Delivering Secure IP-Based Services

Jasomi Uses Intel® Technology and AdvancedTCA for Its High-End Carrier and IMS Session Border Controller

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Originally developed to provide security and access services in Voice over IP (VoIP) networks, the role of the session border controller has grown as service providers accelerate their delivery of IP-based services. A leading developer of session border controllers based on Intel® technology, Jasomi Networks has continued to advance the state-of-the-art technology used in its PeerPoint products by using the AdvancedTCA* form factor, programmable Intel® network processors, and Intel NetStructure® boards.*

Business Challenge

For the past decade, network operators of all types and sizes have been facing the challenge of diversifying their service offerings to increase revenue and attract new customers while reducing churn among their current ones. Recently these service providers have been embracing the Internet Protocol (IP) as the means to deliver rich multimedia content on a wired or wireless network. IP easily enables voice, video, and data "triple play" capabilities for IP endpoints on a broadband Internet connection.

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Jasomi Networks
The Network Boundary Experts

Residential Services	Business Services
On-demand video/movies	Sales force automation applications
Music	Enterprise applications
Video streaming of live content	Rich content distribution
Messaging	Permission-based marketing
Unified messaging	Scheduling and reservation tools
Multimedia messaging	Presence management
Video messaging	Unified messaging
Picture messaging	Distributed call center
Multimedia gaming	Flexible device options
Multimedia gambling	Instant messaging
	Audio and video conferencing
	Desktop application sharing
	Video content delivery

Table 1. Residential and Business Services

DELIVERING SERVICES

Residential and business customers are interested in very different kinds of services as can easily be seen in the examples given in Table 1. Only a few, such as unified messaging, intersect both groups.

Delivering all these services, and adding new ones quickly, presents critical security, service assurance, peering, and legal compliance issues similar to those encountered when deploying basic VoIP services. These include:

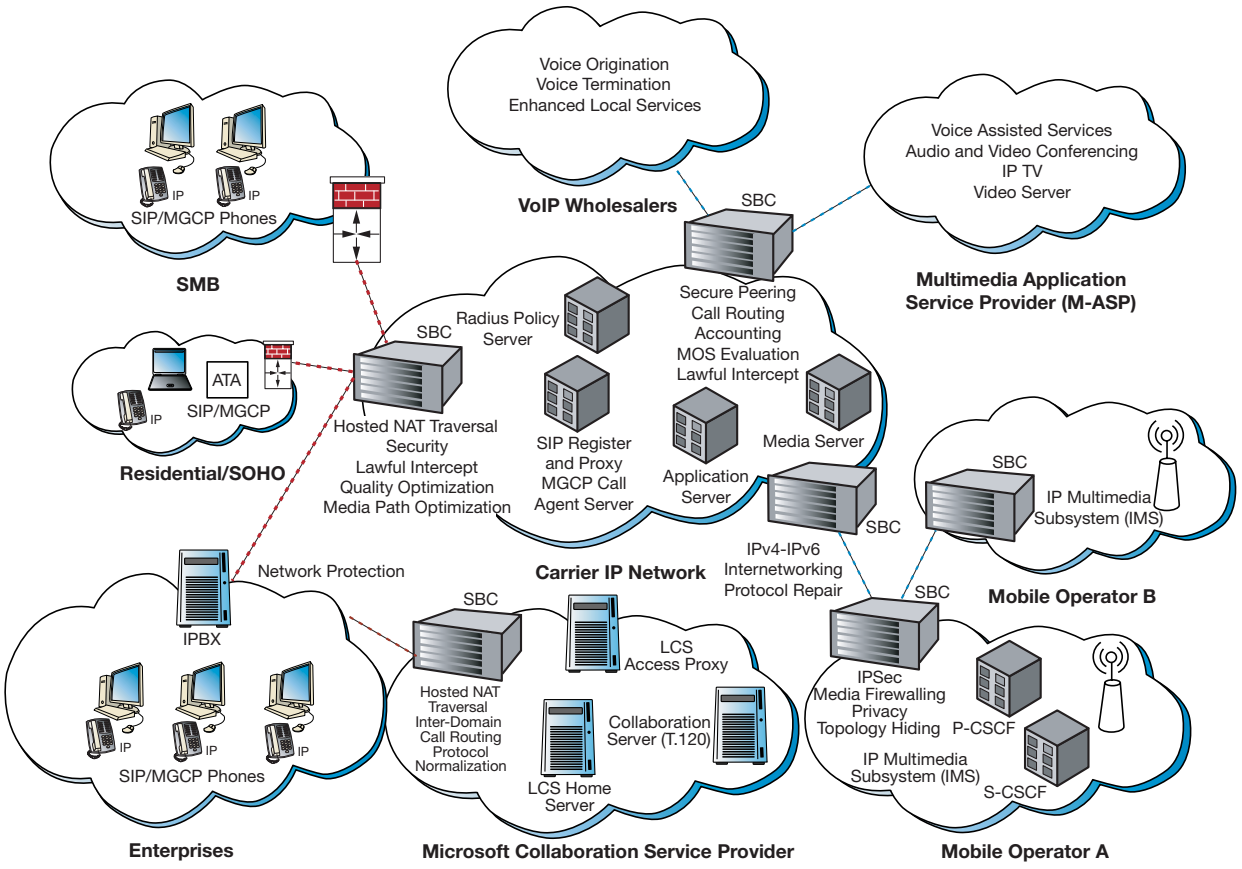
- Security
  - — End-to-end encryption
  - — Topology hiding
  - — Prevention of distributed denial of service attacks
  - — Prevention of SIP-based spam and viruses
- Service assurance
  - — Firewall and Network Address Translation (NAT) traversal
  - — Quality of Service (QoS) enforcement
  - — Class of service policies
  - — Interoperability
- Carrier-to-carrier peering
  - — Transcoding
  - — Auditing
- Legal compliance
  - — Call intercept
  - — Call logging

The session border controller is the key network component that service providers have embraced to resolve these security, service assurance, peering, and legal compliance issues.

WHAT IS A SESSION BORDER CONTROLLER?

Session border controllers were created to intercept and process calls on a VoIP network, allowing a single element to monitor not only the signaling traffic but also the media traffic. This does not mean that the session border controller always proxies media; as one approach to total QoS, the session border controller has the ability to intelligently route media — for example, directly between endpoints.

Session border controllers can be used along with firewalls to monitor media delivery on a private, protected network. On a public network session border controllers enable the use of appropriate protocols from private networks with Internet connections using NAT. Session border controllers can also perform transcoding of the media stream when different coders are in use and can provide security features such as denial of service protection, call filtering, bandwidth management, etc.



Source: Jasomi

Figure 1. Session Border Controller Deployment

Figure 1 illustrates how session border controllers can be deployed in a network. The session border controllers are represented as six-blade chassis and marked with the acronym "SBC."

The Jasomi Networks Solution

Jasomi Networks is a leading worldwide provider of session border controller technology with many years of experience in IP packet processing in the VoIP market segment. The company's open standards-based, modular communications platform is used by service providers and enterprises worldwide and has been running in production environments since 2002.

Jasomi is a pioneer in the move to the Advanced Telecom Computing Architecture (AdvancedTCA or ATCA*) platform, and both the signaling and media engines of its PeerPoint C and PeerPoint A series session border controllers have been ported to AdvancedTCA and now offer extremely high call density and resiliency.

Both the PeerPoint C and PeerPoint A series are based on Intel® technology and driven by PeerPointOS with media and control core engines integrated into a hardened Linux* kernel. On the PeerPoint C chassis, PeerPointOS has been optimized to run on Intel® Xeon™ processors. Jasomi has ported its media core and control core engines on the PeerPoint A500 series, which is capable of supporting 80,000 concurrent calls, using blades with dual Intel Xeon processors and two Intel® IXP2850 network processors.

KEY CAPABILITIES

A few of the key capabilities of Jasomi session border controllers are discussed below.

Far End NAT Traversal Service

The most common problem that service providers encounter when deploying hosted services is the inability for subscribers' voice equipment to work seamlessly behind NAT equipment and firewalls. PeerPoint ensures that subscribers can connect anywhere, any time without having to reconfigure their NAT/firewall equipment.

Security

The session border controller protects the service provider's back-end servers from potential security breaches. As it sits at the network edge between backend servers and Internet-based users, the session border controller intelligently lets valid multimedia traffic through, and rejects and reports malicious traffic. The session border controller hides the internal network topology information, which would be otherwise exposed by signaling protocols such as the Session Initiation Protocol (SIP) or Media Gateway Control Protocol (MGCP). As rollouts of 3G networks continue to accelerate and frameworks such as the IP Multimedia Subsystem (IMS) gain momentum, PeerPoint can act as a security gateway enabling secure Transport Layer Security (TLS) or IPsec connections, which is a requirement of the 3GPP* IMS specification

PSTN and IMS Peering Services

PeerPoint session border controllers help service providers drive costs down and reach new market segments by enabling access to cheaper PSTN gateways through peering agreements with VoIP wholesalers. Using an Intel based AdvancedTCA platform, PeerPoint can generate and report real-time Mean Opinion Scores (MOS) scores to ensure that a service level agreement (SLA) is satisfied.

PeerPoint also supports transcoding between low bandwidth coders such as G.723 and G.729 and a more popular coder such as G.711.

Peering allows access to multimedia applications such as hosted videoconferencing servers, video services, or access to an IMS-based network. PeerPoint can provide the functional "glue" between the SIP and 3GPP network for IPv4/IPv6 conversion, protocol conversion, and encryption.

Audit, Management, and Problem Isolation Services

Since the session border controller is part of the media and signaling path, it is ideally located to collect forensic data on QoS metrics, remote devices, and voice quality to help isolate telephony issues or impose an SLA on peering partners.

Continuous Service Assurance

PeerPointOS offers resiliency during planned maintenance, system outages, or network outages, or when a back-end server becomes unavailable. The redundancy, scalability, and high-availability features enabled by AdvancedTCA make it the especially effective for carrier-grade solutions in this area.

Technologies

Jasomi pursued a demanding selection process before deciding to employ all of the technologies discussed below.

AdvancedTCA

Modular infrastructures have been prevalent in packet-based data networks where standardization and flexibility have proven their value. However, communications networks have a different set of criteria, and the challenge in the last few years has been to create an infrastructure that can provide the high availability, "five-nines" reliability, and excellent performance expected of telecom equipment.

Because of the success of modular infrastructure in data networks, more than 100 communications industry leaders have been working with the standards organization PICMG to create AdvancedTCA, a modular platform architecture designed specifically to address the requirements of the communications industry. A modular platform architecture provides the following benefits for equipment manufacturers such as Jasomi:

- **Lower development costs and fast time-to-market** — Equipment manufacturers can focus on platform differentiation, cutting development time while delivering solutions with increased value.
- **Solid platform strategy** — Building with industry standard components enables flexibility and proven scalability.
- **Higher density and integration** — Using Intel processors allows Jasomi to be at the leading edge of calls per U of rack space. Having a standard AdvancedTCA backplane and architecture allows more system components to be managed together in a cohesive and comprehensive manner.
- **Network evolution managed with confidence** — Moving to a converged, all-IP network requires the flexibility that industry standard, modular network elements deliver.

PROGRAMMABLE INTEL® NETWORK PROCESSORS

Jasomi session border controllers require high-performance, encryption support, extensive software programmability, and broad availability of third-party hardware from a robust ecosystem such as the Intel® Communications Alliance. Based on its rigorous requirements, the Intel IXP2850 network processor became Jasomi's first choice.

The ability to support high-speed transport using programmable network processors (NPUs) is fundamental to building flexible and adaptable network elements, such as session border controllers. A custom ASIC can take many months to develop. Intel network processors can be programmed (or reprogrammed) in a small fraction of that time, providing equipment manufacturers such as Jasomi with a very efficient way to support multiple and constantly evolving protocols. These processors bring the kind of flexibility and affordability to network infrastructure design that Intel® Architecture processors have long provided for mainstream computer applications.

SECURE PACKET PROCESSING BLADES

The Intel NetStructure IXB28504xGbEF is a high-performance secure packet processing blade with the AdvancedTCA form factor, which uses the Intel IXP2850 to provide optimized packet and content processing functions for IMS applications. The IXB28504xGbEF acts as a security gateway and uses the two integrated cryptographic units in the IXP2850 to accelerate IPsec cryptographic algorithms such as the Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES). The IXB28504xGbEF is designed to provide high-performance packet processing for up to 4 Gbps of Ethernet traffic and features a 4x1Gbps I/O interface to the external WAN or LAN. The Intel design provides a highly available system with redundant and partitioned paths for control and payload traffic.

Architecture

A modular communications platform architecture, based on open standards such as AdvancedTCA and Intel building blocks was a natural choice for Jasomi Networks' next-generation communications equipment designs. Along with support for standards such as SIP, MGCP, TLS, IPSec, and DiffServ, Jasomi required the flexibility, scalability, and carrier-grade performance that an Intel architecture-based AdvancedTCA solution offered.

TIME TO MARKET

In order to speed time-to-market, Jasomi Networks joined forces with IP Fabrics, an Intel® Communications Alliance member, to quickly migrate the data plane portion of its application to an open standards-based NPU platform. By using the skills and expertise of IP Fabrics, Jasomi was able to focus on its application and save the time and resources that would otherwise have been needed to bring its engineers up to speed on the internals of the IXP2850. IP Fabrics enabled a rapid application development approach with its Packet Processing Language (PPL) for the IXP2850, which handles the heavy throughput and encryption requirements of the Jasomi application.

MODULARITY

The open standards-based modular architecture of the PeerPoint session border controller enabled by Intel building blocks delivers flexibility and scalability to match the demanding needs of today's service provider networks. Intel's packet processing blade provides direct access to all traffic on the wire, allowing Jasomi's engineers maximum speed and flexibility when designing the bulk-traffic processing algorithms necessary to drive the PeerPointOS. Traffic paths inside the data plane are orthogonal, enabling the deployment of a multiple-port NPU blade in a variety of network configurations with negligible performance impact.

Jasomi uses Intel's high-performance packet processing blades, featuring the IXP2850, together with blades using dual Intel Xeon processors. These are deployed in a two-tier architecture with the packet processing blades at the front-end providing bulk traffic filtering and routine application offloading for the CPU backend.

SCALABILITY

The fact that scaling is often non-linear between signaling and media loads presented a challenge. Jasomi addressed this challenge by cleanly separating the two engines, allowing for an NxM interconnect. The Intel packet and compute processing blades in this design can be scaled independently, allowing extra signaling horsepower to be added for those environments

with a large amount for SIP overhead (for example, in rich presence systems) and extra media processing for those environments with heavy media requirements (for example, for video or file sharing). Control of the blades is accomplished with a lightweight protocol running either on the backplane or across the network, allowing, for example, a chassis of packet processing blades to run next to a chassis of signaling processors, delivering scalable performance and redundancy.

REDUNDANCY

Stateful failover is available both within an AdvancedTCA chassis and between multiple AdvancedTCA chassis, and state synchronization can run on the backplane for internal applications. In this way, the modular approach of the AdvancedTCA architecture is fully utilized to facilitate fast and efficient session border controller functionality.

Summary

The session border controller market segment is highly competitive and dynamic. Using Intel building blocks allowed Jasomi to come first to market with a session border controller based on the AdvancedTCA specification and offering the highest level of call density and resiliency in the industry.

Acronyms

3GPP	Third Generation Partnership Project
ASIC	Application-Specific Integrated Circuit
ATCA	Advanced Telecom Computing Architecture (AdvancedTCA)
CRBT	Color Ring Back Tones
DiffServ	Differential Services
IMS	IP Multimedia Subsystem
IP	Internet Protocol
IPsec	IP Security
MGCP	Media Gateway Control Protocol
MOS	Mean Opinion Score
NAT	Network Address Translation
NPU	Network Processing Unit
PPL	Packet Processing Language
PSTN	Public Switched Telephone Network
QoS	Quality of Service
SIP	Session Initiation Protocol
SLA	Service Level Agreement
TLS	Transport Layer Security
VM	Virtual Machine
VoIP	Voice over IP

About Jasomi Networks

Jasomi Networks enables VoIP for carriers, enterprises, and service providers worldwide. By providing the technology that allows VoIP services to be rolled out economically and securely in complex multi-bordered networks, Jasomi is an integral part of making VoIP work. Jasomi's product line complements today's existing security and networking infrastructure, providing VoIP connectivity across network security boundaries without requiring network re-architecting. For more information, visit http://www.jasomi.com.

Learn More about this Innovative Solution

For general information, proof points, and case studies about the products described in this white paper, visit http://www.jasomi.com and http://www.intel.com/go/telecom. Learn more about the Intel Communications Alliance at http://www.intel.com/go/ica.

For more information

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