

The Gold Standard of Protocol Stack Solutions



TRILLIUM PROTOCOL SOFTWARE

IMS | 3G/4G Wireless | NGN VoIP

Widely regarded by industry experts as a “gold standard” for protocol stack solutions, Trillium® software from Continuous Computing® empowers telecom equipment manufacturers to develop reliable, high-performance network elements for IP Multimedia Subsystem (IMS), 3G / 4G Wireless, and Next Generation Network (NGN) Voice over Internet Protocol (VoIP) applications.

Trillium software enables telecom equipment manufacturers of eNodeBs, CSCFs & NGN Softswitches, Signaling and Media Gateways, and other products to accelerate time-to-market, reduce development costs and decrease project risk and complexity.

The foundation of all Trillium products is the Trillium Advanced Portability Architecture (TAPA®), an elite set of proprietary architectural and coding standards. TAPA ensures complete independence from the target system's compiler, processor, operating system or architecture, delivering field-proven customer benefits that include reliability, consistency and compressed learning curves. TAPA defines a set of interfaces that control all interactions between the Trillium software and the target system.

Trillium software solutions include an innovative, patented model for software scalability and reliability, the Distributed Fault-Tolerant / High Availability (DFT/HA) architecture. Designed to distribute the processing load across multiple processors, DFT/HA is a software advantage that magnifies performance and extensibility while enabling “rolling upgrades.”

In addition to Trillium DFT/HA, Trillium protocol software features a proven multi-threaded design that minimizes locking and optimizes performance in today's multi-core / multi-threaded processing environments.

BENEFITS OF TRILLIUM PROTOCOL SOFTWARE SOURCE CODE

ACCELERATED TIME-TO-MARKET

- Fully portable, platform-independent products
- Simple, yet flexible interfaces with a large base of trained developers
- Mature, field-proven products integrated into a wide variety of solutions

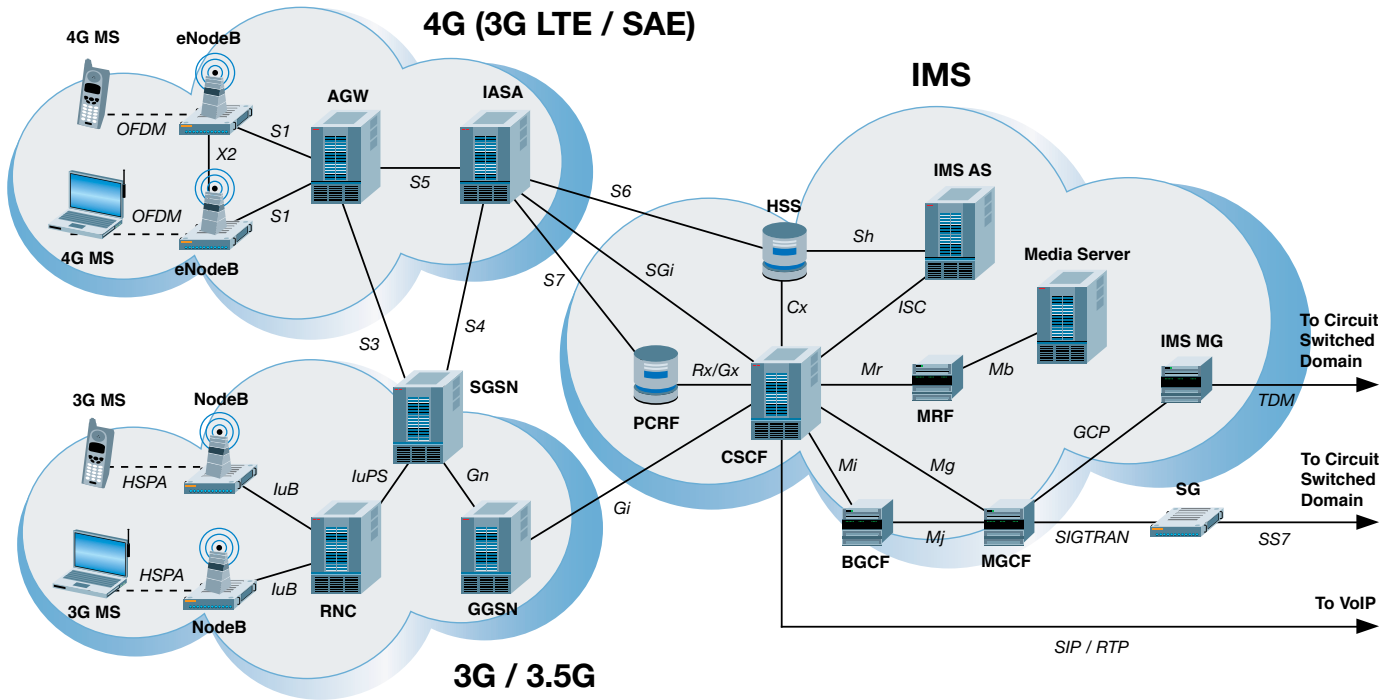
REDUCED DEVELOPMENT COSTS

- Performance optimized for both single and multi-core processing environments
- Consistent TAPA architecture to facilitate integration and efficient use of resources
- Integrated systems, allowing customers to focus on application development

REDUCED PROJECT RISK & COMPLEXITY

- Standards-based products and processes to ensure interoperability
- Expert Trillium Professional Services and global technical support
- Proven, fault-tolerant, and distributed solutions currently deployed which provide carrier-grade high-availability

3G / 4G Wireless and IMS Enabled Devices



Trillium Enabled 4G Wireless Equipment

- Enhanced-NodeB (eNodeB)
- 3G LTE Access Gateway
 - Mobility Management Entity (MME)
 - User Plane Entity (UPE)
- Inter-Access System Anchor
 - 3GPP Anchor (for GPRS Core)
 - SAE Anchor (WLAN & Non-3GPP)
- Policy Control Resource Function (PCRF)

Trillium Enabled 3G / 3.5G Wireless Equipment

- NodeB
- Radio Network Controller (RNC)
- Serving GPRS Support Node (SGSN)
- Gateway GPRS Support Node (GGSN)

Trillium Enabled IMS Equipment

- Call State Control Function (CSCF)
- Home Subscriber Server (HSS)
- IMS Application Servers (SIP Application Server, IM-SSF, OSA-SCS)
- Media Servers
- Media Resource Function (MRF)
- Breakout Gateway Control Function (BGCF)
- Media Gateway Control Function (MGCF)
- IMS Media Gateway (MG)
- Signaling Gateway (SG)

Trillium Wireless & IMS Protocols

4G WIRELESS

- RRC
- RLC
- MAC
- PDCP
- GTP
- X1
- X2-AP
- S1-AP

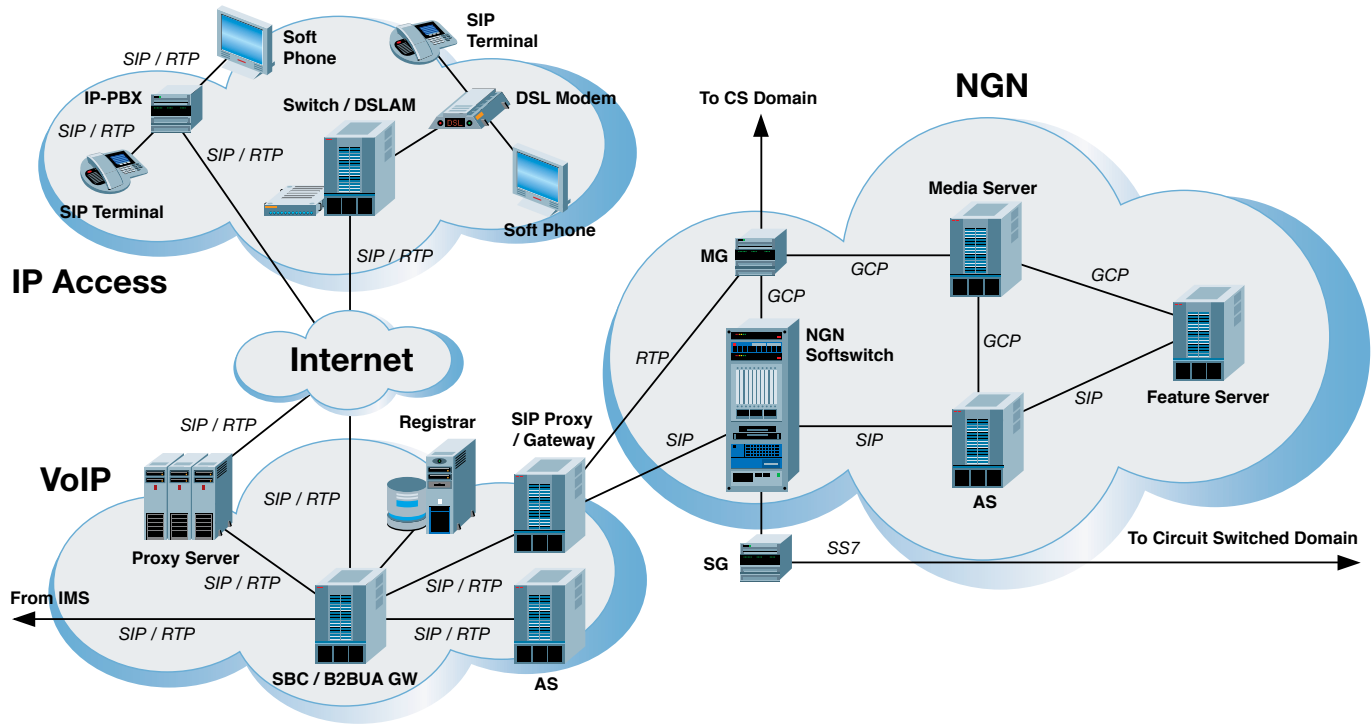
3G/3.5G WIRELESS

- RRC
- RLC
- MAC
- PDCP
- GTP (GTP-c, GTP-u, GTP')
- FP
- NBAP
- ALCAP
- CAP
- MAP
- RNSAP
- RANAP
- GMM/SM
- SIGTRAN (SUA, M3UA, M2UA / M2PA, IUA / DUA / V5UA, SCTP)
- Narrowband & Broadband SS7

IMS

- SIP
- RTP/RTCP (SRTP)
- Diameter
- COPS
- GCP (H.248 / MEGACO / MGCP)
- SIGTRAN (SUA, M3UA, M2UA / M2PA, IUA/DUA/V5UA, SCTP)
- Narrowband & Broadband SS7

NGN VoIP and IP Access Enabled Devices



Trillium Enabled IP Access Equipment

- SIP Terminals
- Soft Phones
- IP-PBX
- IP Switch / DSLAM
- Hosted VoIP Services (not shown)
- Peer-to-Peer SIP Nodes (not shown)

Trillium Enabled VoIP Equipment

- SIP Proxy Server
- SIP Registrar
- Session Border Controller (SBC)
- Back-2-Back User Agent (B2BUA) Gateway (GW)
- SIP Proxy Gateway
- SIP Application Server (e.g., Multimedia Messaging Server)

Trillium Enabled NGN Equipment

- NGN Softswitch
 - Call Agent (CA)
 - Media Gateway Controller (MGC)
- SIP/IN Application Server
- Feature Server
- Media Server
- Media Gateway
- Signaling Gateway

Trillium NGN VoIP Solutions

SIP

- DIAMETER
- GCP (H.248 / MEGACO / MGCP)
- RTP / RTCP (SRTP)

SIGTRAN

- SUA
- M3UA
- M2UA
- M2PA
- SCTP
- IUA
- V5UA
- DUA

SS7

- INAP
- ISUP / B-ISUP
- TCAP
- SCCP
- MTP3 / MTP3b
- MTP2 / MTP2 HSL
- MTP1
- Drivers

Trillium Broadband / Legacy Stacks

ATM

- ALCAP
- Q.2140
- Q.SAAL
- IME / PLOA / CIP
- PPP-over-ATM

ISDN

- Q.930/Q.931
- LAPD
- Q.93B
- LAPB

ROUTING, FRAME RELAY, V5

- MPLS
- PNNI Routing
- Q.933
- V5-LAPV / V5-Envelope Function
- V5 Layer 3

WHAT PEOPLE ARE SAYING

Trillium Protocol Software

"Sumitomo Electric Networks, Inc. (SEN) deploys Trillium SIP protocol software in leading Japanese carriers to support next generation IMS networks. Our broadband modems, which use Trillium SIP software, coupled with Continuous Computing's professional services, have helped our customers meet time-to-market needs."

– Minoru Kuramoto, General Manager, Technologies Group, SEN

"With UMTS TDD 3G commercial deployments and trials occurring worldwide, it is imperative that we rely on cutting edge technology providers like Continuous Computing to help us get to market quickly."

– Malcolm Gordon, Vice President of Product Management, IPWireless

"Continuous Computing is at the leading edge of next-generation telecom technological innovation with their Trillium SIP stack offering. Trillium's high-performance, feature-rich SIP Stack validates [their] commitment to providing leading equipment manufacturers the tools to continuously evolve their SIP powered products."

– Chad Hart, Senior Analyst, Venture Development Corporation

"The deployment of Continuous Computing's integrated hardware and software is an important factor in our drive to deliver high accuracy, high value location solutions, speeding our time-to-market and increasing the flexibility of our products for wireless carriers."

– Joseph Sheehan, President, TruePosition

"Trillium protocol technology is a key success factor which is helping us to accomplish our mission to develop innovative value-added services, products, and applications for the companies of the PT Group and other customers alike."

– Artur Calado, Board Member, Portugal Telecom Inovação

"After a rigorous evaluation process we selected Continuous Computing for our Next Generation Network (NGN) solutions because of superior product performance, carrier grade system reliability, key supplier relationships and a leading-edge technology roadmap. Continuous Computing's local team in China...[has] done a tremendous job in supporting us...to help us meet our aggressive deployment objectives."

– NGN Product Manager of Alcatel Shanghai Bell

"Continuous Computing is an ideal partner for us. The Trillium software and Flex21 systems, coupled with our own SS7 blades controlled by Goldway Communication Ltd.'s ExpressSCE+ service creation and service delivery software platform, provided the building blocks enabling Vertex to create their solution. The combined benefits of this offering is available to other customers seeking a flexible, sophisticated DFT/HA architecture coupled with field-proven high-performance hardware and software."

– Gaetan Campeau, President, Founder, and Executive VP of Sales, TelcoBridges

"As an emerging technology company, a key to our success is to quickly integrate field-proven NGN hardware and software products that can accelerate our customers' developments and deployments. We had previous positive experience using Trillium software and Trillium Professional Services, which made Continuous Computing a preferred vendor for achieving our time-to-market requirements."

– Pardeep Kohli, President and Chief Executive Officer, Mavenir Systems

"Our past experience with Continuous Computing's highly scalable and reliable solutions gave us great confidence in our choice. Continuous Computing's pre-integrated solutions – coupled with the ability to support active-standby and active-active node configurations using DFT/HA architecture – have helped us reduce project risk and accelerate product rollout."

– Jim Bunch, Vice President of Engineering, Carrius Technologies



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