ORACLE COMMUNICATIONS

An Oracle White Paper
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Oracle Improves Communications and Reduces Costs with SIP Trunking

using Acme Packet Enterprise Session Border Controllers

ORACLE

Executive Overview

Oracle employs more than 122,000 workers in 500+ offices across the globe. The company's Global IT (GIT) organization continuously seeks innovative and cost-effective ways to enhance customer interactions, boost employee productivity, and improve communications amongst its highly distributed and mobile workforce.

To that end, the company deployed Oracle's Acme Packet Net-Net Enterprise Session Director Enterprise Session Border Controllers (E-SBCs) to enable secure and reliable SIP (Session Initiation Protocol) trunking services. By migrating to an end-to-end IP architecture, and implementing SIP trunks, Oracle has consolidated and simplified its telephony infrastructure; significantly improved scalability, service agility, and reliability; and dramatically reduced telecommunications expenses.

Two cost-savings projects have taken advantage of Acme Packet E-SBCs:

(1) **SIP trunking to cloud-based audio conferencing services**

Oracle uses a third-party cloud-based service for worldwide audio conferencing. Previously, the Oracle main campus and regional offices were connected to the conferencing service via dedicated PRI (Primary Rate Interface) circuits. By connecting to the conferencing service provider via a SIP trunking service, Oracle GIT has realized a cumulative **$18 million in cost savings** since 2010, while experiencing a 32% increase in minutes of use to over 60 million minutes per month.

(2) **Consolidation of voice telephony infrastructure with SIP trunking**

Oracle migrated its legacy corporate voice network to an all-IP infrastructure, eliminating dozens of legacy voice gateways and hundreds of legacy circuits. In the United States the company replaced multiple Public Switched Telephone Network (PSTN) carriers with a single SIP trunk service provider. By negotiating aggressive volume discounts with a single telecommunications service provider Oracle GIT expects to **save as much as $3 million** annually.

SIP trunking to cloud-based audio conferencing services

Oracle utilizes a third-party hosted service provider for worldwide audio conferencing. Office workers and remote employees use the service to collaborate, and to communicate with customers and business partners.

Before

On its main campus and in larger regional offices, Oracle connected its Cisco® Unified Communications Manager IP Telephony platforms to the hosted conferencing provider using conventional trunks. Employees in smaller locations or working remotely, customers and partners accessed the conferencing service via the PSTN.

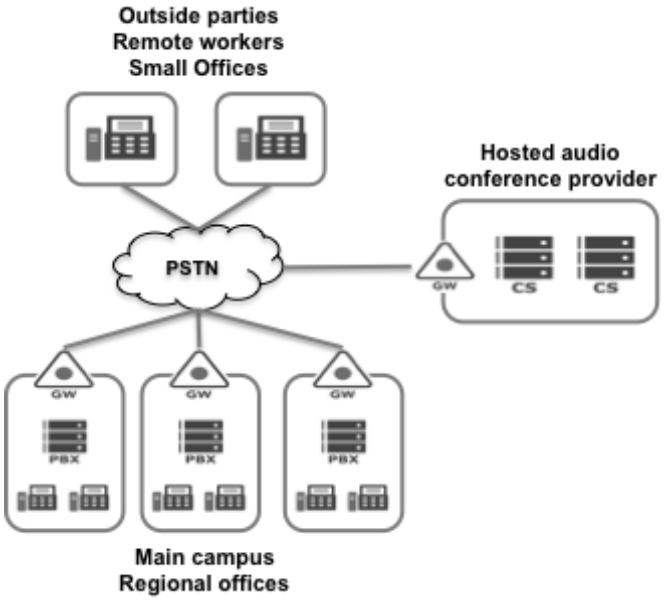

Figure 1: Distributed TDM trunks and switched connections are used to access conferencing services

Challenge

- *Reduce costs to access cloud-based audio conferencing services from across the company's worldwide offices*
- *Build foundation for migration to an end-to-end IP network for all telecommunications while mitigating security, reliability, and interoperability concerns*

Solution

- *Replace legacy dedicated TDM trunks with lower cost and more flexible SIP trunks for access to conferencing and other telecommunications services*
- *Deploy Acme Packet E-SBCs to secure and control the company's SIP trunking*

Expanding capacity or re-provisioning the TDM (time-division multiplexing) infrastructure proved difficult - especially in international locations where adding PRI (primary rate interface) circuits could take weeks or even months. A more flexible and cost-effective solution that leveraged the corporate private IP data network and SIP trunking services was desired.

Implementing an end-to-end IP communications network and deploying SIP trunking services introduces a variety of connectivity, security, and control challenges:

- **Connectivity Challenges**: SIP specifications are less rigid than traditional ITU telecom specifications. The signaling interface between a SIP trunk service and on-premise communications systems may be implemented in different ways or may include or exclude optional SIP functions.

- **Security Threats**: SIP trunks and Internet-facing interfaces expose the IT infrastructure to a wide range of threats and service quality problems, including Denial of Service (DoS) attacks, viruses, and IP telephony spam.

- **Limited Control**: IT organizations often need to route sessions or distribute traffic across SIP trunks to optimize performance, ensure availability, or meet other critical service objectives.

Conventional IP security devices – firewalls, intrusion detection and prevention systems, and anti-malware solutions – weren't designed to control real-time communications sessions and don't address the unique security or service quality concerns associated with real-time communications. Oracle GIT sought a session border control solution to protect and control its SIP trunking borders and to enable secure and reliable communications for Internet users.

After

After an extensive RFP process and exhaustive lab evaluation involving several competitive solutions, the Acme Packet Net-Net Enterprise Session Director enterprise session border controller (E-SBC) was selected as the foundation for Oracle's next generation telephony network. The Acme Packet E-SBC is specifically designed to address the unique connectivity, security, and control challenges enterprises typically encounter when introducing SIP trunking services and implementing all-IP communications networks. Acme Packet's E-SBC was primarily selected due to its unique features, security, flexibility, scalability and reputation as a carrier-grade product.[1]

Dedicated legacy TDM trunk connections to the audio conferencing provider were replaced with nine SIP trunks distributed globally, each with a high availability Acme Packet E-SBC pair. SIP sessions from regional offices are backhauled across the corporate IP network and handed off to the SIP trunking service. The Acme Packet E-SBCs protect and control the SIP trunking borders and enable secure access for Internet-based users (remote workers, mobile users, and small offices) using SIP endpoints.

The Acme Packet E-SBCs protect the company's IT infrastructure and Cisco UC environment against denial-of-service attacks and service overloads, and provide comprehensive protocol normalization and mediation functions that eliminate interoperability barriers with SIP-based elements residing in the SIP trunk service provider and hosted conference provider networks.

[1] Note: Three years later, in February 2013, Oracle announced its acquisition of Acme Packet and made the company's technology a core offering in its portfolio, enabling customers to more rapidly innovate while simplifying their IT and network infrastructures.

By leveraging Acme Packet E-SBCs in the construction of an end-to-end IP network, Oracle GIT was able to eliminate legacy infrastructure inefficiencies and decrease OPEX without sacrificing voice quality or service availability.

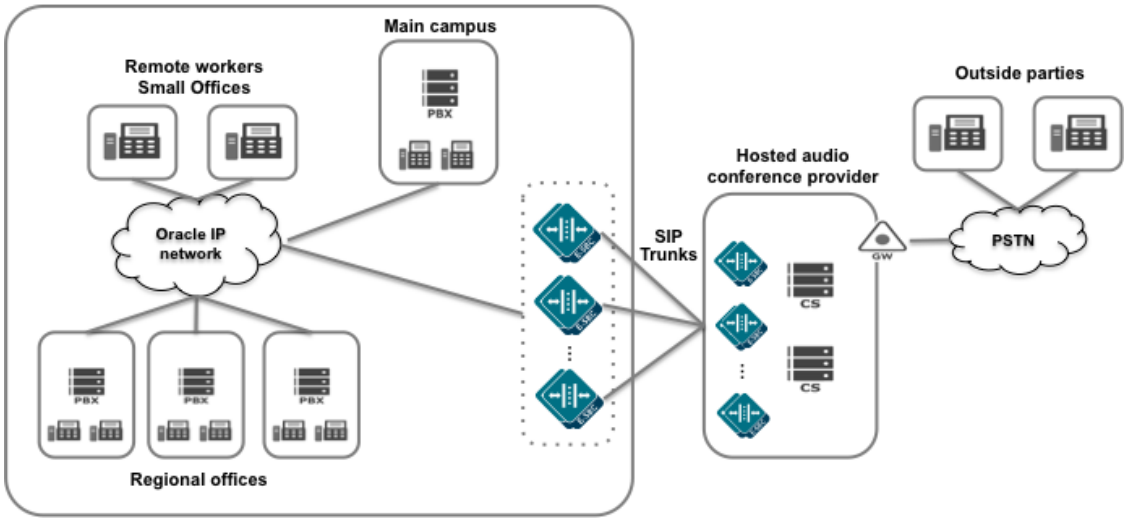

Figure 2: SIP trunks located in central data centers provide access to conferencing services and user traffic is backahuled over the Oracle private IP network

Results

By migrating to an IP-based infrastructure and a SIP trunking service, Oracle GIT was able to:

- Contain telecommunications cost and complexity by consolidating trunks and connecting directly to the cloud-based conferencing service via SIP
- Avoid PSTN toll charges by backhauling traffic across the corporate IP network: On-net calls cost 55% less than off-net calls, resulting in a cumulative **$18 million** annual cost savings since 2010
- Accomplished these cost savings while accommodating a 32% increase in conferencing traffic to over 60 million minutes per month
- Eliminate infrastructure inefficiencies and reduce OPEX without sacrificing voice quality or service availability
- Enable secure access for mobile users, remote workers, and small offices
- Simplify migration to an alternate conferencing provider if ever required

Consolidation of voice telephony infrastructure with SIP trunking

Before

The U.S. portion of Oracle's global corporate voice network relied on legacy telephony technology. Nearly 100 U.S. offices were connected using 120 Cisco PSTN gateways and utilized 354 legacy voice circuits. Multiple telecommunications service providers were used for outbound calling.

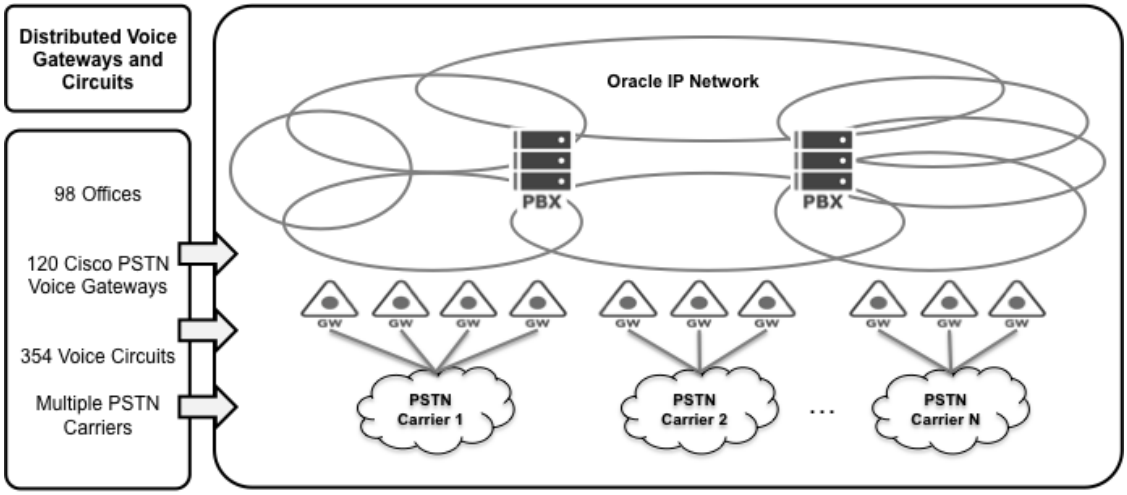

Figure 3: Oracle U.S. TDM communications network uses multiple carriers and TDM gateways

As Oracle grew, so did the complexity, maintenance overhead, and cost of its corporate voice network. Oracle Global IT migrated their legacy infrastructure to IP and replaced conventional PSTN trunks with SIP trunks to achieve three goals:

- Simplify the telephony infrastructure
- Improve scalability and reliability
- Reduce telecom costs

As with the audio conferencing application, the company required a session border control solution to protect and control its SIP trunking borders. Once again, Oracle GIT selected the Acme Packet E-SBC to connect, secure and control its SIP trunking services.

After

SIP is now fully implemented in the U.S. All inbound and outbound voice calls are backhauled across Oracle's corporate IP WAN to hubs that use Acme Packet E-SBCs and high speed data circuits to connect to a single SIP trunk service provider. The new environment consists of three hubs, each with a high availability E-SBC. The IP-based infrastructure has resulted in:

- Removal of 44 legacy voice gateways
- Cancellation of 352 T1s (T-carrier) and 2 DS3s (Digital Signal 3)
- Consolidation of telecommunications service providers from five to one
- Centralization of direct inward dial (DID) phone number delivery, management, and support for all U.S. employees located in 98 offices.

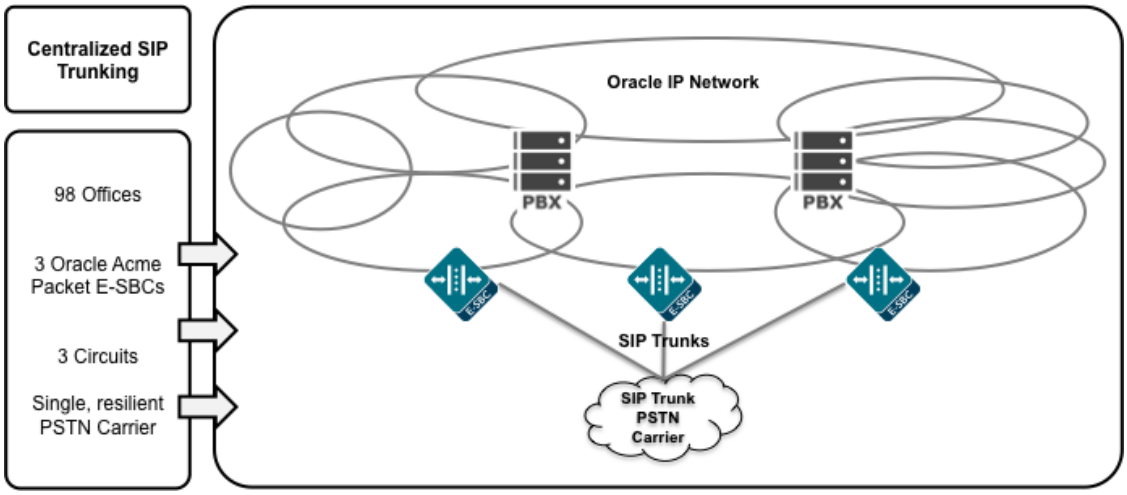

Figure 4: Oracle U.S. SIP network centralizes PSTN access in three hubs and consolidates services with a single carrier

Results:

Simplification of the telephony infrastructure

Infrastructure was reduced at every office. 352 T1's and two DS3's voice access circuits were replaced by three high speed data lines, resulting in a 99 percent reduction in the number of circuits that need to be managed and supported. Dozens of voice gateways will be repurposed as small office routers.

New office build outs and M&A office consolidations are now streamlined since voice gear and circuits — often critical-path items to meeting aggressive real estate schedules — are no longer needed.

Also, Oracle GIT has reduced the number of telecommunications service providers providing general office telephony services to U.S. offices from five to one strategic partner. This change has streamlined and standardized support and troubleshooting, and provided for more comprehensive vendor reporting. By reducing its monthly invoices from 70 to 1, the organization has dramatically simplified billing and cost analysis.

According to Brandon Gresham, Oracle's VP Global IT Field Services:

"Implementation of the SBCs not only enabled more on net voice minutes but also dramatically reduced the complexity of our global communications infrastructure generating cost savings which continue to pay dividends."

Improved scalability and reliability

The new SIP trunking environment was developed from the ground up with an eye towards supporting Oracle's continued growth on a lower sloped cost curve. The U.S. production infrastructure is now fully built and has ample capacity to handle Oracle's current peak calling periods. As Oracle grows, capacity can be expanded quickly and easily via soft configuration changes – capacity can be doubled or even tripled without additional gear or circuitry.

In the unlikely event of hub failures, the system has been designed and built so that any single hub can support 100 percent of Oracle's traffic.

Lower costs

SIP trunking **is expected to reduce** telecom expenses by millions annually. Immediate out-of-pocket savings come from consolidating infrastructure and terminating all PSTN traffic with a single telecommunications service provider. By negotiating aggressive volume discounts Oracle GIT expects to save as much as **$3 million** annually.

Additional soft cost savings and future cost avoidance will be recognized on new office build-outs. With the new centralized SIP trunking environment, Oracle GIT no longer needs to procure, manage, and support expensive gateways and circuits at each office.

Why Acme Packet Net-Net Enterprise Session Director E-SBCs?

Oracle GIT selected the Acme Net-Net Packet Enterprise Session Director E-SBCs after a rigorous RFP process and an intensive four-month lab evaluation involving several vendors. The product's rich session control and connectivity features, strong security capabilities, high scalability, and top price-performance were major contributing factors in the decision.

- **Easy connectivity**: Acme Packet E-SBCs offered the broadest set of SIP connectivity capabilities. The Acme Packet E-SBC's unique Header Manipulation Rules feature enabled Oracle GIT to eliminate interoperability obstacles and accelerate SIP trunk installations,

- **Strong security**: Concerned about both the internal and external security threats that accompany IP communications, Oracle GIT executed an exhaustive battery of DoS

and vulnerability tests. Acme Packet E-SBCs were found to offer the most comprehensive security capabilities. The product's dedicated, purpose-built hardware, and distinctive overload control and dynamic signaling rate limiting features delivered continuous service availability in the face of a wide range of attack scenarios.

- **Complete control**: The product's extensive session routing and control features enable Oracle GIT to ensure high service quality and reliability for real-time IP communications.

- **High scalability**: The Acme Packet E-SBCs offered the greatest scalability of the solutions evaluated. The Acme Packet platform Oracle GIT originally selected supports up to 32,000 simultaneous sessions. The latest Acme Packet E-SBC platform supports up to 80,000 simultaneous sessions.

- **Top price-performance**: Acme Packet E-SBCs offered the best price-performance of the solutions evaluated and represented the lowest upfront capital investment.

"*Oracle Global IT's decision to select the Acme Packet Net-Net Enterprise Session Director E-SBC in 2009 has enabled us to drive considerable operational savings while delivering operational excellence supported by an extremely reliable carrier class product in high availability configurations. The capacity of the platform has enabled us to scale as we have grown both in employees, but also in optimizing our traffic profiles to leverage SIP Trunking and eradicating legacy TDM connectivity. This is all while leveraging a rich feature set that meets our enterprise needs for security, QoS, interoperability, protocol support and operations."* - Peter Harrison, Sr. Director of Oracle Global IT, Communications Infrastructure, Service Design.

Now part of Oracle's product portfolio, Acme Packet E-SBCs continue to enable trusted, first-class delivery of next-generation voice, data and unified communications services and applications across IP networks for enterprises and communications service providers. They fulfill demanding security, service assurance and regulatory requirements in service provider, enterprise and contact center networks.

Nearly 2,000 organizations have deployed Oracle Acme Packet SBCs, including 51 of the Fortune 100 and 89 of the world's top 100 communications service providers. In 2012, Gartner Inc., the world's leading information technology research and advisory company, recognized Acme Packet as a leader in its Magic Quadrant for Session Border Controllers.

Read more about Oracle's Acme Packet products here: http://www.oracle.com.

Future Growth and Subsequent Applications

Oracle plans to expand its use of IP communications and SIP trunking based on the success of these initial projects. The company plans to implement SIP trunks in EMEA next.

Oracle GIT will continue to try and route the majority of its audio conferencing traffic via the Acme Packet E-SBCs, in an effort to reduce costs and obtain better visibility. For the latter, Oracle GIT plans to deploy the Acme Packet Palladion Enterprise Operations Monitor to proactively manage its SIP trunks. The solution provides real-time monitoring, and alarming, correlation and analysis, and troubleshooting capabilities as well as historical reports that will enable Oracle GIT to track and optimize service quality and improve end-user experiences. The Acme Packet Palladion Enterprise Operations Monitor provides greater visibility compared to native tools offered by its SIP trunk service provider, and delivers more extensive key performance indicators (KPIs) than the network monitoring tools Oracle GIT currently uses.

By tracking KPIs in real-time, Oracle GIT will be able to detect and resolve potential performance issues before they impair service quality. Oracle's Acme Packet Palladion Enterprise Operations Monitor provides real-time graphical call flow displays that enable network administrators to analyze voice calls, measure call characteristics and troubleshoot problems on a network-wide basis. The solution will help Oracle GIT ensure its SIP trunk service provider is honoring its SLA commitments and will aid in identifying, isolating, and resolving call quality issues with both the SIP trunking service and its cloud-based conferencing service.

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Author: Annie Benitez Pelaez

Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200

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