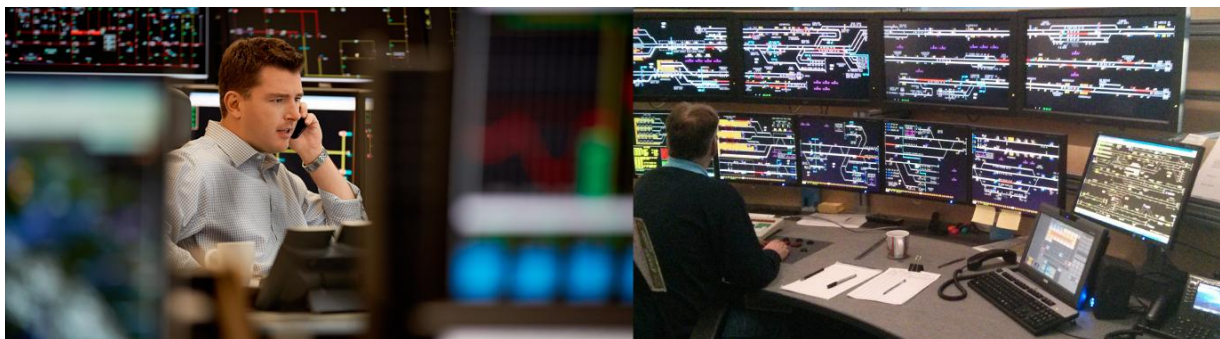


Next-Generation IP Signaling Concentrators for Rail and Industrial Markets



Many industries use centralized or decentralized control centers to manage the operational sides of their businesses. These control centers have high resiliency and uptime requirements because of the nature of the systems that they manage, many of which have penalties associated with the loss of service. These control centers depend upon high-uptime voice systems for communications. This white paper discusses the benefits and deployment capabilities of IP-based solutions within these control centers.

Today's Communications Systems in Control Centers

Traditional industrial control centers have used a combination of modified traditional private automated branch exchanges (PABXs) and/or trader turret systems to provide the communications technology within them. These systems have provided a highly resilient standalone voice solution to control centers for many years. However, these solutions have many limitations that a next-generation IP-based solution can overcome:

- Existing solutions are standalone: One system per control center is required, mitigating any economies of scale.
- Existing solutions are single-site-resilient: Solutions are resilient, but if they fail, no remote site can take over and provide resilience while the main site is being restored.
- Existing solutions are customized: Many of these solutions are customized either in hardware or by specific software builds, creating ongoing support and maintenance challenges for organizations in maintaining or upgrading these systems. Customization also creates support challenges in attempting to stay up-to-date and within a manufacturer's support window, with expensive custom support offers being required.

Examples of such existing solutions include Siemens HiCom Trading 300, Northgate with Aastra MX-ONE, Ericsson Feature Phone on GC MD110, and BT Syntegra PV405.

Next-Generation IP-Based Voice Control Systems

Because of the challenges of traditional voice control systems for control centers, Cisco has developed a next-generation IP-based voice control system to overcome the limitations of existing control systems and allow organizations to embrace modern IP-based telephony technologies. This voice control system comprises numerous components to deliver a more effective solution:

- Cisco® Unified Communications Manager (UCM): Cisco Unified Communications Manager is a highly scalable, resilient voice communications platform that is deployed in numerous mission-critical environments. It runs on industry-standard, highly available hardware, offering increased hardware redundancy and lower capital and ongoing support and maintenance costs.
- Cisco VG350 Analog Voice Gateway:
 - Cisco VG350 provides analog-to-IP conversion to allow existing analog attached telephones to be connected into the IP-based solution. This hardware solution attaches up to 96 off-premises analog lines, with online insertion and removal (OIR) capabilities on the two line cards. The chassis can be powered by dual power supply units with a choice of AC or DC power. It has multiple Ethernet interfaces attaching redundantly to a customer's WAN.
 - The Cisco VG350 supports off-premises lite cards, allowing for longer analog cable runs. It also supports the "cable-detect" feature to allow it to poll for cables being connected to its analog port.
- IP Trade - T3203 and T3210 trader turrets: IP Trade provides a purpose-built, high-capacity user interface that allows you to intuitively visualize and prioritize voice and video communications at the touch of a button. You simply log in to the terminal and your full turret profile is applied to the hardware turret that you have logged into.
- Red Box Quantify voice recorder: Red Box Quantify provides a complete set of voice-recording and call-recording software applications. Specifically, you can access these applications directly through portlets on the IP Trade turrets.

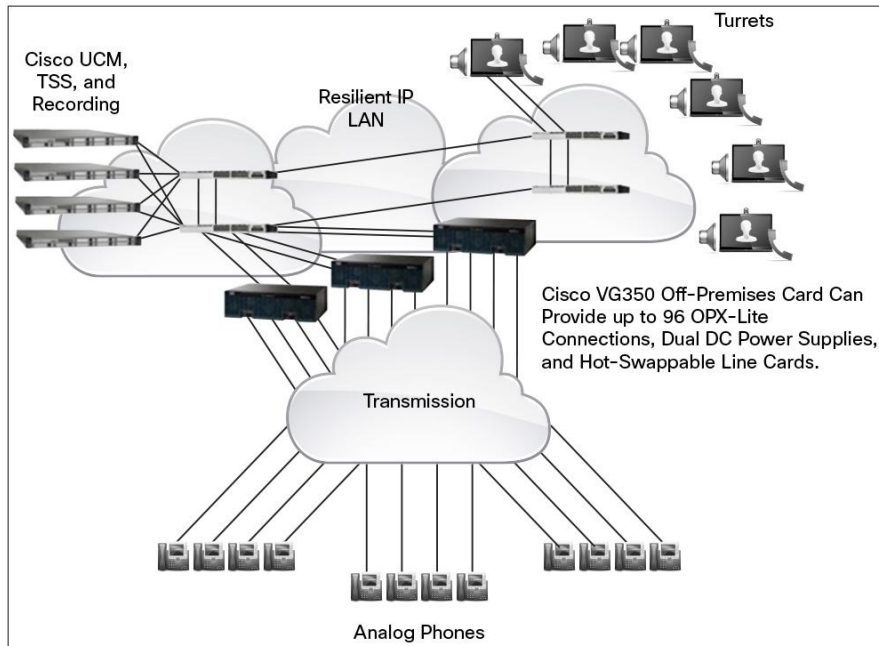
Migration to Next-Generation IP-Based Voice Control Systems

Because many of the existing voice control systems are deployed in mission-critical environments, the ability to migrate from an existing to a newer IP-based solution with as little risk as possible is advisable. Because these IP-based voice control systems are designed in very flexible manners, they lend themselves to easy deployment in an existing location.

Two design options are recommended for initial deployment of IP control systems:

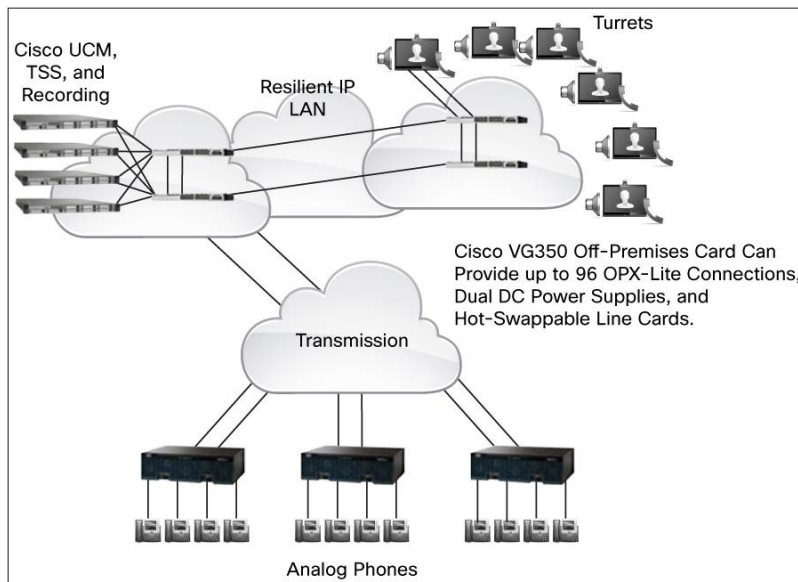
- Collecting analog lines in the centralized control building similar to existing deployments: In this deployment model, all analog phones, cabling, and backhaul transmission methods from the location of the remote phones to the central control room are retained. In the central control room, a bank of Cisco VG350 Analog-to-IP Gateways are used to connect to the existing analog lines being brought into the control room. These gateways are then connected to the local LAN in the control room (Figure 1).

Figure 1. Centralized Analog Gateway



- Collecting analog lines at their sources through Cisco VG350 Analog-to-IP Gateways: In this deployment, VG350 Analog-to-IP Gateways are placed out in the field in the vicinity of a concentrated number of analog phones. The gateways are then connected into the customer's IP WAN and the voice-over-IP (VoIP) traffic is carried over this IP WAN in a redundant fashion back into the control room. The control room receives the VoIP traffic over IP WAN links present in the control room. No analog cabling is connected to the control room (Figure 2).

Figure 2. Distributed Analog Gateway

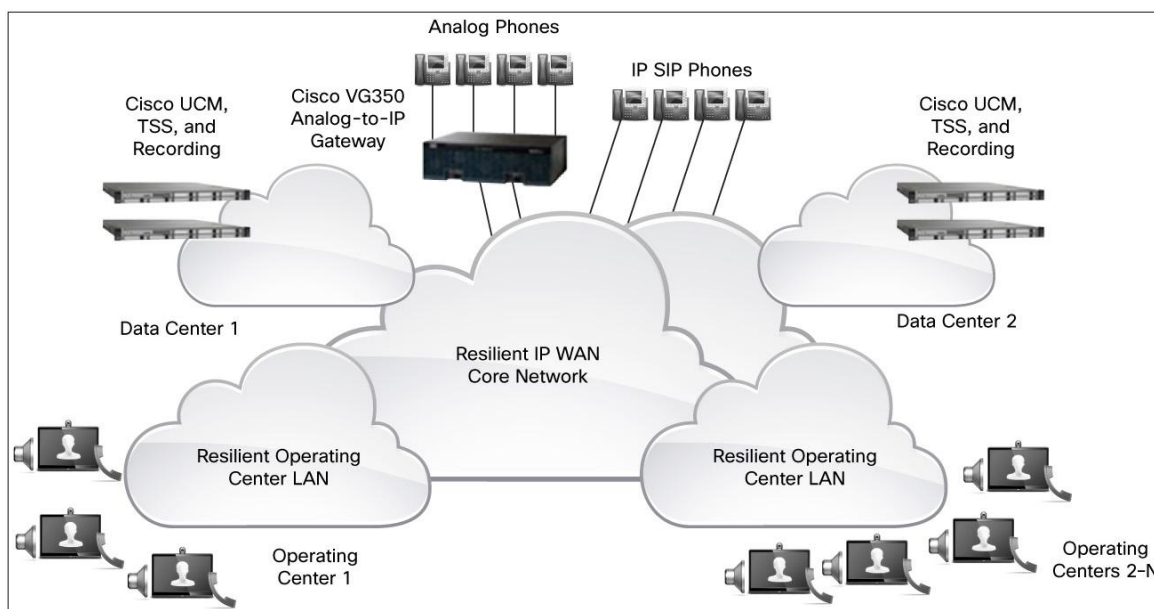


Enhanced Deployment Models of Next-Generation IP-Based Voice Control Systems

One of the core limitations of traditional voice control systems is their restriction to a single platform deployment per each control center they are deployed within. As well as increasing the original capital costs, this solution provides no resilience if the control system fails on site. An additional challenge that these deployments creates is that control systems are purchased over a period of time and disparate control systems from different manufacturers are purchased and deployed into each control center. This situation creates substantial ongoing support and maintenance challenges as well as training challenges when personnel move between control centers. This training problem is particularly challenging as mistakes due to a different human-machine interface (HMI) for the operator can affect the overall operational performance of the control center. It can also affect safety and security, which are critical in both rail- and industrial-based markets.

Using a Cisco next-generation IP-based control system, you can deploy the main voice call control and the required applications to support the turrets centrally in data centers. The turrets support server software and the voice-recording server software. Deployment of these services is usually performed in a redundant design, which allows the resilient portion of the solution to sit in a geographically different location from the primary portion of the solution (Figure 3).

Figure 3. Centralized Concentrator



Summary of Benefits

- Consolidate and converge networks to decrease capital expenditures (CapEx)
- Reduce costs associated with ongoing maintenance and management of disparate networks
- Improve operational efficiencies
- Provide greater resiliency and network redundancy
- Help improve safety and security in mission-critical environments



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