# A New Vision: NMS Media Servers

## ABSTRACT

Innovative rich media applications are coming to market at a tremendous pace and service providers are demanding ever shorter development cycles. Developers are responding to this demand for new applications by evolving their business models to focus on application development and solution integration, rather than platform development and hardware integration. Underlying media processing solutions, previously built in-house, are being replaced by commercial off-the-shelf media servers. Current first-generation media server offerings, however, do not address key requirements, such as supporting a broad range of media types and networks and the ability to support legacy protocols.

In response to these market needs, NMS is offering the Vision family of media servers, a comprehensive product line designed to help developers rapidly develop and deploy converged multimedia applications. Leveraging proven NMS components, Vision media servers are built in a layered architecture that is configurable, adaptable, and based on open standards. Vision delivers a complete family of sophisticated solutions that together solve a broad range of application needs, all from a single trusted vendor.

## About NMS

NMS Communications (NASDAQ: NMSS) is a leading provider of technologies and solutions for mobile applications and infrastructure. Our products enable new mobile voice, data, and video applications and improve the performance and quality of wireless networks, helping customers grow their revenues and profits. Customers and partners include the world's leading telecom equipment providers, system integrators, communication developers, and mobile and fixed-line network operators.

Building on over 20 years of communications industry expertise, NMS is dedicated to providing superior products and technology. And with decades of experience deploying products in networks around the world, we bring value to our customers, allowing them to expand their wireless offerings with multimedia solutions and improve the efficiency of their wireless networks with voice quality solutions and products for RAN optimization.

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## The Increasing Demand for Rapid Service Deployment

Service providers have traditionally measured the time to define, develop, trial, and deploy new services in years. Building a new service on a proprietary platform is an enormous investment in money, resources, and time, leading to harsh financial consequences if the new service proves to be unprofitable. This environment often discourages innovation — if the financial impact of failure is severe, there is very little tolerance for risk taking.

But we are witnessing a sea change in investment priorities for the telecom industry. As new technologies, such as VoIP and SIP, make it simpler and less expensive to roll out new services, the market is responding with the development of new communication services at a tremendous pace. New consumer and business market segments are emerging, with offerings being introduced every day by an increasing number of competitors, including Internet service providers eager to expand beyond their current data offerings into new integrated voice and video services. Service providers are now faced with the challenge of evaluating and entering new markets with compelling offers within months, not years, so that they can quickly capture market share and establish a significant market position.

In today's competitive climate, there is no time to develop a vertically integrated platform and application from the ground up. The time lost could result in competitors getting to market much sooner, allowing them to grab early market share and deprive others of precious early revenue.

## Responding to the Challenge

With service providers expecting advanced multimedia capabilities in record time, developers, particularly network equipment providers (NEPs), must dramatically redesign their business models and development processes and take advantage of new technologies if they are to be competitive and capture market share.

### Focus on Applications and Integration

NEPs must shift their attention and internal resources to the areas that will have the greatest impact on reducing time-to-revenue for their customers — delivering new applications and providing comprehensive integration and support services. This often results in a shift away from a focus on the technology and toward the redeployment and redirection of current resources to add new

skills, expertise, and processes. For many organizations, this means de-emphasizing the hardware and software development capabilities that had long been considered their key competitive differentiator.

### The Trend Away from In-House Development

This shift in focus away from the technology and toward the application as the source of differentiation is causing many NEPs to look outside for their technology. With scarce internal resources now driving application development or managing integration projects, the development teams that vigorously debated the merits of internally designing and building media processing hardware platforms are now realizing that even higher levels of technology sourcing will be necessary if they are to keep pace with the accelerating processing and connectivity demands of their application-building coworkers. In the past, many NEPs viewed any system-level products from a technology vendor, such as NMS, as a competitive threat. Within the last year, however, many NEPs have shifted to the view that open application development environments are the fastest and most economical path to market.

### Adopting Internet Methods and Technologies

The telecom world is on the verge of discovering the enormous productivity gains and risk reduction that can be achieved by adopting Internet software technologies. Innovations, such as the rise of network distributed processing using Internet protocols and the change in the programming environment from compiled code development to scripting and markup languages, enable dramatic reductions in software development cycles.

**Distributed architecture —** By building computing resources from a distributed network of inexpensive processors and accessing them via Internet protocols, developers no longer need large special-purpose processors. They can now build applications on a variety of network servers, most of which are based on general-purpose computing platforms. Multimedia applications, with their tremendous appetite for processing power, are a natural fit for this distributed computing environment.

**Mark-up Languages —** Mark-up languages, like VoiceXML and CCXML, are enabling developers to render the voice user interface and implement complex network signaling much faster than with compiled languages. This dramatically reduces the number of software cycles required during an application's development, test, trial, and deployment processes. And complementing these languages are SIP and other network protocols that simplify traditional telecom functions that normally require highly specialized programming skills, such as call control and network signaling.

# Media Servers:
# The Key to Rapid Deployment

As developers focus more on the application and move away from in-house development, they need open, commercially available technology on which to develop and deploy their multimedia applications. Multimedia applications require significant media processing and handling resources to deliver integrated, high-performance services that meet the expectations of demanding subscribers. While initial deployments of rich media services often used dedicated media processing platforms to execute each application or service, developers are now turning toward media servers as the service platform. Media servers, fundamental components of next-generation networks, facilitate the sharing of media resources within the network among many different services, enabling significant cost savings for service providers.

But while media servers promise to provide turnkey solutions that can dramatically reduce application development time, first-generation offerings do not address key market requirements.

## The Limitations of First-Generation IP Media Servers

Early media server offerings typically consist of proprietary appliance-class units with pre-defined media and protocol support, network interface options, and support for VoIP networks only. Typically, first-generation IP media servers:

- Lack TDM and SS7 interfaces which enable current network infrastructures, emerging VoIP networks, and the IMS architecture of the future to be supported from a single unit without a forklift upgrade

- Support a limited number of hardware platforms and operating systems, which prevents them from complying with supported technology guidelines common within large NEPs and service providers

- Do not have the ability to be readily modified to accommodate important legacy protocols and vocoders critical to supporting existing applications

# Vision: A New Approach
# to Media Servers

NMS's approach to media server design is embodied in the new Vision family of media servers and is based on key principles that are highly distinguished from other commercial media servers. The Vision media servers from NMS:

- Own and manage the bearer channels (VoIP, ISDN, or ISUP), with responsibility for network signaling

- Perform media processing: basic IVR functions, transcoding, media streaming, conferencing, fax, and video stream processing

- Are controlled by applications through a network protocol, enabling the application to be created in a rapid-development environment

- Redefine the media server as an "open development platform" so that legacy features or unique capabilities can be accommodated

- Feature a layered architecture, based on NMS's Open Access™ components, that is configurable, adaptable, and supports open standards

- Integrate features like a media gateway and signaling server in order to reduce both the application development effort and the customer's vendor set

- Offer a range of interoperable server products in a family that together address a range of application needs

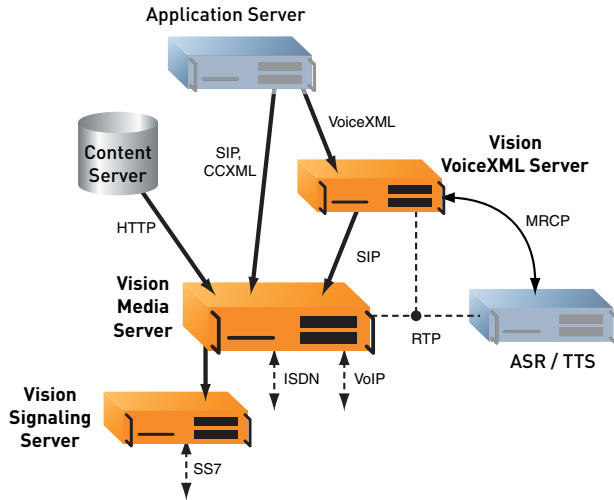| First-generation media servers | Vision Media Servers |
|---|---|
| Appliance, one-product-fits-all | Broad features built on Open Access, off-the-shelf configurations |
| VoIP-only | Supports VoIP, SS7, ISDN: All versions are SIP-enabled and IMS-ready |
| Multiple vendors and interoperability problems | Single vendor with integrated gateway and complete product line |
| Closed architecture = NO enhancement | "Open platform" invites customers to enhance their offerings and address new challenges |

**Figure 1: The Advantages of Vision Media Servers**

By eliminating the need to develop media platforms or source multiple platforms from multiple vendors, Vision media servers can save developers the significant effort of building telecom infrastructure equipment. This savings enables developers to get their product to market sooner, which hastens revenue generation and lowers the risk of introducing a new product or service.

## Vision Media Server

The Vision Media Server is the cornerstone of the Vision family and is ready to deploy in a wide range of applications, including network announcements, messaging, prepaid card processing, conferencing, self-service, voice portals, call centers, IP and mobile Centrex, and more.

The Vision Media Server manages the telephony user interface under remote control from an application and provides powerful media processing capabilities such as IVR, conferencing, transcoding, video, and fax. Media server control protocols define the network interface to applications. The Vision Media Server supports VoIP and SIP, but customers may also select PSTN network interfaces that fully integrate gateway functions, such as splitting VoIP streams for ASR engines or IP call agents.

**Figure 2: Vision Media Servers**

Control protocols based on Internet technology allow applications to remotely control the Vision Media Server over a network. Because the protocols use industry standards like SIP and XML, any language or rapid development environment, such as Java/J2EE and C#/.NET, may be used to build applications. The control protocols also enable scalable applications to be developed for high service availability, with minimal effort, by exploiting the properties of SIP to provide service discovery, load balancing, server failover, and other features that are well established for building distributed Internet applications.

The very broad Vision Media Server is available in a range of configurations that allow the developer to select the perfect cost, performance, and feature profile for each deployment (see Figure 3). Customers can purchase a Vision Media Server at reduced port capacity and later increase capacity using a simple product activation process without any modification to the hardware.

| Rack Size | Network Connections | Platform Type | Port Range |
|-----------|---------------------|---------------|------------|
| 1U | VoIP | PCI | 40–120 |
| 2U | TDM, VoIP | PCI | 240–720 |
| 4U | TDM, VoIP | CompactPCI | 1,440–2,400 |

**Figure 3: Vision Media Server off-the-shelf configurations**

## Vision VoiceXML Server

The Vision VoiceXML Server is specifically designed for deploying speech-enabled applications in VoIP or PSTN networks. It supports the VoiceXML language standard, as well as additional extensions based on XML, allowing outbound dialing, caller authorization, and information collection for call detail records without violating the VoiceXML standard.

The Vision VoiceXML Server can stream files with low latency from an HTTP server, caching media for improved performance. Fully enabled for SIP, the Vision VoiceXML Server can be combined with the Vision Media Server to provide applications with advanced

## Building Optimized Solutions

NMS offers both the Vision Media Server and the Vision VoiceXML Server, allowing developers to match required media processing capabilities to their applications' requirements and optimize for either cost or performance. The following chart characterizes the major differences between these two servers.

| | Vision Media Server | Vision VoiceXML Server |
|---|---|---|
| Media Functions | IVR, RTP vocoders, file compression, conferencing, fax, video | G.711 IVR |
| Network Interfaces | VOIP or TDM; SIP, ISDN, ISUP | VOIP or TDM; SIP, ISDN, ISUP |
| Call Control | Complex, SIP, CCXML | Simple, VoiceXML |
| User Dialog | Simple DTMF IVR | Complex with ASR and TTS |
| Dense Platform | DSP | X86 CPU |

**Figure 3: Capability Comparison**

Many applications follow a four-step sequence while executing. First, a call is placed or received, then a complex user dialog occurs. This triggers the third step of complex media processing, and finally the call is completed in step four. By architecting the application to implement the complex user dialogs on a Vision VoiceXML Server and the complex media processing on a Vision Media Server, the application can be both cost-effective and high performing, and can scale to significant port densities.

### Contact Centers

In contact center applications, the self-service portion, including automated handling of the caller inquiry, resides on the VoiceXML Server, while connection with call agents, the conferencing capability that enables a supervisor to listen to the call, and call monitoring and call recording functions run on the Media Server.

### Prepaid Card Processing

In prepaid applications, the resources that identify and authenticate the user, capture the number to be called, and handle account charging and operator assistance run on the VoiceXML Server. The actual connection to the called party, conferencing, and call monitoring are handled by the Media Server.

### Conferencing

The VoiceXML Server is best suited to identification tasks, including conference scheduling, conference identification, and caller authentication. The Media Server addresses establishing and managing connections to the conference, conference mixing, call monitoring, and recording.

user dialogs and speech processing, in addition to media server features like conferencing and announcements (see sidebar on previous page).

### Vision Signaling Server

Designed specifically to provide highly scalable network signaling capabilities for Vision Media Servers, the Vision Signaling Server brings NMS's proven SS7 signaling technology to a new range of applications and network deployments, including prepaid card processing, mobile Centrex, conferencing, and network announcements. The Vision Signaling Server combines high performance, telco-grade reliability, and up to 4 E/T1 trunks and 32 SS7 signaling links in a cost-effective, rack-mount server.

As enhanced services applications grow in popularity and call rates increase, the efficiency of network signaling becomes more important to service providers who are focusing on minimizing network operating expenses. SS7 provides higher capacity signaling than do alternatives such as ISDN or channel associated signaling (CAS). That in turn allows larger user populations to be supported without having to expand the enhanced services platform, improving both customer satisfaction and the bottom line.

## Conclusion

In an age in which the telecommunications industry is focused on the quick deployment of innovative applications, NEPs, application developers, and systems integrators are re-evaluating the way they do business. With a new focus on application development and solution integration, they are turning to commercially available media servers to get their applications into the hands of service providers and out to subscribers in record time.

But first-generation media servers have too narrow a focus and offer too limited a range of options. NMS's Vision media servers overcome these limitations and deliver powerful media processing solutions that address a broad range of media types and support IP, TDM, and SS7 networks. These servers make it possible for NEPs, application developers, and systems integrators to respond quickly to service provider demands for converged multimedia applications.

Vision media servers take advantage of NMS's expertise in innovative enabling technology and are built on a layered architecture that is configurable, adaptable, and based on open standards. Vision products also provide an open development platform environment so that legacy functionality or unique capabilities can be easily accommodated. With more than two decades of experience helping the world's major equipment manufacturers build and deploy media servers, and a core product line of unequaled breadth, NMS is uniquely suited to provide customers with a complete range of media server offerings that will give them lower development costs and unprecedented time-to-market advantages.

### Vision Video Products

Vision media servers can be combined with Vision video products to address demanding mobile and IP video applications.

### Vision Video Transcoder

The Vision Video Transcoder provides real-time, high-density transcoding and rate transformation capabilities for an expanding set of video formats, including H.263 and MPEG-4.

### Vision Video Gateway

The Vision Video Gateway supports real-time, bidirectional conversational and streaming video sessions between 3G-324M-enabled mobile phones and IP-based video applications.

**NMS** COMMUNICATIONS

NMS also has offices throughout North America, Europe, and Asia.
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