

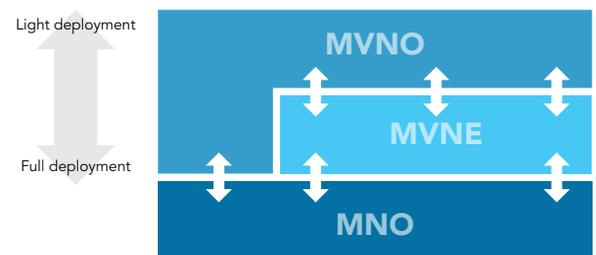
## Accelerating Service Opportunities for MVNOs and MVNEs

### Mobile Virtual Network Ecosystem

The mobile network virtual operator (MVNO) landscape is changing fast, and the various participants are implementing numerous operating and deployment models ranging from light deployments to full network core and transport functionality.

The operators that make up the mobile virtual networks ecosystem are varied in size, infrastructure intensity, and market focus and address different end-user segments and demographics. While some focus on the business-to-consumer market, others exclusively concentrate on business-to-business, providing enabling services only to other virtual network operators. The latter group, also known as mobile virtual network enablers (MVNEs), play an important role providing the technical heavy lifting for MVNOs with services like:

- Traffic aggregation
- Network switching
- Session routing
- Interfacing and interworking with MNOs
- Customer care outsourcing
- Device management
- Billing



MVNOs are progressively investing in their own networks, seeking to gain operational and service independence from the underlying MNOs. MVNEs are fulfilling a need to help MVNOs that lack network expertise, infrastructure, and capital by providing a flexible way to add additional services above and beyond what is supported by the underlying MNOs.

### Dialogic Solutions for Mobile Virtual Network Operators and Enablers

Dialogic products and solutions can benefit not only MVNOs looking to move from a light to full infrastructure model, but also MVNEs by providing virtualized signaling, switching, media processing, and real-time communications solutions to modernize their networks and provide advanced white label services to their MVNO customers.

Dialogic solutions focus on solving technical challenges in specific areas of MVNO and MVNE networks that involve signaling, session and call control, voice-video-text applications, and media processing, including:

- Signaling, interconnection, and interoperability between networks
- Switching and routing
- Charging control applications for prepaid users
- Real-time communications white label services
- Customer care enablement
- Diameter/MAP interworking

### Signaling, Interconnection, and Interoperability Between Networks

A key component used for signaling interworking between networks is a Signal Transfer Point (STP). The STP is used for routing and traffic termination and has been a mainstay platform for 2G and 3G networks. It can be offered as a part of a signaling service by MVNEs or used by MVNOs for routing traffic from mobile switching centers (MSCs) to MNOs.

# Accelerating Service Opportunities for MVNOs and MVNEs

The Dialogic® DSI Signaling Transfer Point (DSI STP), based on the Dialogic® DSI G5V Signaling Controller, is a compact, cost-effective, software-only telecommunications signaling platform, providing core network connectivity for use in all-IP signaling environments. The DSI STP supports comprehensive screening capabilities in addition to routing at the MTP and SCCP levels and Global Title Translation. MVNEs can use STP signaling to connect their networks to MNOs, as well as to MVNO networks. MVNOs can use the platform to get more control on costs and services that require signaling to and from their network, underlying MNOs, and the PSTN.

## Switching and Routing

An important component in telecommunications network is the softswitch. The softswitch is used for voice switching and call control, and enables MVNOs and MVNEs to implement the service logic involved in routing traffic, porting numbers, and least cost routing of calls, as well as provide differentiated offerings. In addition to call routing, HLR interrogation is another of the softswitch's many functions applicable to MVNOs and MVNEs.

Due to the softswitch's importance, virtual network operators need it to be reliable and stable to deliver the Quality of Service (QoS) their customers expect. The Dialogic® ControlSwitch™ System provides these functions and capabilities, along with unparalleled routing control and service flexibility. Unrestricted access to a wide range of routing parameters, which can be extended on demand, gives operators the ability to support a variety of service classes and specialized routing above and beyond that afforded by the MNO.

The ControlSwitch System supports Class-4 interconnection services between MVNOs and international, national, or regional mobile operators. In addition, the Dialogic® I-Gate® 4000 PRO and Dialogic® I-Gate® 4000 EDGE media gateways (MGWs) can be added to provide termination to carriers requiring TDM links. The Dialogic® BorderNet™ Session Border Controller (SBC) enables highly scalable IP interconnection for those MNOs requiring SIP-based connectivity of voice traffic to peering partners. A SIP-enabled MNVO makes it possible to obtain better control of traffic flows and develop services independent of the underlying MNOs. The BorderNet SBC is an all-software, appliance that can be deployed either on Commercial of the Shelf Servers (COTS) or in virtualized environments, and like the ControlSwitch System, it can be deployed in public or private clouds. Investment is further optimized due to the highly scalable nature of the solution, which can be deployed with as little as 25 sessions and grow to over 100,000 as the traffic increases. Separate media handling platforms are not required because the BorderNet SBC supports native software-based transcoding.

**Key Ingredients for MVNO Success**

McKinsey & Company did an analysis on the key success factors for MVNOS. Successful MVNOS incorporated the following when it came to strategy:

- Exploit brands and market segmentation** – Create a unique position and value proposition for specific demographic, emerging, and underserved segments that traditional MNOs find too costly or are unable to address.
- Build MNO relationships** – Understand the commercial drivers to effectively negotiate business terms and conditions to prevent cannibalistic pricing.
- Strive for market excellence** – Deliver simple product offerings with clear subscriber value, and make it easy for customers by offering innovative pricing and streamlined customer interaction.
- Focus on sales and customer excellence** – Offer channel incentives, promotions, and customer engagements as key components in delighting the customer
- Pursue operational excellence** – Find the right level of infrastructure investment to minimize cost while balancing internal skill sets; engage the right enabling partners

*Virtually mobile: What drives MVNO success - McKinsey & Company, Inc.*

<b>MVNO/MVNE Functions</b>	Applications and Customer Engagement	Service Activation	Analytics Reporting	Customer Care / CRM	IVR / VIVR	Hosted UC
	Charging and Billing Applications			Billing	OCS	Balance Management
	Routing and Service Logic		Policy	HLR / HSS	MGCF	Mediation
	Transport, Access and Interconnect	vSBC	MGW	GMSC	SS7 / SIGTRAN	DRA / DEA IWF
<b>MNO Functions</b>	RAN	UMTS / EPC	HLR / HSS	GMSC / MSC	SS7 / SIGTRAN	DRA / DEA / IWF

Dialogic Solutions

Figure 01. Dialogic solutions enable MVNEs to replace legacy infrastructure with modern, virtualized network functions and offer a wider array of white label services to MVNOs. They help MVNOs as they move from a light to a full deployment model to gain more control over subscriber quality and services offered.

# Accelerating Service Opportunities for MVNOs and MVNEs

## Charging Control Application for Prepaid Users

Prepaid subscribers are a primary target for MVNO customers, and flexibility is key when it comes to setting up the charging rules and policies that verify whether customers have a sufficient balance to make calls. An account-centric model that supports real-time charging can help eliminate potential credit overruns from prepaid users, and enable verification that users have sufficient funds on their accounts before the service can be consumed. Failure to perform real-time validation can leave the MVNO with a loss of revenue. Traditionally, this charge verification step has been handled by platforms using the CAMEL protocol, but not all charging and billing platforms support CAMEL and some may use other protocols like HTTP.

The Dialogic® PowerNova™ Application Server (AS) uses a SIP-based approach to manage call flows in service provider networks and can be configured through its flexible GUI-based drag and drop service creation environment to provide charge control functionality and mediation capabilities. The charge control application built on the PowerNova Application Server provides key functionality including account balance management, session supervision for geographical redundancy, and protocol mediation. Benefits of using the PowerNova solution include:

- Revenue loss prevention through real-time charge control
- Reduced complexity compared to traditional platforms
- Rapid design and implementation

A Gateway MSC (GMSC), like the ControlSwitch System, maintains control over the call using the SIP protocol. If a subscriber has a sufficient credit balance, the PowerNova charge control application instructs the ControlSwitch to connect the call to the destination carrier.

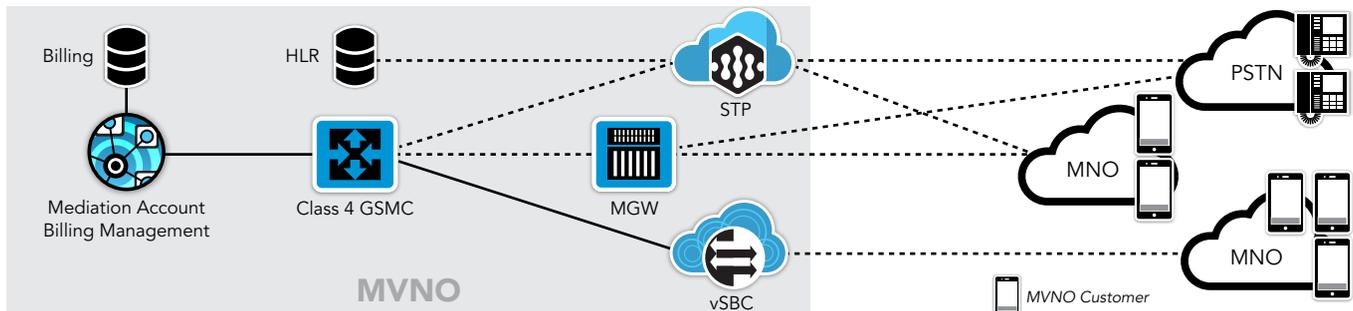


Figure 02. Dialogic solutions for virtual network operators include the PowerNova-based charge control application, GMSC, virtual SBC, media gateway, and virtualized STP. Together, they provide a comprehensive, scalable and reliable routing, termination, and real-time charge control solution to protect revenue from pre-paid subscribers and provide a high degree of subscriber QoS.

## Real-time Communications White Label Services

MVNOs and MVNEs are looking to expand the set of offerings to support more attractive market segments like small businesses and entrepreneurs. Dialogic has white label, all-software, real-time communications services to further enable and integrate the mobile digital lifestyle for MVNO customers including on-the-go workgroups in companies with a multinational footprint.

Enabling access to the latest services as seamlessly as possible can lead to increased revenue for operators, improved productivity, and overall satisfaction for subscribers. Deploying services in a matter of hours and days, versus weeks and months, can help maximize time-in-market. Dialogic offers converged rebrandable solutions that can all be accessed via a subscriber’s smartphone or desktop like:

- Hosted PBX
- Business VoIP
- Visual voicemail
- Video and voice conferencing,
- Mobile apps

These services can be provided directly by an MVNO or hosted by MVNEs wanting to provide an expanded array of communications and collaboration services to its MVNO customers.

# Accelerating Service Opportunities for MVNOs and MVNEs

## Customer Care Enablement

The Dialogic® PowerVille™ IVR application is implemented in over 250 telecom service provider networks and over 15,000 enterprises in more than 95 countries around the world for a variety of self service, customer care, and value added service applications.

The PowerNova AS is at the heart of this IP-based multimedia communications service delivery platform. It simplifies application innovation and development to help MNVOs and MVNEs create new multimedia, omni-channel customer engagement applications and bring them to market faster and more cost effectively.

Some common customer care and customer engagement applications that have been deployed using the PowerNova AS include Network IVR for prepaid mobile services, outbound telemarketing, auto-attendant services, and Visual IVR for improved customer interaction and first call resolution (FCR).

The Dialogic® PowerVille Visual IVR application can enhance the user experience by making it easier for a subscriber to interact with an MVNO's customer care organization. A Visual IVR extends the capabilities of a normal IVR by transforming it into a collaborative, voice and visual, on-demand web-based application for smartphones. Without having to download an application, any software, or require the user to register on an app store, an enterprise can initiate a Visual IVR session in which a customer is no longer limited to "dial pad only" interactions with the smartphone screen. The Visual IVR expands customer engagement opportunities by enabling dynamic and interactive capabilities of a web-based interface. It can leverage location and other contextual information, and can incorporate audio prompts, text, visual cues, graphics, and simultaneous presentation of options for the customer to select. Interaction is enhanced because the customer is no longer limited to numeric options on a keypad, but can now also use characters and screen-selectable options as well.

The benefits are clear with the PowerVille Visual IVR both for the MVNO and their subscribers:

- Higher selection accuracy because the subscriber can change entries before selecting
- No need for the subscriber to download and install potentially large apps because the Visual IVR application is on-demand and web-based
- Subscriber engagement portals and campaigns can stay fresh because changes to the Visual IVR content can be made rapidly and does not require the customer to update any app
- Lower average holding times because a full menu can be displayed at once
- Expanded user options that integrate pictures, chat, instructional videos, camera shots, messaging, as well as breakout to a live agent to create an omni-channel user experience

Effective and engaging customer care and interaction can differentiate an MVNO. Dialogic customer engagement solutions make creating and implementing these solutions easy.

## Diameter/MAP Interworking

Charging, billing, and authentication of services are important functions of concern to MVNOs when providing 3G and 4G mobile data services to their customers. Diameter Signaling Controllers (DSCs) facilitate the interconnection between MVNEs or MVNOs and the underlying MNO networks. DSCs perform a lot of the "heavy" lifting needed when it comes to signaling interworking, network protection, and mediation to rapidly enable new services securely and flexibly.

DSCs can support several initiatives to expand services delivered by MVNOs or enabled by MVNEs:

- Enabling 4G services with Diameter to MAP interoperability
- Offering specialized billing plans through integration with an MNO's online charging system (OCS)
- Addressing Wi-Fi opportunities with RADIUS integration
- Accelerating roaming opportunities using Diameter
- Supporting IoT signaling mediation solutions for Private Virtual Network Operators (PVNOs)

Dialogic can help MVNOs and MVNEs with Diameter, MAP, and RADIUS interconnect solutions that can facilitate expanding 4G offerings, enable new virtual network operator business models, and speed interoperability with MNO authentication infrastructure.

## Comprehensive Array of Solutions for the Creative MVNx

Dialogic solutions enable MVNEs and MVNOs to build an open IP-based architecture that can leverage existing infrastructure investment while establishing a future-proof IP-based network model. Some of the Dialogic IP solutions for virtual network operators and enablers include:

Dialogic Solutions	Features and Capabilities
<b>DSI G5V Signaling Controller</b>	<ul style="list-style-type: none"> <li>Virtualized Signal Transfer Point (STP) and signaling gateway</li> <li>Flexible signaling Message Router and gateway STP                             <ul style="list-style-type: none"> <li>Cost effective solution for end-of-life STP replacement applications</li> </ul> </li> <li>SCCP routing services                             <ul style="list-style-type: none"> <li>Flexible interconnection gateway between multiple networks with routing based on DPC, SSN, Global Title, and others</li> </ul> </li> <li>SIGTRAN Gateway                             <ul style="list-style-type: none"> <li>High-density E1/T1 TDM connectivity using LSL, HSL, ATM (up to 248 LSL)</li> </ul> </li> </ul>
<b>ControlSwitch System</b>	<ul style="list-style-type: none"> <li>Fully virtualized, public cloud deployable</li> <li>IMS/VoLTE-ready MGCF and GMSC</li> <li>Integrated MGCF and BGCF</li> <li>Migration path from existing TDM voice networks to NGN and IMS/VoLTE</li> <li>Open architecture – works with existing media gateways (MGWs)</li> <li>True geographic redundancy</li> </ul>
<b>I-Gate 4000 Media Gateways</b>	<ul style="list-style-type: none"> <li>High-quality voice</li> <li>Significant bandwidth savings opportunities – up to 16:1 – well suited for point-to-point, high traffic volume migrant/ethnic MVNx applications</li> <li>Low- and high-port density options</li> <li>NGN and IMS/VoLTE applications</li> <li>Open platform – support for MGCP and H.248 media gateway control with other vendors’ switching platforms</li> <li>Transcoding gateway (I-Gate 4000 PRO MGW) – support for HD Voice codecs used in 4G and WebRTC</li> </ul>
<b>BorderNet SBC</b>	<ul style="list-style-type: none"> <li>All-software SBC available as either a virtualized or hardware appliance</li> <li>Native software-based transcoding</li> <li>Scalable from 25 to 100,000 sessions</li> <li>Advanced processing scheduler improves media and signaling performance and scalability in both virtualized and COTS deployments</li> </ul>
<b>PowerNova Application Server and Service Creation Environment</b>	<ul style="list-style-type: none"> <li>Platform for building real-time applications and omni-channel engagement solutions that manages and directs multimedia sessions including recorded and real-time voice, video, and messaging                             <ul style="list-style-type: none"> <li>GUI-based service creation environment allows application designers to drag and drop functional building blocks to create and modify services and service call flows</li> <li>IMS-ready, Telephony Application Server (TAS) and SIP session manager with multiple tiers of B2BUA capability and support for call management and routing</li> <li>Messaging support including SMS and SMPP</li> <li>Media server interaction using MSML/MOML, MSCML, or VXML</li> <li>Diameter-based authentication, CDR, and charging module</li> <li>Social media and mobile app plug-ins</li> <li>Web services module</li> </ul> </li> </ul>
<b>PowerVille Applications</b>	<ul style="list-style-type: none"> <li>PowerVille applications are built using the PowerNova Application Server. Many of the applications can be deployed out-of-box                             <ul style="list-style-type: none"> <li>Network IVR</li> <li>Visual IVR</li> <li>Cloud Centrex and hosted PBX</li> <li>Business and consumer VoIP</li> <li>Visual voicemail</li> <li>Audio and video conferencing</li> <li>Outbound telemarketing (voice – video – email – SMS)</li> <li>Prepaid calling recharge, balance inquires, and activation of customer self-care services</li> <li>WebRTC Click-To-Call</li> <li>Intelligent routing services – toll free, special number, redirection</li> <li>SMS, social media, messaging platform integration</li> </ul> </li> </ul>



# Accelerating Service Opportunities for MVNOs and MVNEs

---

## Summary

MVNOs want to take more control over how they deliver services to their subscribers and how they manage their underlying MNOs. Dialogic solutions provide virtual network operators and enablers with software-centric, scalable infrastructure, flexible real-time application creation, and customized development solutions that improve their ability to rapidly respond to market demands without putting a strain on their operations.



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

For a list of Dialogic locations and offices, please visit: <https://www.dialogic.com/contact.aspx>

Dialogic, I-Gate, ControlSwitch, BorderNet, PowerNova, and PowerVille are either registered trademarks or trademarks of Dialogic Corporation and its affiliates or subsidiaries ("Dialogic"). Dialogic's trademarks may be used publicly only with permission from Dialogic. Such permission may only be granted by Dialogic's legal department at 3300 Boulevard de la Côte-Vertu, Suite 112, Montreal, Quebec, Canada H4R 1P8. The names of actual companies and products mentioned herein are the trademarks of their respective owners.

Dialogic encourages all users of its products to procure all necessary intellectual property licenses required to implement their concepts or applications, which licenses may vary from country to country. None of the information provided herein forms part of the specifications of the product(s) and any benefits specified are not guaranteed. No licenses or warranties of any kind are provided hereunder.

Any use case(s) shown and/or described herein represent one or more examples of the various ways, scenarios or environments in which Dialogic® products can be used. Such use case(s) are non-limiting and do not represent recommendations of Dialogic as to whether or how to use Dialogic products.

Dialogic may make changes to specification, product descriptions, and plans at any time, without notice.