CLARENT®

Clarent®
OpenAccess™ Solution

Convergence solutions for the network edge

Looking to enhance your service offerings to your residential and business customers?

Interested in working with a leader in voice-over-IP solutions to deploy your local access network?

Convergence solutions for the network edge

Clarent OpenAccess Solution

- softswitch
- applications platform
- media gateways

Convergence solutions for the network edge

Local access for a **Global Market**

For years, carrier networks have enjoyed the substantial benefits of converged voice and data, and now with Clarent, the end customer has realistic access to this powerful enabling technology. Converged voice/data applications – high quality voice services and applications over broadband- not only allow service providers to offer new value-added services but also empower end-users with greater flexibility and control over the services and features they want, when they want it. Clarent, the leader in carrier class voice-over-IP (VoIP) solutions, is giving service providers the tools needed to extend powerful voice services and value-added applications to residential and business customers over any broadband access technology. The Clarent OpenAccess Solution consists of a variety of software and hardware products that extend from the customer premises to global networks delivering an end-to- end solution that enables service providers to offer bundled voice/data services to their customers.

Clarent OpenAccess Solution Key Benefits:

- Greater revenue opportunities through enhanced voice/data services
- Lower infrastructure deployment and Operations, Administration and Maintenance (OAM) costs
- PSTN-grade voice quality and reliability
- Distributed architecture that allows excellent scalability at low marginal cost
- Open, standards-based architecture that allows third-party application development
- End-user empowerment through browser-based moves, adds and changes.

Advanced **solutions** based on **forward thinking**

The first stage in the telecommunications revolution, the convergence of voice and data over the existing data network, was mostly about Internet offload – reducing the load on the circuit-switched PSTN network and utilizing existing data networks to carry some of that load. VoIP technology enabled service providers to achieve significant cost savings resulting in cheaper domestic long distance and international minutes for end customers. Clarent has successfully led this market – with a customer roster of global service providers that are household names in 30 countries around the world such as AT&T, British Telecom, Cable and Wireless, China Telecom, Telstra and NTT. This first stage continues to evolve with a better understanding of convergence and consequently, better products; however, Clarent believes that it is only the beginning in terms of exploiting the greatest benefits of convergence: high quality voice services and value-added voice applications that have largely eluded end-customers. Now, with broadband becoming increasingly affordable and ubiquitous, the time is ripe for competitive broadband service providers to offer enhanced services such as unified messaging, user self-provisioning and mobile e-commerce.

Clarent OpenAccess Architecture

The Clarent OpenAccess Solution, built using proven technology employed by the world's largest networks, enables both telco and Internet service providers to deliver value-added voice and data services to existing and new broadband subscribers. Clarent believes that the promise of the VoIP revolution really lies in offering reliable, scalable, high quality and most importantly - on-demand converged voice and data services to end users through a single network. Clarent is committed to working with customers to make this happen.

The Clarent 3-tiered architecture (Figure 1) defines the overall architecture of the entire Clarent line of solutions ranging from Local Access to Carrier. Clarent OpenAccess uses the same 3-tier model of separating and distributing call processing, call control and application / business logic into modular elements. These modular elements can then be distributed anywhere in the network – affording customers unsurpassed flexibility, reliability and scalability that reduces capital outlays and operational costs while enabling them to introduce new revenue-generating services. As illustrated in the architecture diagram above, Clarent is the only company that offers a true end-to-end solution to next-generation service providers. The Clarent distributed architecture practically eliminates any single point of failure in the carrier network and provides geographic diversity. Each component – no matter where it's deployed in the network – is managed separately but designed to communicate with all other elements giving customers seamless functionality with the highest reliability.

The Clarent OpenAccess Solution

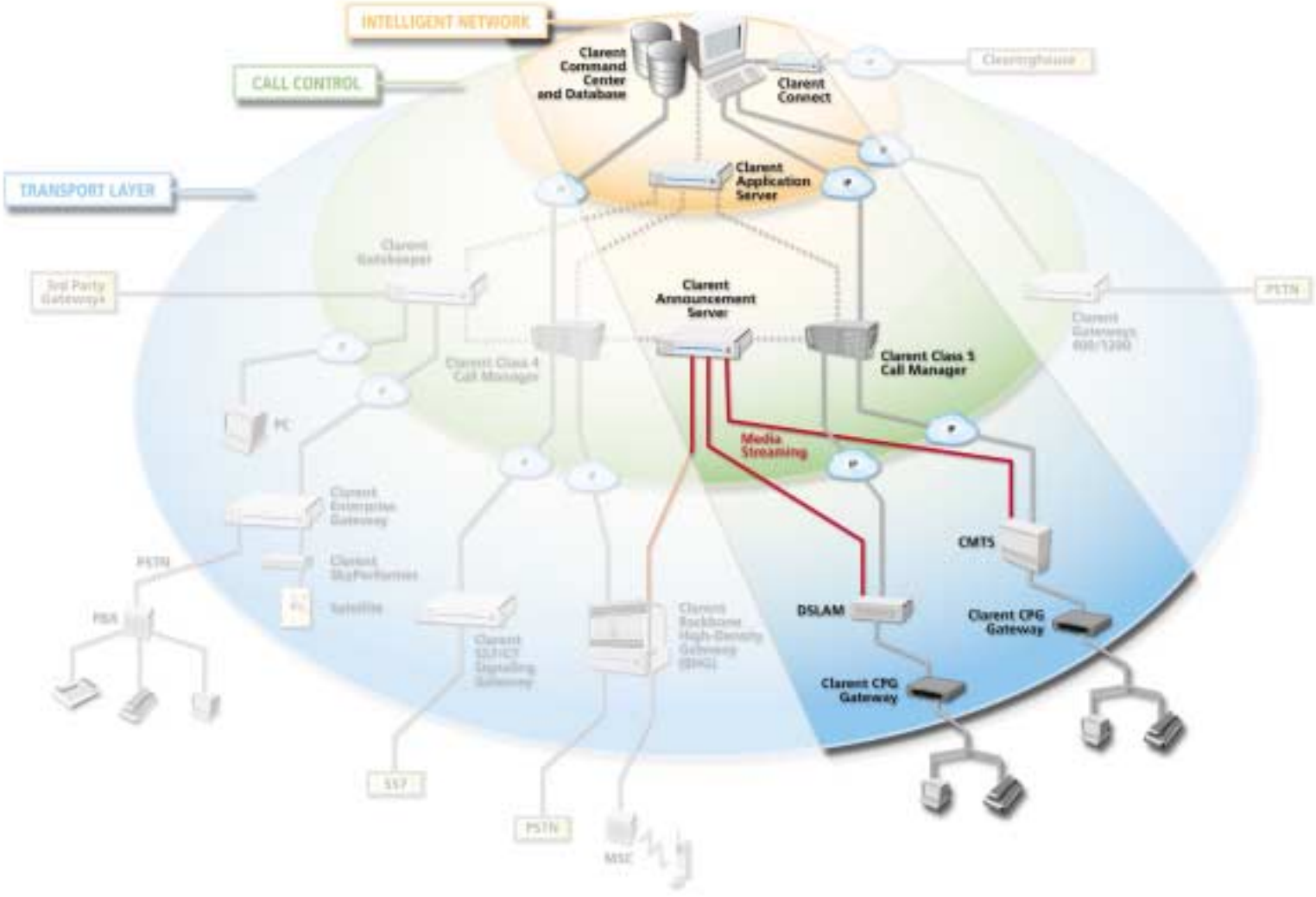

Figure 1. The Clarent OpenAccess three-tiered architecture.

Clarent OpenAccess Solutions

The Clarent OpenAccess Solution allows service providers to offer value-added voice and data services over the "last mile" of any broadband network – be it cable, xDSL, fiber or a wireless local loop. It is designed to provide customers with a distributed, easily managed and highly scalable solution at network end, while ensuring easy deployment of CPE and self-provisioning of services at the consumer premises. Clarent understands and appreciates the fact that a customer's success rests on key business needs such as speed to market, ease of managing and supporting deployments both at the network end as well as at the customer premises. The Clarent OpenAccess Solution is designed specifically to meet that need.

Clarent OpenAccess Solution Components

Clarent Command Center™

The Clarent Command Center is at the heart of the Clarent 3-tiered intelligent network architecture. It enables the implementation of traditional telephony and next generation services, and provides subscriber authentication, call routing information and billing functions. The combination of distributed network intelligence and a centralized database provides for solutions that are highly scaleable. Subscribers, customer premises media gateways (Clarent CPG™) and Clarent Call Managers can be added incrementally without the need for a huge up- front capital expenditure - thus increasing the ROI of the network.

The Clarent Command Center provides several advantages to service providers planning to roll-out telephony services:

- Rich set of services and features that are ready to roll-out to subscribers today
- Distributed architecture that is scalable, reliable and easy to manage, and provides easy implementation of new services across the network
- Open architecture that allows third party developers to create and implement new applications for the Clarent platform
- Commitment to standards and interoperability with other vendor's devices

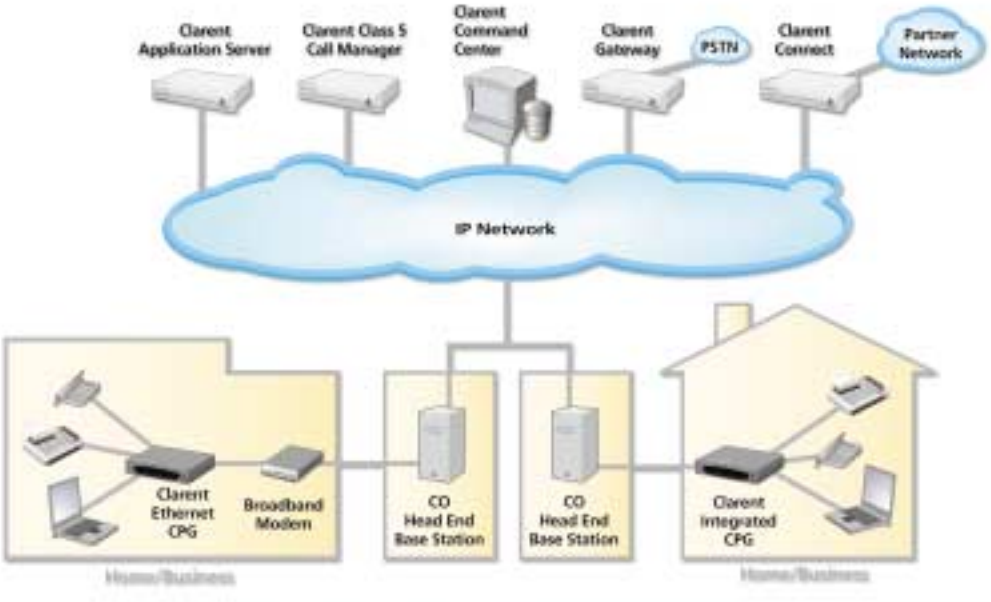

Figure 2. Typical Clarent OpenAccess Solution Deployment

Clarent Class 5 Call Manager

The Clarent Class 5 Call Manager provides call state processing for MGCP-based customer premises media gateways and many of the most popular CLASS services provided by carriers today. The Call Manager interacts with the Clarent Command Center to authenticate subscribers, establish call rates for billing, and provide call routing. A service development kit is also available for creation of new applications. True to the Clarent architecture, signaling is done separately from media streaming (voice and data), enabling support for a large number of subscriber lines, CPG gateways and IP phones on a single Class 5 Call Manager.

Clarent Application Server

Service providers use the Clarent Application Server and Clarent Assist to manage their local access networks. The network administrator is able to:

- Access real-time configuration information
- Download new services/applications across the network
- Download software updates to the Clarent Call Manager or customer premises media gateways
- Provide distributed network administration from any web browser in the world.

The Clarent user interface is a simple to use java-based applet that can be customized for any user group. Clarent Assist is a user-friendly, web-based management tool for network managers, which allows them to view and configure the port status of any Clarent Call Manager or Clarent CPG gateway.

Clarent Address Server

The Clarent Address Server is a network appliance that provides Network Address Translation (NAT) functionality to the IP phones and customer premises media gateways that are behind the firewall. It allows IP phones and gateways to communicate with the Clarent Call Manager in the network, eliminating the need to put them outside the firewall and thereby reducing firewall traffic. It is an intelligent NAT device that is “application aware” and knows how to parse the body of the message to translate the port address. This allows Clarent CPG gateways and IP phones to communicate with other gateways and/or IP phones behind the firewall as well as in the public internet.

The Clarent Address Server is simple to use and transparent to the Class 5 Call Manager and the media gateways - no configuration changes occur on these devices.

Clarent Customer Premises Media Gateways

Clarent’s customer premises media gateways (Clarent CPG) provides a mechanism for connecting 2, 4 or 24 standard telephone sets to a voice-enabled IP local access network. The network interfaces offered include DSL, Cable, Ethernet and ISDN. Clarent offers media gateways that connect to a broadband modem as well as integrated access devices (IADs) that include an in-built modem.

Dial tone, ringing and busy signals are generated in the Clarent CPG. Voice encoding is also performed in the gateway, using standards G.711, G.723, G.726 and G.729a voice codecs. Fax encoding is supported using T.38 and G.711 fax calls, and dial-up modems are supported using G.711. Also, a LAN Ethernet port on the gateway allows connection of a small router, hub or computer with an Ethernet interface card.

IP Phones

Clarent has developed and ensured the interoperability of several standards-based IP Phones. These Qos-enabled phones match the broad range of capabilities of high-end PSTN phones, such as speakerphone, speed dialing, and caller name display. Clarent IP phones leverage 10/100 Base T Ethernet connectivity to provide high-quality voice services to residential and business customers. Clarent IP phones are easy to setup and manage, requiring virtually no intervention by the end-user.

Database

The Clarent network uses a centralized, standards-compliant database to store account information, billing data and system settings for the network.

The Clarent OpenAccess Solution provides a platform for new advanced services such as unified messaging, mobile commerce and interactive information downloads, in addition to many of the CLASS services that carriers offer today, including call forwarding, call waiting, caller ID, call return, speed dial etc. These qualities, together with extensive service and network management tools, make Clarent the ideal solution for competitive service providers looking to offer new services to their broadband customers.

Clarent’s Professional Services organization is highly experienced in the deploymentof IP telephony networks, and in the integration of provisioning, network management and billing systems. Customers can rest easy knowing that a highly professional, experienced support organization will be standing by to assist in all phases of pre- and post-deployment operations.

Clarent OpenAccess Solution for Cable Operators

The Clarent OpenAccess Solution has been designed to allow cable operators to offer "Plain Old Telephone Service" (POTS), and advanced VoIP services over their networks, in compliance with PacketCable™ specifications for packetized voice services. The Clarent Class 5 Call Manager acts as a Media Gateway Controller in the PacketCable model by controlling customer premises gateways for call control signaling functions and delivering enhanced telephony services. This solution allows cable operators to deploy telephony service in a network deploying DOCSIS compatible data services, providing lower initial capital expenditures than for the deployment of the proprietary, circuit-switched solutions being deployed today. The Clarent solution also creates efficiencies in bandwidth usage and in operations for the deployment, provisioning and maintenance of service. The Clarent solution is compatible with DOCSIS, other international standards for data services, as well as with proprietary data solutions.

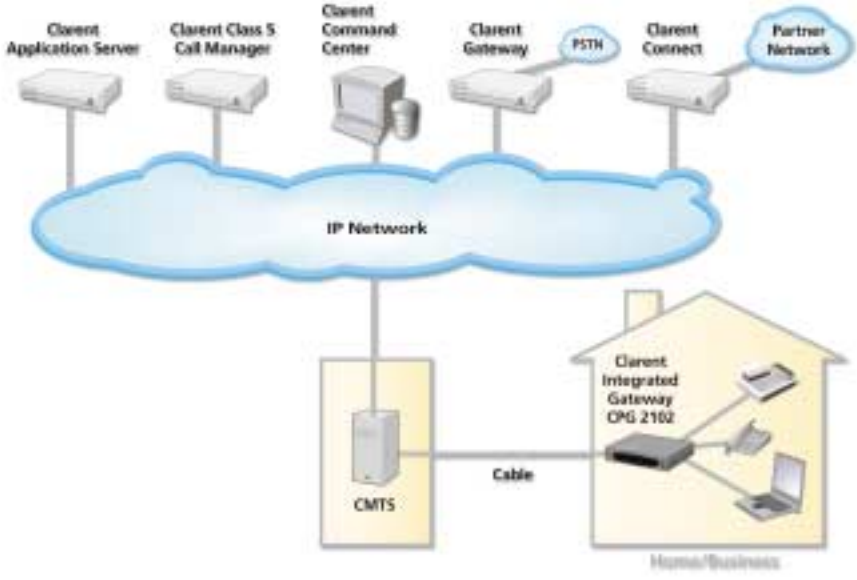

Figure 3. The Clarent OpenAccess Solution for Cable

Clarent OpenAccess Solution for DSL and other Broadband Service Providers

Competitive Local Exchange Carriers (CLECs), Data Local Exchange Carriers (DLECs), and Internet Service Providers (ISPs) offering DSL service to homes and small offices can now offer enhanced voice services bundled with their data services. Clarent offers a variety of customer premises media gateways that work with any broadband access technology and access-specific integrated access devices (IADs) that come with an built-in DSL modem – giving customers the flexibility to offer a variety of deployment scenarios and preserving the end-user's investment in the existing broadband connection.

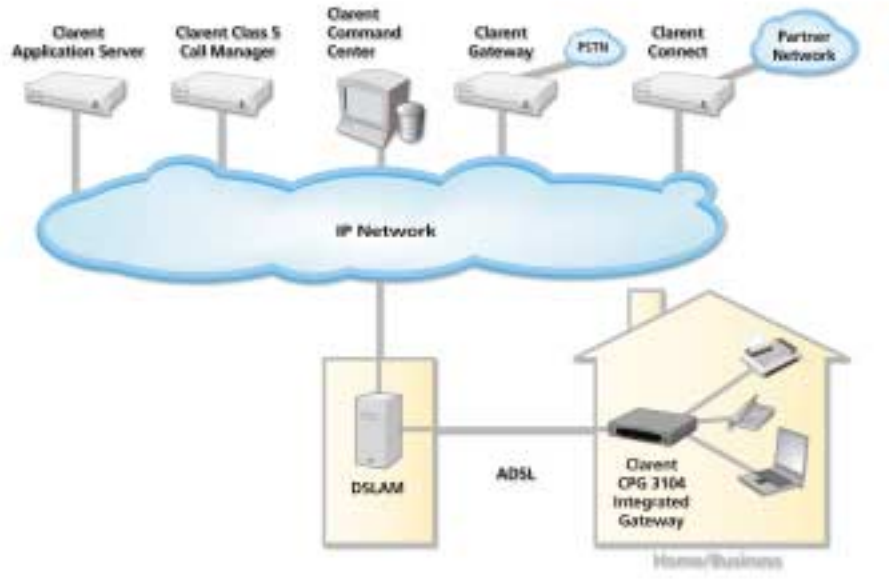

Figure 4. The Clarent OpenAccess Solution for DSL/other Broadband.

We can **help** you **deliver** on the **promise**

Convergence is taken to the next level with the Clarent OpenAccess Solution. The power and benefits of the Clarent distributed, 3-tiered architecture are efficiently brought to the network edge, enabling service providers to create and offer enhanced voice/data services to their new and existing broadband customers while empowering end-customers to get more out of their broadband connection. The Clarent OpenAccess™ Solution exemplifies the best of what convergence has to offer, and with the vision, experience and technology Clarent brings, customers can count on intelligent, real world solutions for the deployment and management of today's networks. To learn more, call Clarent today or visit us on the Web at **www.clarent.com**.

End to **end,** **anywhere** in the **world** **Now!**

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