

ZEUGMA SERVICES NODE

HIGHLIGHTS

- **Carrier Grade:**
NEBS compliant, in-service upgradeable, fully redundant, high availability system for deployment in carrier networks around the world.
- **Multi-Service Edge:**
Integrated routing and subscriber and application management delivered in a chassis-based system with aggregate throughput of 720 Gbps.
- **Hybrid Architecture:**
The introduction of the extensible compute grid with up to 520,000 DMIPS of processing capacity in combination with a non-stop forwarding plane makes possible a new class of applications at the network edge.
- **Statistics Collection:**
Leveraging the compute grid, the ZSN can collect flow statistics on all subscribers and their services; additional reporting is available through ZSN OSS.
- **Bandwidth Management:**
Integrated real-time resource management (TISPAN RACS compliant), subscriber-specific on-demand bandwidth and QOS, and per-flow CAC functions.
- **Application Sandbox:**
New applications can be provisioned into the Zeugma Application Sandbox where their diverse behavior is safely executed. Applications include VOIP and video QOE, service-specific bandwidth on demand, and URL filtering.



The Zeugma Services Node (ZSN) delivers an extensible applications delivery platform on a carrier-grade, routing and subscriber management edge device. This unique combination of capabilities enables broadband service providers to deliver new revenue-generating services with minimal complexity and dramatically reduced cost.

The Zeugma Services Node (ZSN) is a critical element in the control, delivery, and accounting of services at the network edge. In recognition of the key role it plays as a single interaction and control point, the ZSN has been architected from the ground up to cater to the most stringent demands of the largest carriers around the world.

Unique to the ZSN is its extensible compute grid that ensures applications can scale as service adoption and subscriber growth continues. Operationally, compute grid resources seamlessly expand and contract as Compute Blades are added or removed from the system. No other system can scale to meet the growing demands of today's emerging services.

The combination of the data plane and control plane brings new capabilities not found in typical network equipment. The fundamental notion of a subscriber application session is only possible through the combination of flow-based classification, deep packet inspection, and extensible service logic. Sessions are not just composed of a flow; they can consist of a number of diverse protocols and transactions.

Diverse application service logic is managed by the ZSN through the Zeugma Application Sandbox. This protected environment enables new behavior to be deployed into the network in internet timeframes, not traditional carrier upgrade cycles. As new revenue opportunities present themselves, the ZSN can respond to the opportunity whether based on walled garden or over-the-top services which can benefit from managed network resources.

Network resources are managed through an integrated TISPAN/RACS-like function. The ZSN ensures that service sessions are uniquely promoted or demoted based on a subscriber's policy and resources. Furthermore, resource management enables the network to apply call admission control (CAC) when resources are constrained.

The ZAS can also facilitate services that go well beyond identification and delivery of applications. The analysis of voice and video for quality of experience (QOE) enables carriers to ensure premium services are being delivered as advertised. IPTV ad insertion can turn broadcast advertising into premium, high revenue, personalized advertising based on demographic profiles.



HARDWARE

Chassis

- 22.5" (H) x 19.0" (W), 15.5" (D)
- 13 RU chassis, 3 chassis per 7' rack
- 19" or 23" rack mountable
- 14 slots, minimum two for Compute Blades, up to 12 slots for Traffic Blades
- Cooling: bottom front to top rear
- Interface capacity up to 720 Gbps (unidirectional)

Compute Blade

- 1+1 OAMP redundancy and 1:n subscriber redundancy
- 4 GB memory upgradeable to 16 GB
- Compact Flash storage
- Ethernet 10/100/1000 BaseT management port
- Fully meshed backplane: all Compute Blades are concurrently addressable

Traffic Blade

- 10 Gbps line rate forwarding with deep packet inspection
- 14M packets per second throughput
- Flow metering, marking, policing, and shaping, WRED, priority or WFQ hierarchical scheduling
- 64K queues, 500K managed flows per slot
- 10-port Gigabit Ethernet based on SFP hot pluggable optics: SX/LX/ZX
- 1-port 10 Gigabit Ethernet based on XFP hot pluggable optics: SR/LR
- 6-port 10 Gigabit Ethernet based on XFP hot pluggable optics: SR/LR
- Fully meshed backplane: all Traffic Blades are concurrently addressable

High Availability and Redundancy

- 1+1 shelf manager, 1+1 OAMP, 1:N subscriber management process & graceful protocol restart
- Hot-swappable Compute and Traffic Blades
- Redundant fans and power modules

Operating Environment

- Power: 3200 watt (max), -48VDC
- Operating temperature: 5-40C
- Humidity: 5%-85% non-condensing
- NEBS Level III, SR-3580, GR-63 Core, GR-1089 Core, ANSI/UL 60950-1-2002, CAN/CSA C22.2 No 60950-1-0, CE Mark, ETSI EN 300 019, ETSI EN 300 386, FCC Part 15 Class A, ICES-003 Class A

SOFTWARE

Architectural Features

- Distributed compute grid coupled with Zeugma Application Sandbox enable scalable and extensible service applications. True plug and play environment for delivering services

Subscriber Management

- RADIUS authentication, authorization, and accounting (AAA), dynamic circuit binding, policy definition and application registry
- Dynamic / static IP Subscriber Sessions (ISS), DHCP relay, proxy and server

Protocol and Encapsulation Support

- Routing: OSPF v2 (RFC-2328), ECMP (RFC-2991, 2992)
- Multicast: IGMPv3 (RFC 3376) , PIM-SM (SSM)
- Ethernet: IEEE 802.1q VLAN
- Session protocols: SIP (RFC-3261), RTSP (RFC-2326), RTCP (RFC-), RTCP-XR (RFC-3611), RTSP-HR (draft-ietf-avt-rtcp-hr-00), TI PIQUA

Traffic Management

- 802.1p class of service (COS), Differentiated Services Code Point (DSCP) TOS, and application driven queuing
- Packet classification (RFC-2474, 2575, 2597, 2598); DiffServ packet marking by ACL, hierarchical ingress policing and egress shaping; DSL Forum's TR-092 and TR-059 compliant hierarchical scheduler
- Bandwidth manager enables per subscriber, per application, on-demand bandwidth and QOS queue resource allocation

Statistics Collection

- Equipment, port, framing, routing, and flow statistics (RFC-1213, 1471, 2011, 2021, 2819, 2863, 2933, 3635, 3954, 3917, draft-ietf-magma-mgmd-mib-08, draft-ietf-ipfix-protocol-19, draft-dressler-ipfix-aggregation-02, DSL Forum TR-092, TR-101)
- Per subscriber, per flow statistics collection reported on 15 minute intervals with TCA support

IMS/TISPAN Alignment

- Transport layer: L2TF, RCEF
- Service layer: A-RACF (ETSI ES 283 026), SPDF (ETSI TS 183 017), RACS (ETSI ES 283 003), NASS (ETSI ES 282 004, 004, 034)

Network Management System

- Command line interface (CLI) support via SSH/Telnet
- Service oriented architecture (SOA) support inspired by industry standard XML interfaces (WS-*, MTOSI, etc.)
- Secure user authentication and privilege level based authorization for both CLI and SOA (XML)
- Linux based Oracle database for multi-node provisioning and analytical processing
- Linux based J2EE application server for multi-node Operations System Support (Zeugma OSS)
- GUI support for OAMP, statistics, application, and service management

SANDBOX APPLICATIONS

QOE Monitor

- Quality of experience analysis for video on demand and voice over IP
- MOS calculation with TCAs

Application Driven QOS

- Detection of control signalling for video on demand and voice over IP
- Dynamic queue assignment
- Dynamic shaper adjustment

URL Filtering

- Per subscriber URL filtering
- Black-list redirect

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