned as required
- Directory inventory: ensure the proper directory numbers are assigned to the appropriate devices and directory numbers are within the published Direct Inward Dial (DID) ranges for each location
- Call routing: ensure call routing configurations are properly provisioned for each deployment model, campus, branch office, remote users, and toll bypass
- End user call handling/call forwarding: ensure end users call handling requirements are implemented as required
- Customer compliance: many customers have established standards for many components of their network, ClarusIPC® configuration reports can be used to ensure these customer standards are adhered to prior to device deployment

Production Device Deployment Management

This phase of the project focuses on the steps required to install all devices for the project or a phase of the project. Properly managing this phase of the project will result in significant cost savings by reducing the time required to deploy devices. The components for this phase of the project include:

Device Registration Management

The device registration process can be time consuming and in many cases requires the device firmware to be updated. Clarus Systems uses the ClarusIPC® Real-time Monitor to manage the device deployment and registration phase of the project. The device registration management steps to success include:

- Create the required device monitoring profile, which could include multiple CUCM Clusters and locations.
- Distribute the device Real-time Monitor URL to the designated team responsible for device deployment.

- Established a controlled device deployment plan, which would be based on the building, floor, location and closely track the progress of deployed phones.

System/Location/Device On-Net Certification

This phase of the project focuses on performing tests which certify the availability and performance system, application, media, and device/user features available through only a Local Area Network (LAN) connection. The testing will certify the physical and logical components of the project or project phase.

- Device registration to assigned primary CUCM server - 100%
- Station to station dialing – 100%
- Call forward to voicemail(could require WAN) – 100%
- Outbound blocked route/translation patterns – 100%
- Softkey templates – 20%/Softkey Template
- Abbreviated/special dialing patterns – 100%
- Configuration verification
    - Sidecar status
    - Phone button templates
    - Softkey templates

Device Deployment Problem Management

Problems and issues encountered during this phase of the project should be reported to the appropriate support personnel based on requirements/objectives established during the implementation planning meeting. Problems should be categorized using the following model:

- System
- Application
- Network
- Device/User
- Configuration/Provisioning

SYSTEM/LOCATION/END USER CUTOVER

This phase of the project can be combined with the Device Deployment Phase and should be determined as such during the implementation planning meeting. Throughout this phase, you should focus on the steps required to certify the circuits (PSTN and/or WAN), translations, and physical connections have been completed to allow inbound/outbound calling, applications, media resources, and failover/alternate routing.

System/Location/Device Off-Net Certification

This phase of the project focuses on performing tests which certify the availability and performance system, application, media, and device/user features available through only a PSTN and/or Wide Area Network (WAN) connection. The testing will certify the physical and logical components of the project or project phase.

- Direct Inward Dial (DID) - 100%
- Inter Office DID – 100%
- Call Forward to Voicemail (when WAN required) – 100%

- Outbound Allowed Route/Translation Patterns – 20%/CoS
- Music On Hold (MoH) – 10%
- Conference Call with External Callers – 10%
- Survivable Remote Site Telephony (SRST)
- CCM Failover

Cutover Problem Management

Problems and issues encountered during this phase of the project should be reported to the appropriate support personnel based on requirements/objectives established during the Implementation Planning meeting. Problems should be categorized using the following model:

- System
- Application
- Network
- Device/User
- Configuration/Provisioning

Final Customer Acceptance

Following the completion of the device deployment, cutover and any configuration, moves, ads, changes (MAC) updates, the final customer acceptance process should be completed. This will ensure system availability, performance, and configurations are certified prior to the start of the next business day for all customers. Execute the steps below to complete the final customer acceptance phase:

- Test execution
    - Rerun all device deployment test plans
    - Rerun all cutover test plans
    - Problems/issues encountered will immediately be reported to the appropriate support personnel
- Device registration status
    - Verify final device registration status
    - Problems/issues encountered will immediately be reported to the appropriate support personnel
- Complete CUCM sync to collect final configuration data
- CUCM configuration verification
    - Perform final configuration verifications
    - Perform final customer compliance (when applicable) verifications
    - Problems/issues encountered will immediately be reported to the appropriate support personnel
- Final customer acceptance report generation
    - Generate/distribute final customer acceptance configuration ("As Built")/compliance reports
    - Generate/distribute final customer acceptance certification reports Direct Inward Dial (DID) - 100%
- Schedule final customer acceptance meeting with the team to review all reports and obtain acceptance for the project or project phase

OPERATION SUPPORT PLAN (DAY 2)

It is necessary to establish a comprehensive operations (Day 2) support plan to ensure ongoing system availability to ensure end user issues are efficiently managed. As outlined in previous sections, ClarusIPC® provides several capabilities which allow the management of the critical components of a CUCM System.

TIER I/II/III SUPPORT

The use of Help Desk and Remote Hands should be utilized from the beginning of any CUCM deployment project. ClarusIPC® Plus+ supports role based access, including administrator, operator, and Help Desk. To provide comprehensive support, the recommended implementation of Help Desk and Remote Hands should include:

- Configure ClarusIPC® Plus+ to integrate with the customers LDAP (active directory, Sun One, CUCM DC Directory)
- Assign Tier I (Help Desk) customer support members to the Help Desk role
- Provide training on all components of Help Desk and Remote Hands
    - Real-time configuration
    - Reference phone
    - Call history
    - Configuration comparison
    - Remote Hands
- Review current Tier I/Help Desk support team processes and objectives
- Work with Tier I/Help Desk team designates and work several end user issues to provide hands on training and knowledge transfer

VOICE SERVICE AVAILABILITY/PERFORMANCE MONITORING

Following the completion of the deployment phase of a project, begin the monitoring of end user voice traffic. Voice Monitor allows users to efficiently monitor voice quality, service availability, and security conditions through the use of a sophisticated rules and policy engine. The application is designed to allow you to monitor Call Detail Records (CDR) and Call Maintenance Records (CMR) using a rules-based template of custom-defined policies to set alerts and monitor system availability including:

- Service Availability/Performance
    - Failed calls
    - Network congestion
    - Fail-over/alternate routing
    - Poor voice quality
- Compliance
    - Improper call forwarding
    - Non-business hours outbound calling
    - Unsupported/blocked outbound calls
- Business Management
    - Inbound, unanswered calls
- Reports
    - Daily call failures and most impacted
    - Hourly call history
    - Monthly alert summary, monthly call failures

Voice Monitor allows the user to enable Email notification or generate an SNMP Trap when alerts are triggered. When email notification is utilized create a series of distribution lists for each specific alert/policy.

CONFIGURATION/CHANGE MANAGEMENT

Following the completion of the deployment phase of a project implement a comprehensive program to manage configuration changes. Within all CUCM environments, there are several types of ongoing configuration changes which can be applied:

- System upgrades and/or changes
- Network upgrades and/or changes
- Major routing changes
- Daily Routing/Moves/Adds/Changes (MAC)

Each change impacts specific components of a CUCM system and should be managed as follows:

- System/network/major upgrades/changes
  - Can impact the majority of end users
  - Perform pre-upgrade activities to establish baselines
    - Configuration report generation/analysis
    - Certification of impact CUCM components
    - Report non-standard/compliant configurations and discovered issues to appropriate support personnel
  - Perform post-upgrade activities
    - Configuration report generation/analysis
    - Certification of impact CUCM components
    - Report unexpected configurations, certification tests results, and issues to appropriate support personnel
- Daily Routine/MAC Changes
  - Establish a specific change management process which identifies the type of changes which will be made to the system on a routine basis and the time of day those changes are authorized to be made
  - Based on the change management process, perform the following:
    - Create a scheduled task to perform:
      - CUCM sync to collect configuration data
      - Generate specific configuration reports
      - Establish a email distribution for the configuration reports to be sent
  - Include the appropriate change tracking reports for device and directory number changes.

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