

## VoIP-Enabling a Class 4/5 Switch Network

### VoIP Enabling a Wholesale Network: Before VoIP

Before VoIP, wholesale carriers installed Class 4/5 Points Of Presence (POPs) switches to service a particular market or application. These switches are traditionally connected via expensive, dedicated long-haul circuit-switched interconnections as depicted in Figure 1.

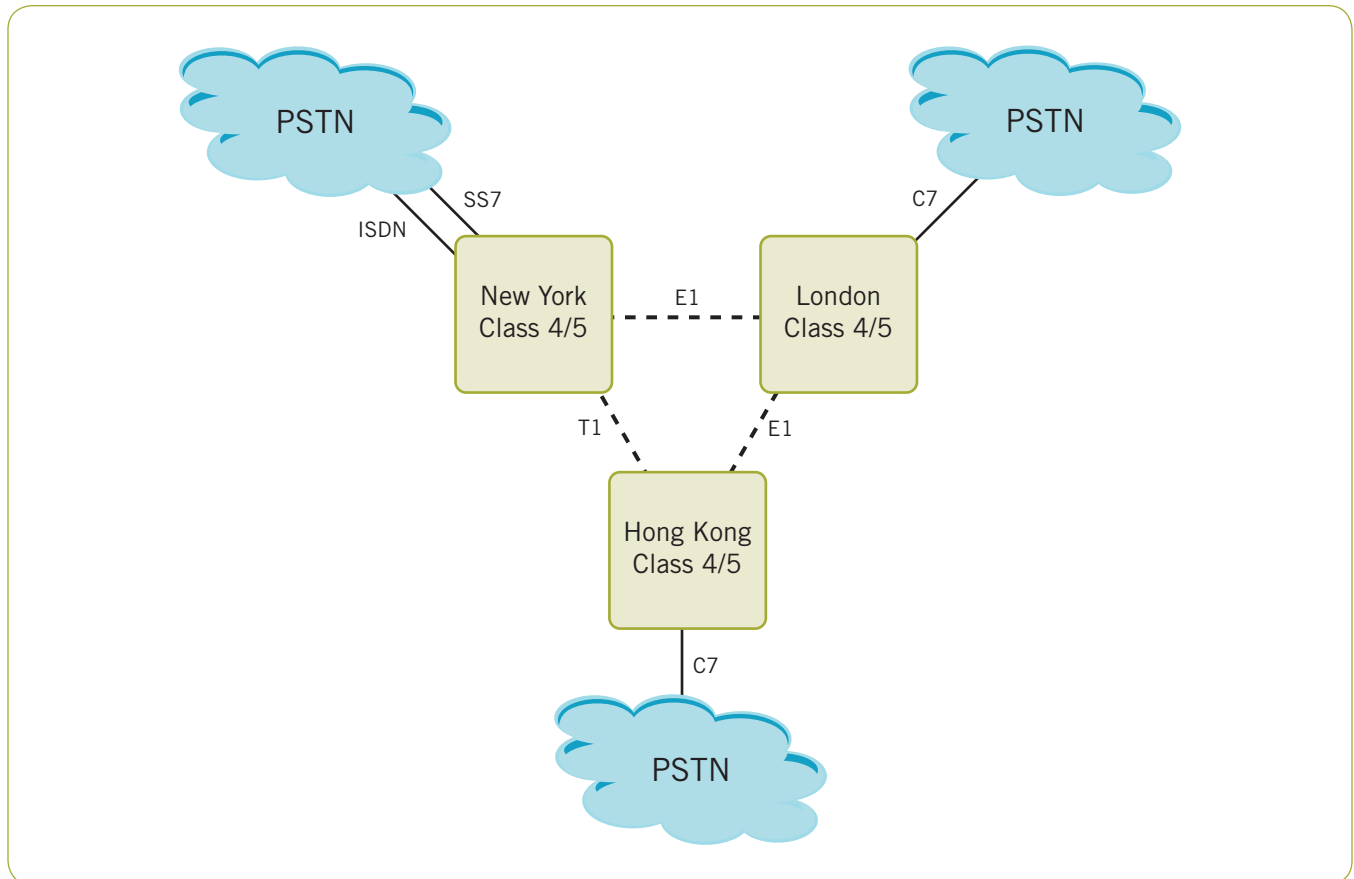


Figure 1. Traditional TDM Switch Interconnections

Circuit-switched capacity is fixed, and provisioning additional circuits can take up to four to six months. In the architecture depicted in Figure 1, the Class 4/5 switches use dedicated circuit-switched interconnections to hand off traffic between the various POPs. With carrier rates changing daily, this architecture makes it difficult to quickly engineer network capacity and manage costs. As VoIP technology matures, a move toward IP interconnection could be considered a viable option.

### Limitations of the First Generation the VoIP Solution

To enable these networks with VoIP, wholesale carriers originally deployed either a softswitch or discrete circuit to VoIP gateways. Figure 2 depicts VoIP enabled with discrete VoIP gateways.

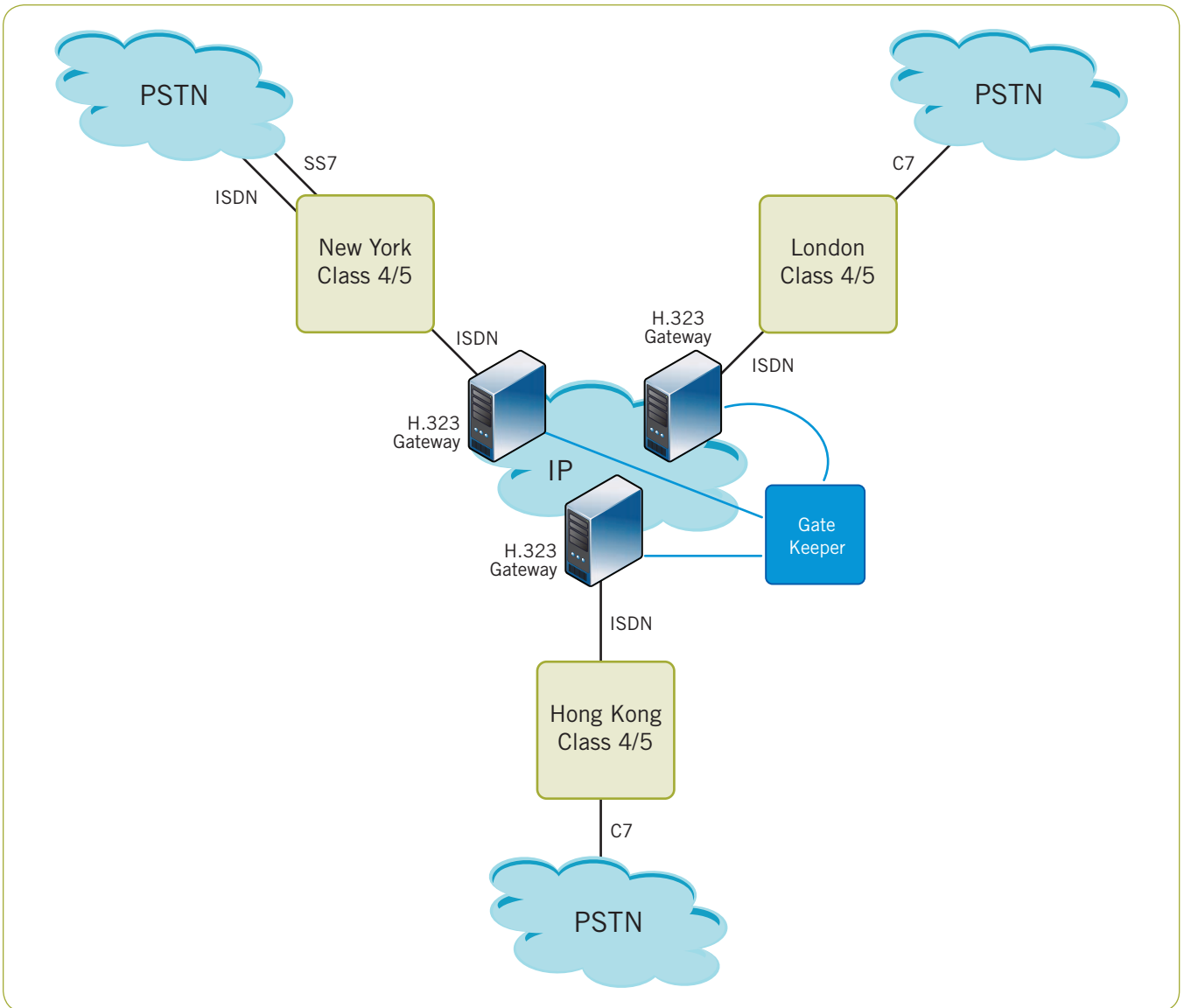


Figure 2. VoIP Enabled with Discrete VoIP Gateways

The advantage of this network design was the scalability and the dynamic nature of resource allocation. If additional capacity were needed between particular cities, more could be allocated immediately without waiting for traditional Time Division Multiplex (TDM) circuits to be provisioned. But several factors weighed against this design, such as Channel Associated Signaling (CAS) signaling, Post Dial Delay (PDD), and lack of call routing information on the TDM interface. Although the Integrated Services Digital Network (ISDN) alleviates the PDD and call routing issues, ISDN ports on Class 4/5 switches are expensive. Most VoIP gateways are managed via a Command Line Interface (CLI) or a third party Element Management System (EMS). The CLI can be cumbersome and presents scaling problems when managing dozens to hundreds of gateways.

An alternative to discrete gateways is the softswitch architecture, but this architecture also has disadvantages, which often include a high cost of entry. In addition, the softswitch architecture is composed of many individual parts: the softswitch, an SS7 signaling server, and trunking gateways. Multiple discrete components increase complexity and costs, and may introduce interoperability issues if products from multiple vendors are used.

As an alternative, legacy Class 4/5 switch manufacturers are offering VoIP upgrades to their existing products, but these can often entail high up-front costs (reflected as capital expense) and can consume large amounts of floor space (reflected as operating expense).

## Dialogic Addresses First Generation VoIP Issues

Dialogic addresses the issues of distributed VoIP components with the Dialogic® IMG 1010 Integrated Media Gateway.

The IMG 1010 integrates SS7 and C7 ISUP signaling with VoIP signaling and can help reduce interconnection costs by eliminating one to two extra network components. It can control up to 32 DS3s of voice circuits through a single pair of signaling links. The Dialogic® Gate Control Element Management System (GCEMS) integrates routing, configuration, translation, and management into a single, scalable, flexible GUI, which can simplify operations and reduce costs.

Dialogic supports the “pay as you grow” philosophy by offering components for expanding systems, which lowers the high initial costs of deploying SS7. For example, a carrier can begin by implementing a single IMG 1010 with integrated SS7 ISUP and support for 4 spans of bearer traffic, and then later expand up to 16 spans via software license or up to 768 channels by adding a second VoIP module.

The IMG 1010 not only scales cost-effectively, but evolves as service provider requirements evolve. Because the IMG 1010 can simultaneously support multiple TDM and IP signaling protocols, service providers can interface to many different types of gateways and carriers. Dialogic® Programmable Protocol Language (PPL) enables providers to simultaneously interoperate with many signaling variants. IMG 1010 support for both PSTN-IP gateway functions and IP-IP transcoding offers users both flexibility and investment protection.

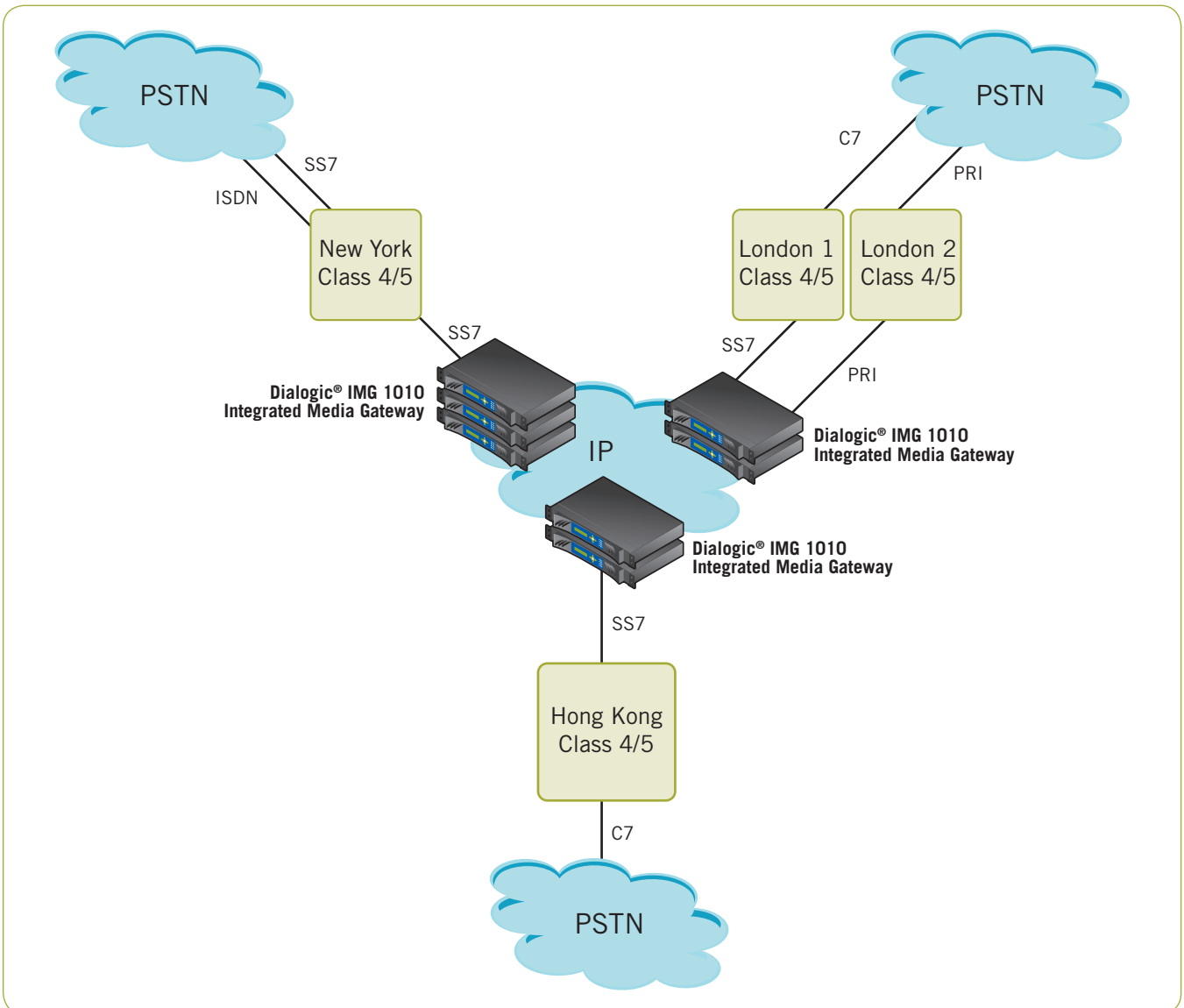


Figure 3. Dialogic® IMG 1010 Integrated Media Gateway Integrated with VoIP Distributed Components

## IMG 1010 Features and Benefits

The Dialogic® IMG 1010 Integrated Media Gateway is a standalone, turnkey VoIP gateway with the following features and benefits.

### Features

- The IMG 1010 integrates SS7 signaling, VoIP, and routing into a single 1U chassis, combining two network elements: the SS7 signaling server and the trunking gateway
- Dialogic's built-in routing technology can eliminate the need for a separate VoIP Gatekeeper or SIP proxy
- Each IMG 1010 supports 66 route tables with 5,000 entries each
- A pair of IMG 1010's can control SS7 voice circuits (also known as Circuit Identification Codes [CICs]) on 30 other IMG 1010s

### Benefits

- Compact 1U chassis; has any-to-any signaling capabilities:
  - SS7 ISUP (ANSI, ITU, and ETSI base variants)
  - H.323 v2
  - SIP (RFC 3261)
  - ISDN PRI
  - CAS
  - SIP-T / SIP- I
- Scalable Density
  - Ranges from 4 spans up to 32 T1s or 24 E1s per 1U chassis
  - Optional DS3 I/O interface
  - Ability to control over 20,000 CICs from a single IMG 1010 SS7 stack (includes support for A-links and F-Links)
  - Up to 512 sessions of transcoding natively supported
- Flexible VoIP Media Support
  - Up to 1024 VoIP channels per coder (G.711, G.723, and G.729)
  - Up to 672 channels for complex coder including iLBC and AMR
  - T.38 and G.711 IP fax support
  - DTMF tone relay support via RFC 2833 or SIP INFO
- GUI-driven Dialogic® Gate Control Element Manager System Software that runs on Red Hat Linux servers

To learn more about Dialogic® products, go to [www.dialogic.com](http://www.dialogic.com)

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