

# Clarent® NetPerformer® and NetPerformer EG

The Next Generation Voice and Data Convergence Solution for the Enterprise

## Clarent NetPerformer

is the optimal voice and data convergence solution for enterprises to integrate traffic over a variety of popular corporate WAN infrastructures.

**Clarent NetPerformer EG** unites today's distributed voice communications systems with Clarent's leading VoIP softswitch platform.



Reduces communications costs

Simplifies network management

Enables new voice applications

Scales as your business grows

Supports industry standards

Supports satellite access

Delivers superior voice quality

Unified communications



## The ultimate voice and data convergence solution

Grant your enterprise access to a complete, convergence solution with superior multi-service support from Clarent NetPerformer. A Clarent NetPerformer installed at the enterprise easily evolves from linking businesses using a private voice and data network, to a communications power nexus: the Clarent Class 5 Softswitch, combined with the NetPerformer EG VoIP SIP gateway capabilities.

Clarent NetPerformer elegantly integrates crucial voice and data capabilities into a single unified platform to tackle the greatest convergence challenges:

- Superior voice quality and reliable data delivery through prioritization
- Instant connectivity to most PBX, key system and data networks
- Integrated routing to a broad array of WAN protocols.

The result? Employees experience PSTN voice quality and effective data delivery while IT and telecom managers enjoy simplified management and increased data transport choices.

## Future-proof convergence

Clarent NetPerformer technology is a stable and proven convergence platform that many global corporations already employ in their worldwide networks. For more than 10 years, these corporations have saved communication costs by using compressed voice and data over efficient packetized networks. Clarent's design creates a migration path for valued customers with NetPerformer chassis SDM-9360, SDM-9380 and SDM-9500 (SDM-9585 module) allowing them to extend their connectivity to Service Providers offering VoIP services as well as new IP based applications. The customers doesn't have to reinvest in new hardware, a simple software upgrade will provide them all the features offered by the NetPerformer EG.

Three Clarent NetPerformer product family models provide telephony interfaces in densities that accommodate large headquarters installations and small, remote offices, alike. Supporting anywhere from 2 to 240 telephony channels per unit/chassis, Clarent NetPerformer can converge voice and data over Leased or Switched lines, Frame Relay, ATM, PPP links, ISDN PRI and BRI, Satellite as well as IP/Ethernet circuits. PBX and PSTN

voice interfaces include Analog FXS, FXO and E&M; Digital T1, E1, ISDN-PRI, and ISDN-BRI – even switched QSIG message delivery: Clarent NetPerformer can handle them all.

## Unified communications

Interconnect remote and regional offices that are stranded like islands with incomplete communications service. Clarent NetPerformer creates a unified network that interconnects distributed offices whose multiple PBX brands and other disparate access technologies could not previously interoperate.

Bring branch and home office workers into the productive environment created at the corporate hub. Clarent NetPerformer EG connects to the Clarent C5CM softswitch, delivering uniform dialing plans and services for all locations.

## Access to new applications

Release your business from an impoverished communications infrastructure through new, advanced IP applications. Clarent NetPerformer EG employs Clarent's market-leading architecture for the combination of voice and data applications. Thanks to new IP services in Clarent's distributed softswitch, enterprise business users can now reach applications such as global voicemail, unified messaging, instant teleconferencing and newer, data-empowered platforms that only IP can provide.

## Communications savings you can see

- Purchase and manage fewer trunks from a local service provider.
- Bypass tolls worldwide for intra-enterprise and off-net calls.
- Take advantage of advanced voice and data compression for improved network efficiency.
- Implement a simpler and more robust network management strategy.

Explore the exciting opportunity in voice applications at your own pace. New and existing Clarent customers now have the luxury to cash in the option for standards-based VoIP because Clarent is ready when you are.

## Clarent NetPerformer reduces communications costs...

Converting voice calls into packets that can traverse data networks creates significant long distance communications cost savings.

Clarent NetPerformer enables the integration of disparate phone systems, eliminating the need for a common PBX solution. This unequaled flexibility means real cost savings.

Clarent NetPerformer scales from small sites to large hubs – delivering complete communications connectivity and services to all employees.

## ...by reducing network infrastructure...

A converged corporate backbone with Clarent NetPerformer allows enterprise businesses to reduce trunk lines to local exchange and long distance carriers as traffic migrates to data networks.

## ...and conserving network bandwidth.

Clarent PowerCell™ for voice and data transport over various WAN infrastructures, including IP and IP/Ethernet circuits, offers Clarent's award-winning prioritization and compression technology for superior network performance.

## Clarent NetPerformer...

**Simplifies network management** – Clarent NetPerformer EG's SIP-based integration with Clarent's distributed softswitch greatly simplifies communications management challenges. Clarent's central, open database lets telecommunications managers automate moves, adds and changes across the entire enterprise. Clarent softswitch interfaces including Clarent Domain Controller make caller permissions, activity reports and even up-to-the-minute billing data immediately accessible.

For element management, Clarent offers ACTview® 3000. ACTview 3000 integrates

Clarent NetPerformer - Scalable & Flexible			
NetPerformer Chassis Model	SDM-9360	SDM-9380	SDM-9500 with SDM-9585 module
Channel Density	30 Digital (1 T1 or 1 E1) or 8 FXO/FXS or up to 16 E&M or up to 16 BRI channels	96 Digital (4 T1 or 3 E1) or 8 FXO/FXS or up to 16 E&M or up to 16 BRI channels	240 Digital (10 T1 - 8 E1) or 32 FXO/FXS or up to 64 E&M or up to 64 BRI channels Chassis supports up to 4 SDM-9585 modules; 2 chassis can be cascaded
Throughput	2 Mbps (1 E1 half duplex)	8 Mbps (2 E1 full duplex)	8 Mbps per module (2 E1 full duplex) per card
Serial Ports	2 universal	3 universal	3 universal per card
Ethernet Interface	One 10/100BaseT	One 10BaseT	One 10BaseT per card

with multi-vendor network management systems via SNMP-compliant MIBs and user-friendly graphical management. ACTview 3000 joins with HP OpenView™ network node manager for NT or Sun Solaris platforms to augment your control and expand your vision.

**Enables new voice applications** – Clarent's distributed softswitch architecture makes application platforms "plug and play." Clarent NetPerformer unites the enterprise with the service provider's newest applications to offer your business ways to gain operational efficiencies, save time and contain costs.

**Scales as your business grows** – "Right-sized" capacity; the Clarent NetPerformer on the SDM-9500 hardware platform can address the needs of even the largest enterprise sites with support for 240 digital or 64 analog voice channels in a single stackable chassis. At smaller branch and regional offices the Clarent NetPerformer on the SDM-9360 or SDM-9380 hardware platforms provides optimal configurations.

**Supports industry standards** – Clarent NetPerformer EG interoperates seamlessly with Clarent gateways and other CPE edge devices, via the Clarent Class 5 Call Manager. In addition, Clarent supports H.323 and SIP protocols to offer standards-based interoperability for Clarent certified multi-vendor and mixed networks.

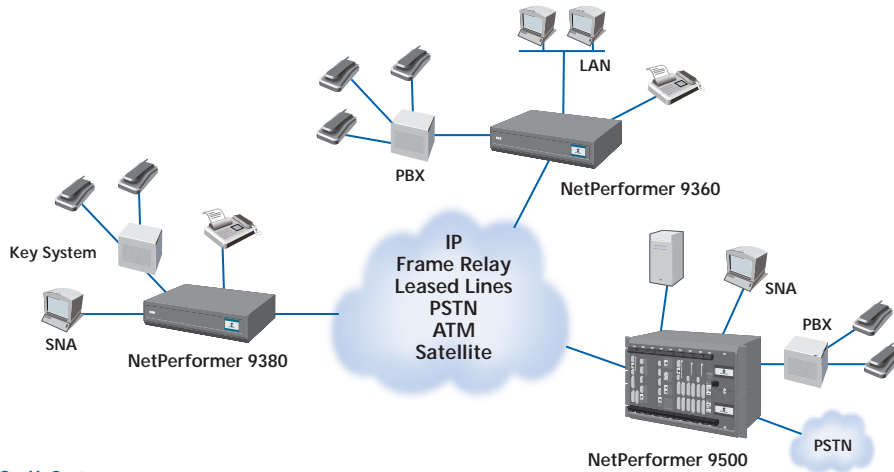
Flexible interconnectivity is not limited to voice. The Clarent NetPerformer offers flexible data protocol support for a wide range of network services and user requirements.

**Offers satellite access** – Clarent SkyPerformer™ software option adapts your Clarent NetPerformer for satellite-based converged communications. When landlines are unavailable for all offices, Clarent SkyPerformer supports a hybrid satellite-terrestrial topology for a low cost, single carrier operation. Clarent NetPerformer provides toll-quality voice with Clarent SkyPerformer interfaced to any satellite modem.

**Delivers superior voice quality** – "Super-class" prioritization for voice and critical data allows Clarent NetPerformer to prioritize voice packets over data when exchanging packets between the enterprise business site and the network backbone. Up to eight classes of traffic can be established with 16 different levels of prioritization. PowerCell® QoS can be combined with IP Precedence TOS bit and 802.1p/q support to provide end-to-end Quality of Service not only for voice but for mission critical data application as well.

Furthermore, digital voice support for key signaling methodologies is standard, and the Clarent NetPerformer product family connects to most industry standard PBX units and key systems.

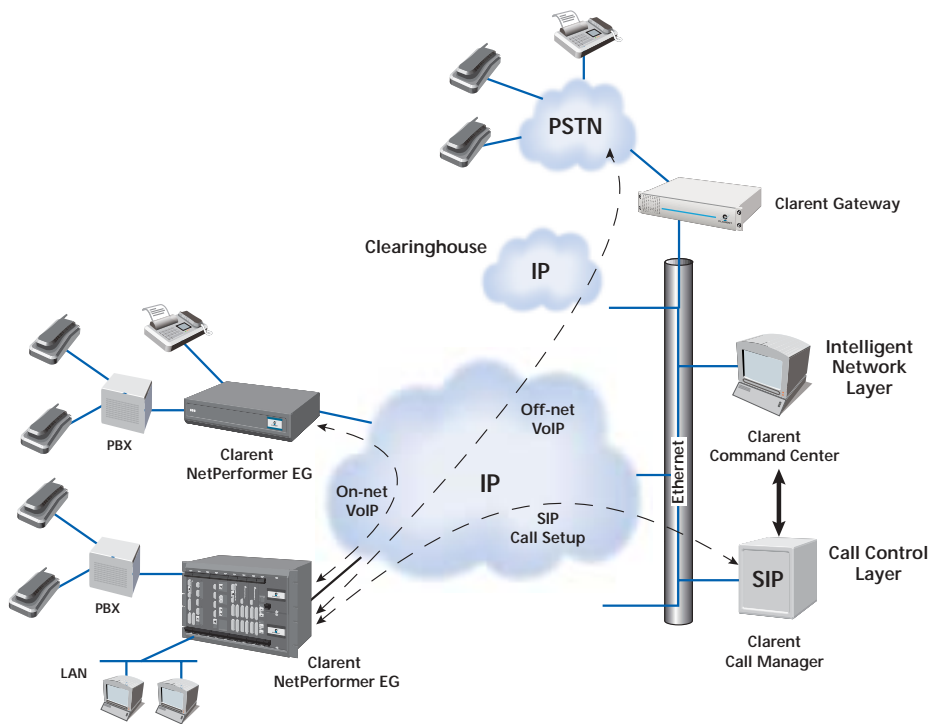
## Clarent NetPerformer Network Implementation



### NetPerformer Call Setup

Clarent NetPerformer connects phone, FAX, key systems, PBX and PSTN to each other using NetPerformer at both ends. Voice Traffic Routing tables in each NetPerformer delivering any-to-any connectivity, performing dialed digit manipulation (as required).

## Clarent NetPerformer EG Network Implementation



### SIP Call Setup

Clarent NetPerformer EG connects to the Clarent distributed softswitch (Clarent Class 5 Call Manager and Clarent Command Center) through industry standard SIP signaling messages to perform call setup.

### On-net and Off-net VoIP

Clarent NetPerformer EG streams voice media to other Clarent NetPerformer EG gateways, Clarent Gateways or other CPE gateways via standard RTP (voice) and T.38 (fax).

### Clearinghouse

Clarent Connect completes calls destined to partner networks for worldwide call termination.

## Specifications

### System Details

#### SDM-9500 (Rackmount)

Modular chassis: 8 slots for voice/data modules, one slot for 100 Mbps Firewire bus expansion card to additional chassis (up to 2 in a single daisy-chain utilizing SDM-9585)

- Power: auto-sensing 100-240 VAC, 50/60 Hz, -48 VDC
- Optional redundant VAC power supply

#### SDM-9585 for SDM-9500 chassis

- 3 universal serial ports (user or link), RS-232C, X.21/V.11, RS-530, RS-449/RS-442, V.35
- One 10BaseT Ethernet
- 4 expansion slots for interface modules
- Up to 4 DSP SIMMs per module
- Performance Level: 10,000 cells per second per module
- Maximum of 4 SDM-9585 modules per SDM-9500 chassis

#### SDM-9380 (Standalone)

- 3 universal serial ports (user or link), RS-232C, X.21/V.11, RS-530, RS-449/RS-442, V.35
- One 10BaseT Ethernet
- 4 expansion slots for interface modules
- Up to 4 DSP SIMMs per unit
- Power: auto-sensing 100-240 VAC, 50/60 Hz
- Performance Level: 10,000 cells per second

#### SDM-9360 (Standalone)

- 2 universal serial ports (user or link), RS-232C, X.21/V.11, RS-530, RS-449/RS-442, V.35
- One 10/100BaseT Ethernet
- 4 expansion slots for interface modules
- Up to 2 DSP SIMMs per unit
- Power: auto-sensing 100-240 VAC, 50/60 Hz
- Performance Level: 4,000 cells per second

### Interface Options

#### SDM-9500 (SDM-9585), SDM-9380, and SDM-9360

- IM-T1: T1 interface module for PBX or WAN connection with integrated CSU (RJ48 connector)
  - IM-E1-75: E1 interface module for PBX or WAN connection (75 ohms, BNC connectors)
  - IM-E1-120: E1 interface module for PBX or WAN connection (120 ohms, RJ48 connector)
  - IM-EM: 4-port E&M module (2- or 4-wire: types I, II, or V, RJ48 connectors)
  - IM-FXS: 2-port FXS module (loop start, RJ11 connector)
  - IM-FXO: 2-port FXO module (loop start, RJ11 connector)
  - IM-BRI: 2-port BRI S/T for PBX or WAN connection (RJ48 connectors)
  - IM-DSI: 2-port universal serial WAN interface (HD26F connectors)
  - SIMM-1: 1-DSP voice processing module, supporting 3-4 voice channels, depending on algorithm
  - SIMM-3: 3-DSP voice processing module, supporting 9-12 voice channels, depending on algorithm
  - SIMM-6: 6-DSP voice processing module, supporting 18-24 voice channels, depending on algorithm
- Up to 24 DSPs per SDM-9585 module or SDM-9380 unit  
Up to 12 DSPs per SDM-9360 unit  
Serial connectors: HD26 female
- Interface types: DTE or DCE, RS-232, V.35, X.21, RS-449, RS-530
  - Internal/external clocking

### Network Connections

Network Topology: Public and private Frame Relay and ATM, mesh, hierarchical, star, point-to-point, Satellite point-to-point/multipoint (SkyPerformer option)

QoS: 8 classes of service, 16 priority weights, association to 802.1p and TOS bits (version 9.2)

Circuits: leased, switched, Frame Relay and ATM

#### Link port protocols

Leased lines and dial back-up:

- PowerCell Data, Synchronous full duplex, HDLC T1/E1

channelized

- Frame Relay and HDLC, full or fractional services, up to 64 logical ports. Drop and insert for voice and data

IP WAN:

- PowerCell Data over IP, using Ethernet, PPP, Frame Relay or ATM interfaces

Frame Relay:

- User- UNI, network - UNI, RFC1490, PowerCell
- Local management interface: LMI, ANSI T1.617/annex D, ITU-T Q.933/annex A, CLLM or disabled
- PVCs: 300 per node, automatic DLCI discovery.

ATM (optional license required):

- T1/E1 full or fractional, PowerCell Data over AAL5 UBR using up to 31 VCs, RFC1483 Multi-protocol Encapsulation over AAL5, RFC2364 PPP over AAL5, FRF.8 Service Interworking

ISDN E1 PRI and BRI:

- Switched or leased line mode, Frame Relay, Power Cell Data, PPP, HDLC

Link port maximum speed without compression: 2.048 Mbps

Link port maximum speed with data compression: 2.048 Mbps (SDM-9360 only 384Kbps)

Automatic node discovery and rerouting with least cost metric routing

Automatic load balancing, bandwidth on demand (over leased line), dial back-up, time-of-day connect

Dialing protocols: V.25bis, X.21, AT and control leads, D channel on ISDN PRI and BRI

### Channel Density

#### SDM-9500

Maximum telephony channels: up to 8 FXS or FXO, 16 E&M or ISDN BRI, or 96 digital channels per SDM-9585 module

Maximum of 240 voice channels per SDM-9500 chassis

#### SDM-9380

Maximum telephony channels: up to 8 FXS or FXO, 16 E&M or BRI, or 96 digital channels per chassis

#### SDM-9360

Maximum telephony channels: up to 8 FXS or FXO, 16 E&M or BRI, or 30 digital channels per chassis

### Telephony Features

#### SDM-9500 (SDM-9585), SDM-9380, and SDM-9360

Voice compression algorithms (number of channels per DSP):

- ACELP-CN 8K/6K, G.729/G.729a (8K), G.711 (PCM 64K), Fax Relay: 4 channels
- G.729, G.723 (Low 5.3K/High 6.3K), Modem Relay (only with PowerCell): 3 channels
- G.726 (ADPCM 16K/24K/32K/40K): 5 channels

Digital telephony channels:

- T1 line coding: B8ZS/B7ZS/AMI, D4/ESF framing
- T1 signaling: robbed bit signaling, CCS transparent, ISDN Japan, ISDN National and QSIG (version 9.2)
- E1 line coding: HDB3
- E1 signaling: CAS, R2, EuroISDN / ETSI, QSIG
- Digital CAS Signaling types: Immediate, Wink, FXO, FXS, FXO ground, FXS ground, custom
- ISDN BRI Signaling: EuroISDN / ETSI and Japan, ISDN National and QSIG (version 9.2)
- Mu-law or A-law coding

ATM telephony channels:

- AAL1 Circuit Emulation Services (maximum 20 channels), compressed voice over AAL5 using PowerCell

Analog line impedance: 600, 900 ohms and complex

Group III FAX: 4.8, 7.2, 9.6, 12.0, 14.4 Kbps

Modem Relay: V.32bis up to 14. Kbps

Network signaling:

- NetPerformer: any-to-any switching, proprietary using PowerCell
- NetPerformer EG version: any-to-any switching, VoIP SIP (Session Initiated Protocol), call control by Class 5 Call Manager, including end-to-end QSIG support

### Ethernet Interface

SDM-9500: One 10BaseT per SDM-9585 module, four per SDM-9500 chassis

SDM-9380: One 10BaseT

SDM-9360: One 10/100BaseT

### LAN Support

Ethernet interfaces: Ethernet II and IEEE 802.2, 802.3, SNAP Standards: IP RIP V1/V2 or Static, OSPF, NAT, IP Multicast IGMP V1/V2 PIM-DM, BootP/DHCP relay, DHCP client (version 9.2), IPX RIP and SAP, LLC2, 802.1p/q prioritization and VLAN (version 9.2), 802.1D Spanning Tree Protocol (STP), MAC Layer

Filter criteria: based on protocol, address (source, destination or SAP), TOS bit/diffServ or custom filtering

### Data Features

Maximum speed: 2.048 Mbps

Protocols:

- SNA: SDLC, LLC2 or Frame Relay RFC-1490 (BAN, BNN), maximum of 64 PUs per module/unit, (types 1, 2.0, 2.1, 4/5), Local SDLC and LLC2 spoofing, SDLC/LLC2 conversion
- Legacy Sync: PPP, BDLC, HDLC, SDLC, X.25, X.25 over Frame Relay (annex F/G), COP, BSC, VIP, IBM/RJE, Uniscope, Poll/Select, Siemens Nixdorf, JCA, Zengin
- Frame Relay: RFC-1490, UNI-DTE, UNI-DCE
- Asynchronous: ENO/ACK, XON/XOFF, transparent, CTS/DTR

### Physical Characteristics

#### SDM-9500

Height: 12.5" (31.8 cm)

Width: 17.5" (44.5 cm)

Depth: 12.3" (31.1 cm)

Typical weight 23 lbs. (10.4 kg)

Typical shipping weight: 26 lbs. (11.8 kg)

#### SDM-9380 and SDM-9360

Height: 3.5" (9.2 cm)

Width: 17.5" (44.5 cm)

Depth: 12.3" (31.1 cm)

Weight: 13 lbs. (5.9 kg)

Typical shipping weight: 17 lbs. (7.7 kg)

### Environmental Tolerances

Operating Temperature: 0° to 45° Celsius

Relative Humidity: 10% to 90%, non - condensing

### Regulatory – Compliance and Agency Approval

Clarent NetPerformers comply with or have obtained Regulatory Agency approval at least against the following standards:

EMC – Emission FCC CFR 47 Part 15; EN 55022 (1998); AS/NZS 3548 (1995)

EMC – Immunity EN 55024 (1998)

Safety IEC 950/60950 (1991) + Amendments 1 to 4

EN 60950 (1992) + Amendments 1 to 4

UL 1950 3rd Edition; CSA C22.2 N°950

AS/NZS 3260 (1993); ACA TS001 (1997)

Telecom – Analog FCC Part 68; IC CS-03 Part 1

Telecom – Digital FCC Part 68; IC CS-03 Part 2 and Part 6

TBR 001, TBR 002, TBR 003, TBR 004,

TBR 012, TBR 013, NTR4

### Network Management

SNMP management via ACTView 3000 Network Management

System for HP OpenView network node manager for

Windows or Sun Solaris

Menu driven async console port (VT-100) via DB9 male

connector, auto-sensing DTE/DCE

Remote Telnet access to command port

FTP upload and download of software and configuration

Traps, traces and extended statistics

Username/password security control, administrative filtering

[www.clarent.com](http://www.clarent.com)



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