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Network Convergence Gateway (NCG)

Solution Brief

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CounterPath Network Convergence Gateway (NCG)

MobileVoIP and Fixed Mobile Convergence (FMC) applications for Service Providers, Mobile Network Operators (MNO) and Mobile Virtual Network Operators (MVNO)

CounterPath delivers a broad range of end-to-end MobileVoIP applications and single identity phone number services over mobile, cable, DSL and Wi-Fi networks. When service providers and network operators deploy our NCG and MobileVoIP applications to consumer and business users, they improve cost, coverage, capacity and continuity of services across networks—while simultaneously growing service revenue and promoting customer loyalty and retention.

Network Convergence Gateway (NCG)

The NCG is a carrier-based, core network, Fixed Mobile Convergence (FMC) server that bridges broadband and mobile networks— in both pre-IMS and IMS environments. The NCG is the core enabling technology behind CounterPath’s suite of MobileVoIP applications. The NCG converges the personalization and mobility of mobile phone services with the flexibility, innovation and outstanding cost economics of the rapidly growing VoIP sector.

The NCG enables service providers to extend single-number mobile voice, text, multimedia messaging and video services to residential, corporate and hotspot locations with broadband access. This is achieved via SIP on a service provider’s existing network—while preparing them for the IMS (IP Multimedia Subsystem) platform of the future.

The NCG bridges SIP and SS7 Cellular Networks, acting as a SIP registrar/proxy/server to broadband networks and either:

- A Serving Mobile Switching Center (S-MSC)/Visitor Location Registrar (VLR); or
- A Gateway Mobile Switching Centre (G-MSC) to the mobile network.

NCG MobileVoIP Applications:

Convergent Voice and Messaging for Consumers

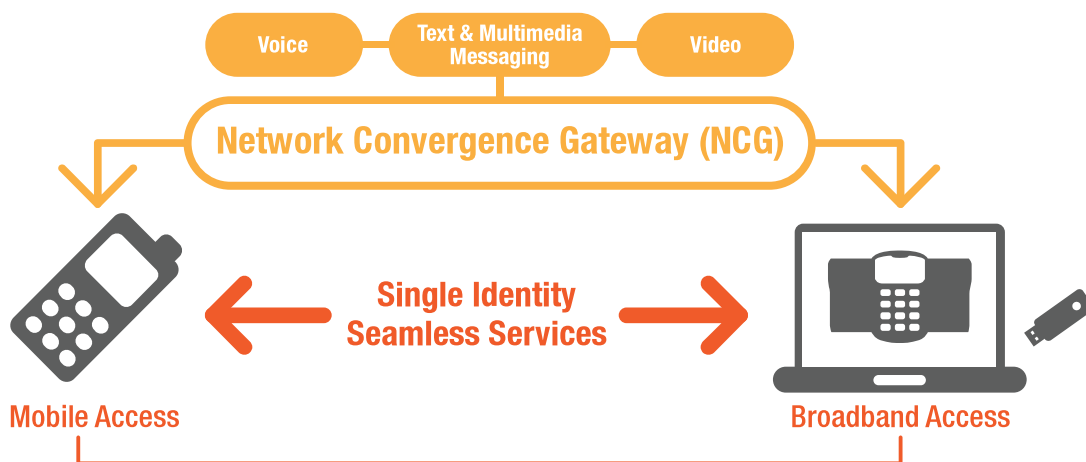
Transforms a PC or laptop computer into a mobile phone and messaging portal using a CounterPath Multimedia Communicator, like eyeBeam.

Dual-mode Handover

Provides seamless voice and data services between mobile and Wi-Fi networks via dual-mode handsets.

MNO / MVNO Interconnect

Enables numbers from a Mobile Network Operator (MNO) and a Mobile Virtual Network Operator (MVNO) to roam into a partnering MNO’s network.



Network Convergence Gateway

Convergent Voice and Messaging for Consumers

Convergent Voice and Messaging enables mobile subscribers to start using their PC or laptop as a virtual mobile phone with their existing mobile voice and messaging services, plus a host of compelling new features—without adding a new phone number or changing phones.

Where Mobile Meets VoIP

Convergent Voice and Messaging is a CounterPath MobileVoIP application that integrates a CounterPath softphone with mobile services and a mobile phone number. Using the Network Convergence Gateway (NCG) within the mobile operator's core network, a bridge is formed between the mobile network's SS7 signaling and the SIP signaling of a broadband network.

By connecting a CounterPath softphone to a broadband connection, it is registered and authenticated by NCG in the mobile network. The result is an ability to associate these two user devices (PC and mobile phone) with a single phone number and set of services—effectively turning the softphone into a virtual mobile phone capable of SMS, MMS and bypassing metered cellular minutes with low-cost VoIP calling.

Benefits for Mobile Operators

- Provides a distinctive and strategic mobile Unified Communication and Fixed Mobile Convergence (FMC) service
- Grows use of mobile number and voice / messaging usage
- Grows ARPU via subscription and usage fees
- Expands usage of mobile portal and advertising audience
- Lowers roaming and churn costs
- Leverages and enhances existing network infrastructure
- Service bundles which offer convenience and value can increase ARPU through Minutes of Use (MoU)
- Enables direct response to Internet VoIP competitors
- Enables low CapEx and TCO, fast ROI and is engineered for:
 - Turn-key deployment, fast time to market
 - Simplified network architecture
 - Simplified logistics

Convergent Voice and Messaging is available in:

USB Key Distribution: contains a SIM Card Reader, a SIM Card and integrated Flash memory storing the eyeBeam client.



Softphone Only Distribution: an eyeBeam client that is designed to authenticate directly to the operator's core network through RADIUS.

Benefits for Consumers

- Mobile number is the prime identity – one identity, one voice mail box, one message store with message waiting indication
- Receive voice calls, SMS, MMS on PC
- Send voice calls, SMS, MMS from PC (shows mobile number caller ID)
- Simple to use (i.e. drag & drop SMS, click to call)
- Calling features (call transfer, hold, barring)
- Call handover between PC and handset
- Sequential or simultaneous ring
- Video calling between eyeBeam, 3G mobile handsets



Dual-mode Handover

Seamless handover enables users to automatically connect to send or receive MobileVoIP calls on secure Wi-Fi, and seamlessly hand the call over to cellular when transitioning between networks—without dropping calls. Also referred to as Voice Call Continuity (VCC), seamless handover is the key subscriber demanded capability of MobileVoIP and Fixed Mobile Convergence (FMC).

Voice Call Continuity (VCC)

All Network Equipment Providers (NEPs) must offer VCC as part of their MobileVoIP offering to ensure deployment in core IMS and Pre-IMS networks. VCC provides mobile providers, fixed providers, cable providers and MVNOs the ability to offer single phone number voice services that can seamlessly hand over in-process voice calls between circuit-switched cellular and Voice-over-IP over Wi-Fi access networks.

Many NEPs are making build versus buy decisions on VCC handover. CounterPath and the Network Convergence Gateway leads other independent VCC providers in functionality, market readiness and handset support.

A growing number of dual-mode cellular/Wi-Fi handsets are compatible with the single phone number and seamless cellular to Wi-Fi handover capabilities of the CounterPath NCG. These include GSM/Wi-Fi Windows Mobile® devices targeting the enterprise, and low cost Linux smartphones from, suitable for mass consumer use.

Dan starts the day early, joining a conference call with the London office. This call uses his home Wi-Fi network.

He leaves his condo to get on the train. The call automatically performs a seamless handover from Wi-Fi to cellular.

Dan arrives at the office and transitions onto the corporate Wi-Fi network—never dropping the call.



Benefits for Mobile Operators

- Delivers near term voice and messaging services and revenue
- Seamless bridging of current mobile and IMS networks
- In-call handover based on 3GPP technical requirements
- Certified against tier one NEPs existing suite of products
- Standards based solution for all – wireline, wireless, cable, MVNO providers
- Coverage, churn reduction, capacity, and continuity with mobile / Wi-Fi, Pre-IMS / IMS VCC
- Opportunity to bundle VCC with other services to increase share of user's total telecom spending
- Flexible 2G+ and IMS Architectures for Consumer Services
- Controlled user experience and billing relationship

Benefits for Mobile Consumers

- Convenience of a single handset with improved in-building coverage
- Opportunity to save wireless minutes and gain an unlimited pool of VoIP minutes
- Ability to have a single relationship for all voice and messaging services via single-number identity

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MVNO Interconnect

Enables Mobile Network Operator (MNO) and Mobile Virtual Network Operator (MVNO) numbers to roam into a partnering MNO's network. End-user customers will maintain single number identity while roaming between partnering mobile networks and their VoIP networks, seamlessly. CounterPath's Network Convergence Gateway Solution unites the MNO and MNVO networks.

MVNOs Roam Into the MNO Network

Mobile Network Operators (MNOs) have the opportunity to expand network usage and transactions by enabling other non-mobile operators to roam into the MNO network. With the MVNO Interconnect solution, MVNOs may roam VoIP DIDs directly into the mobile network and offer service parity between the mobile and VoIP networks. This enables a win-win model for the MNO and MNVOs by increasing overall network usage and seamless service interaction between the two networks.

The solution is typically hosted by the MNO which gives total control over service delivery and feature enablement of the MVNO. The CounterPath NCG performs the role of a Gateway MSC (Mobile Switching Center) in the mobile network, providing an entry point for VoIP numbers into the Mobile Network.

MVNO Interconnect Capabilities

- Roams existing Fixed, Cable and MVNO VoIP phone numbers into the Mobile Network
- The NCG MSC locates subscribers on mobile and IP networks

The CounterPath NCG captures inbound and outbound calls and provides the interface for Call Detail Records (CDR) integration with billing systems. The MVNO Interconnect application also provides optimal long distance routing and keeps local calls in local LATA.

- Extends mobile services to SIP endpoints
- Turns mobile handsets into VoIP endpoints

Benefits for Mobile Operators

- Increase revenue through network expansion of non- overlapping customer base of the MVNO
- Reduce CapEx and OpEx by moving significant amounts of traffic from the mobile radio access network to the broadband access networks (cable or DSL, with a Wi-Fi option)
- Acquire and grow subscriber base by extending products and offering new opportunities for bundled services
- Acquire new opportunities to gain a higher share of subscribers, telecommunication spending
- Reduce churn through bundling

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Specifications - Network Convergence Gateway

SIGTRAN

- Signaling System 7 Message Transfer Part 3 (MTP3)
 - User Adoption Layer (M3UA) (IETF RFC 3332)
- Stream Control Transmission Protocol (IETF RFC 2960)
- GSM ITU/NA MAP over SIGTRAN

GSM

- 3GPP 29.002 Release 4
- TCAP ITU White Book
- SCCP ANSI T1-112 1988
- SCCP ITU Blue Book
- "C" Interface to HLR
- "E" Interface to MSC
- "E" Interface to SMS-C and 3GPP 23.038 Extended Character Set
- 3GPP TS 24.228 Client / SIM Authentication
- 3GPP TS 23.140 MMS MM1 Client Server Interface

Intelligent Networking

- 3GPP 23.078, 29.078 CAMEL Phase 2, 3, & 4 Origination and Termination Triggers to support the Services Control Function (SCF)

SIP

- Session Initiation Protocol (IETF RFC 3261)
- Reliability of Provisional Responses in SIP (RFC 3262)
- Offer/Answer Model with SDP (IETF RFC 3264)
- SIP Specific Event Notification (RFC 3265)
- Session Description Protocol (SDP) (IETF RFC 2327)
- REFER Method (RFC 3515)
- Message Waiting Indicator (RFC 3842 and RFC 3265)
- Session Initiation Protocol for Instant Messaging and Presence Leveraging Extensions (SIMPLE) to SMS (RFC 3428)
- SIP-Aware Load Balancing using Open Shortest Path First (RFC 2328)
- Basic Network Media Services (RFC 4240) for Tones and Announcements
- HTTP Digest Authentications Using AKA (RFC 3310)

OSS/ BSS

- CDR Generation via FTP or RADIUS
 - RADIUS Accounting/CDR Generation (RFC 2866)
 - RADIUS Authentication Client (RFC 2865)
- OS Resource Monitoring / High Availability
- SNMP v 2C Alarm Monitoring, Statistical Gathering
- MIB II (RFC 1213)
- Subscriber Trace

Hardware (Minimum Specification)

- IBM Blade Server T
 - 4 Power Supplies/Chassis
 - 1 Management Modules/chassis
 - 4 1 Gigabit Ethernet Switch/chassis
 - NEBS 3 and ETSI certified
 - 8U height by 19" rack width chassis
 - Either AC or DC power
 - No single point of failure
 - Hold up to eight (8) blades
- IBM Blade Server
 - 2.8 GHz CPU
 - 4G RAM: Two 2G modules
 - 80G Hard Disk: Two 40G SCSI RAID-1 drive

Operating System

- Redhat Linux Redhat Enterprise Linux Standard Edition ES 3.0 Update 8

Standard 2/2/2/4 Redundant Configuration

- 2 IBM Blade Center T Chassis
- 2 Convergence Database (CDB) blades
- 2 Network Signaling Handler (NSH) blades
- 4 Convergence Services Gateway (CSG) blades

System Performance

- 100,000 BH simultaneous registrations per CSG blade
- 100,000 BH Voice, SMS, or MMS call/transmission attempts per CSG blade

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