



[M A S T E R M I N D
T E C H N O L O G I E S]



Speaking from Experience™

Guide to Products & Services

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Mastermind Technologies, Inc
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About MasterMind Technologies, Inc.

MasterMind Technologies, Inc. is a communications technology company – a leading innovator and marketer of telephony software products and integrated solutions.

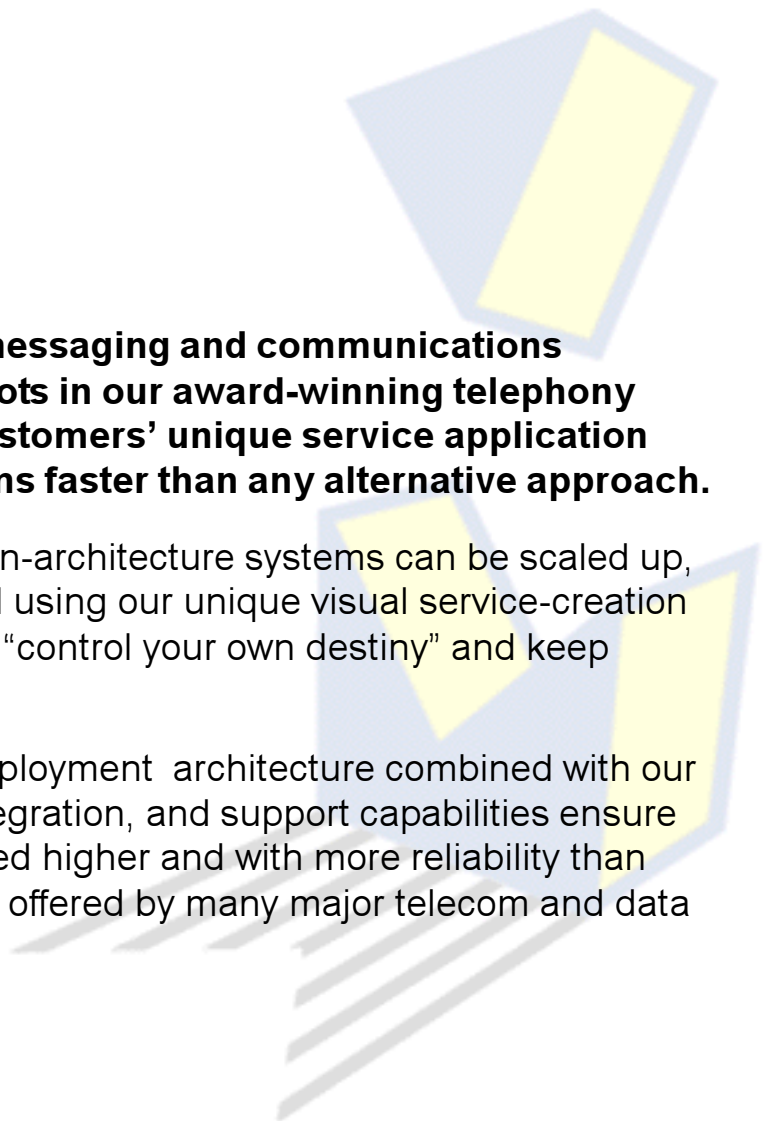
We provide signaling and service solutions to the new communications infrastructure marketplace - solutions that enable service providers to differentiate themselves from their competition by cost-effectively delivering high-performance telephony and messaging services across the global spectrum of disparate telecom and data networks.

Solutions

MasterMind Technologies' messaging and communications solutions, with their early roots in our award-winning telephony developer tools, turn our customers' unique service application ideas into production systems faster than any alternative approach.

Once in production, these open-architecture systems can be scaled up, modified, and enhanced at will using our unique visual service-creation environment – allowing you to “control your own destiny” and keep ahead of the competition.

Our fully redundant service deployment architecture combined with our unparalleled development, integration, and support capabilities ensure that your services can be scaled higher and with more reliability than even the “appliance” solutions offered by many major telecom and data networking companies.



Solutions

Our solutions combine carrier-class platforms with the ultimate in flexibility. MasterMind Technologies' solutions not only facilitate application-level customization, they are also able to neatly integrate into, and/or communicate with, existing networks, databases, devices, and billing systems.

MasterMind Technologies solutions offer the following benefits:

Maximum Market Differentiation via High-Value, “Tailor-Made” Services

If competitors are offering the same feature sets you are, then regardless of how extensive the features, your goal of differentiation has not been achieved. The highest value services are those that are customized to meet the specific requirements of your subscribers/users.

Shortest Time to Market

With the whole market now moving at Internet speed, you need to move fast to stay ahead of the competition. MasterMind Technologies solutions can be brought online in weeks if not days as opposed the months spent by competitors.

Maximum Flexibility

The market is constantly shifting and changing. To remain competitive, you require services that can be modified, enhanced, and evolved quickly, easily, and safely once they are up and running.

Carrier-Class Stability and Scalability

With consumer expectation of telco-grade reliability and quality of service (QoS), your services need to be highly scalable and able to provide carrier-class stability and reliability.

BrainStorm™ Unified Messaging

In general terms, Unified Messaging (UM) refers to a service that provides a central repository and management system for “messages” of all types, including voice-mail, email, fax, and pager messages. Typically, these messages can then be accessed from a number of devices including web browsers, telephones, and wireless devices.

Unified Communications (UC) unifies real-time communications with Unified Messaging. BrainStorm™ is MasterMind Technologies' answer to Unified Communications. BrainStorm™ not only replaces existing messaging systems, it provides a stable platform on which to roll out new services to existing subscribers as the UC market matures.

Built on the highly scalable telephony services platform, MasterNet, BrainStorm is a messaging storage and management system that integrates email, voicemail and fax into one virtual mailbox while also provides enhanced communications services such as “one-number” / “follow-me” calling, enhanced voice mail features such as automatic callback, forwarding of voice messages to email accounts and speech recognition-based IVR.

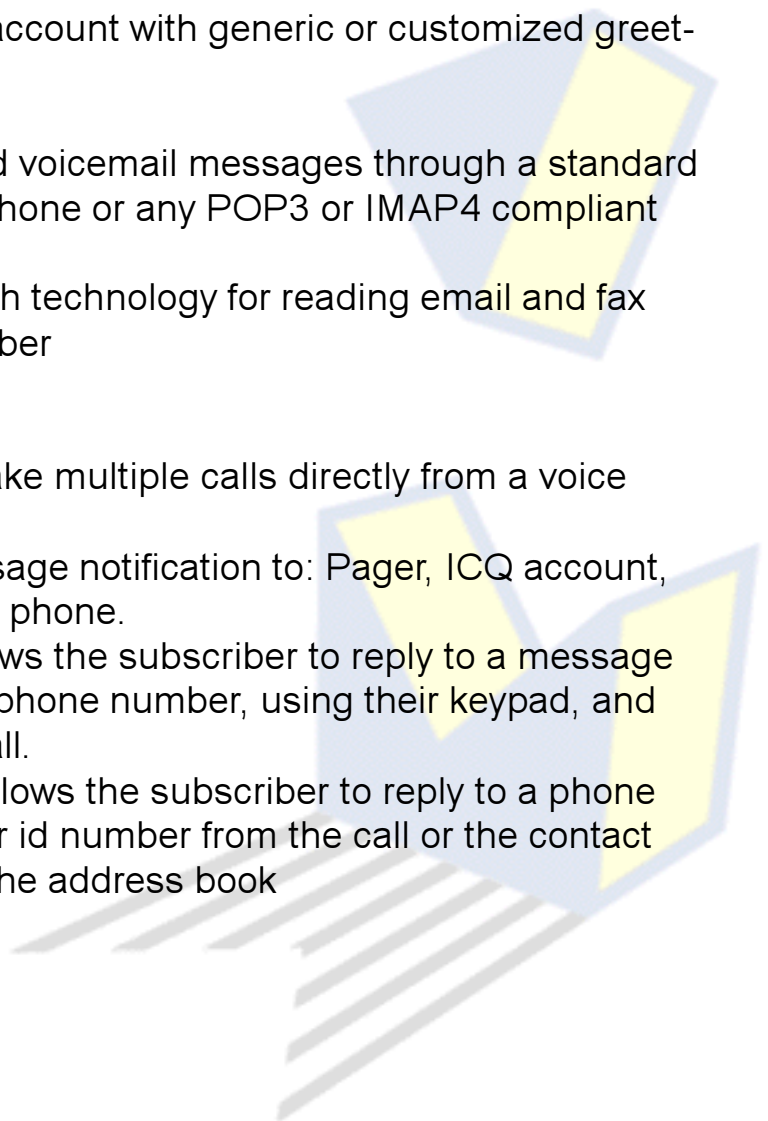
Messages can be accessed by telephone, web page or wireless device and email can be read to the user with text to speech technology or displayed with a web browser or in one of many de-facto standard email clients. BrainStorm users can send, receive, reply, forward, delete, consolidate and synchronize messages from a central management interface.

Distinct voice mail features include sequential call forwarding and a multiple direct dial-out function that gets a fresh dial tone after each call. Users can stream voicemail messages over the Internet and listen to email messages over the phone. Faxes can be downloaded and viewed in a TIFF format, or forwarded via phone or email to multiple locations.

BrainStorm™ Unified Messaging

BrainStorm is built on the fault-tolerant MasterNet telephony services platform which includes support for switching, enhanced IVR, fax, Voice over IP (VoIP), speech recognition, text-to-speech and a service creation environment for rapid application development. In addition, BrainStorm has standards-based interfaces to web servers, email and database management systems, web pages, email servers and databases.

Application Features

- ✓ Personalized voicemail account with generic or customized greetings
 - ✓ Fax account
 - ✓ Access to fax, email, and voicemail messages through a standard wireless or wireline telephone or any POP3 or IMAP4 compliant mail client
 - ✓ Advanced Text-to-Speech technology for reading email and fax messages to the subscriber
 - ✓ One-number follow-me
 - ✓ Message forwarding
 - ✓ Direct dial – ability to make multiple calls directly from a voice mailbox
 - ✓ Automatic inbound message notification to: Pager, ICQ account, email account, or mobile phone.
 - ✓ Standard Callback – allows the subscriber to reply to a message by simply entering a telephone number, using their keypad, and the system places the call.
 - ✓ Automated Callback – allows the subscriber to reply to a phone message using the caller id number from the call or the contact phone number listed in the address book
- 

BrainStorm™ Unified Messaging

Enhanced Features

- ✓ Phone based appointment and task management, including alerts
- ✓ Conferencing
- ✓ Access to call detail information for generating reports on call statistics
- ✓ Multiple time zone support

Mail Client Support

Integrates with almost any IMAP4 and POP3 compliant email client. Including some of the most popular email clients:

Outlook
Outlook Express
Eudora
Lotus Notes

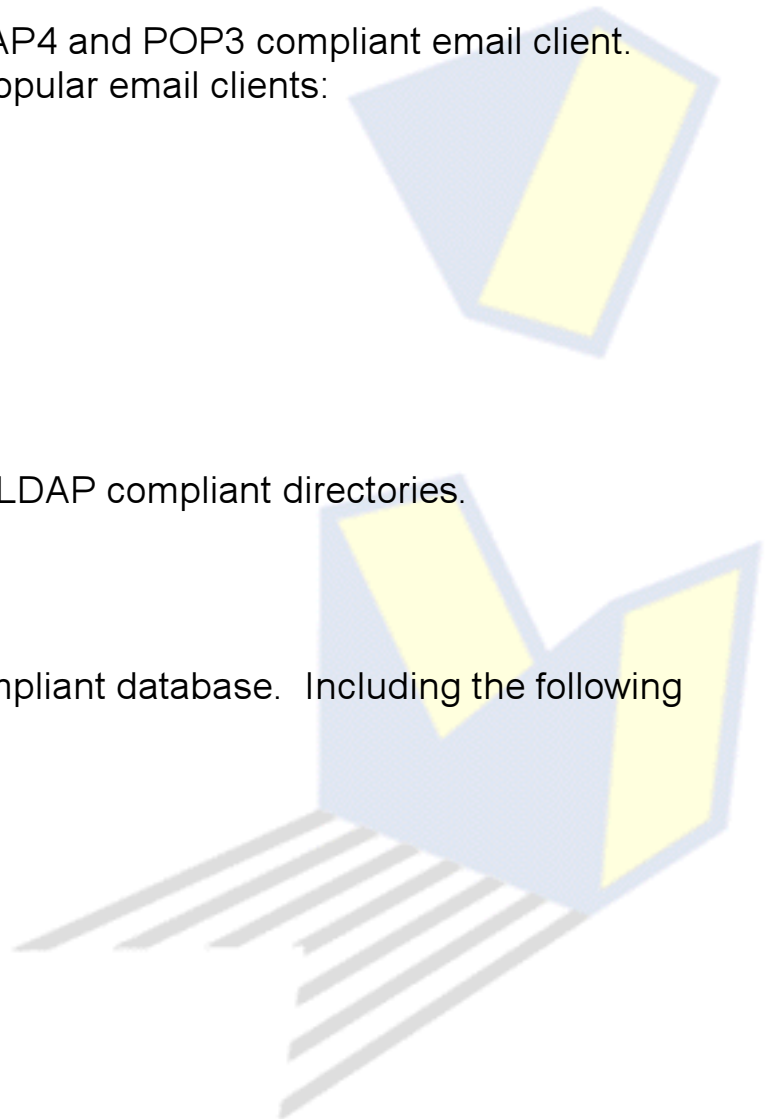
Directory Support

Built in support for LDAP and LDAP compliant directories.

Database Support

Integrates with any ODBC compliant database. Including the following industry-leading databases:

Oracle
MS SQL Server
Sybase SQL Server



UpFront™ Pre-Paid Calling

Around the globe, communications carriers are maximizing their subscriber bases while minimizing risk by deploying pre-paid communications and messaging services. Especially in countries where legacy billing and credit infrastructures do not exist, pre-paid calling services are exploding.

UpFront™ is MasterMind Technologies pre-paid communications and messaging solution.

Like BrainStorm™, UpFront™ is built on our MasterNet™ platform and therefore also inherits all of MasterNet™'s platform features (see the [MasterNet™](#) section of this product guide).

Application features

- ✓ Calling rates based on DNIS (dialed number)
- ✓ Optional first-minute surcharges
- ✓ Supports multiple customer-service locations
- ✓ Allows individual applications to be taken out of service without affecting others
- ✓ Service applications can be upgraded/replaced “on the fly”
- ✓ Supports least-cost routing
- ✓ Built-in calling-card fraud protection
- ✓ Configurable minimum balance requirements
- ✓ Configurable low-time warnings
- ✓ Allows multiple calls without intervening hang up
- ✓ Enables “rechargeable” calling cards (i.e., no need to reissue depleted cards)
- ✓ Supports multiple spoken languages – selectable via voice menu
- ✓ Configurable call blocking (e.g., to 900 numbers)
- ✓ Supports remote voice-prompt administration via telephone
- ✓ Manage accounts individually or in logical groups
- ✓ Extensive call logging/reporting

Custom Services

Custom Enhanced Services

Our signaling and service platforms, upon which solutions are deployed, are unique in their ability to support high-performance, feature-rich applications while also delivering carrier-class reliability, scalability, and manageability (see the *Technologies* section of this product guide).

With these robust platforms serving as a foundation, virtually any messaging or communications application solution can be brought to market in a matter of weeks.

The process of bringing a custom service online works as follows:

- 1) Service Application Requirements Definition:** A member of our sales team and a Solutions Development Manager will work with you to specify your unique service application.
- 2) MMT Product Requirements Analysis:** We'll continue to work with you to identify the appropriate technologies and sub-systems for the your particular service application, network environment, and infrastructure.
- 3) Application Design and Build:** Next, our applications engineers will get involved to ensure a sound and complete specification and to actually develop your unique service applications.
- 4) System Delivery and Integration:** Finally, we will deliver a pre-wired system, with your custom software pre-installed and tested, to your facility for final integration.
- 5) Service Deployment:** After that, your unique, "competitor differentiating" services are brought online to begin generating revenue.
- 6) Service Evolution:** If and when you decide to alter, enhance, or otherwise evolve one or more of your applications, you have the option of doing so yourself with our visual service-creation environment or continuing to use our in-house experts to facilitate your needs.

Custom Services

Custom Application Development

In virtually all MasterMind Technologies solution deployments, custom application development is part of the equation (see “Custom Enhanced Services” above). The reason is that one of the biggest strengths of our solutions is their ability to allow you to differentiate yourself from your competition by enabling you to deploy unique high-value services that are “tailor-made” for your customers.

When it comes to development of custom communications and/or messaging applications designed to run on the New Networks, MasterMind Technologies’ engineering capabilities are unparalleled. We bring to the table a wealth of experience in a huge array of technologies and a team of engineers itching to deliver cutting-edge solutions.

System Integration

“Systems integration”, as we define it, is a lot more than system installation. It is truly the integration of our platforms with our customers’ unique existing networks and systems infrastructures. This is a process that we consider key to providing the best possible solutions.

Our systems integration team has successfully deployed a broad range of solutions in various corporate and carrier environments around the globe. It is very likely that they’ve already been over most of the hurdles you face in deploying or scaling your service applications.

Personalized Support

MasterMind Technologies’ technical support staff has won rave reviews in every poll we’ve conducted with our customers. They have direct access to our core engineers and are highly motivated to resolve issues as quickly as possible.

Technologies

MasterMind Technologies' platform products are the convergence point for an immense array of technologies directed toward delivering leading-edge communications and messaging solutions on new, converged and hybrid networks.

We offer platforms at two levels:

MasterVox™ for corporate-class solutions;

MasterNet™ for carrier-class solutions.

MasterNet™ is a superset of MasterVox™ — adding substantially increased scalability, reliability, and manageability to the MasterVox™ function set.



MasterVox™

MasterVox™, the premier communications service creation environment and runtime engine, is a mature product that has won numerous awards and has been deployed in over 20 countries.

It is actively facilitating a broad range of computer-telephony, internet-telephony, and messaging service applications around the world.

MasterVox™ undergoes constant enhancement with new features and functionality, ensuring it's continued superiority for deploying leading-edge applications.

At a high level, MasterVox™ is comprised of two main parts: a communications service creation environment (SCE) and a runtime signaling and service engine.

Service Creation Environment (SCE)

The Internet existed for decades before the emergence of the Worldwide Web, but did not experience explosive growth in public use until then. This is primarily due to the fact that the web browser provided an interface that was easy to use and able to grow as technology changed.

Our award-winning communications service SCE plays that same role for high-performance communications services. It provides that web-browser-like ease of use, and it puts the power of service creation and modification in your hands. No longer will you be beholden to consultants to implement software modifications or network equipment vendors to issue new releases in order get a new desired feature online.

In a rapidly shifting industry, this flexibility and control will enable you to maintain market differentiation and service value over time and thus increase customer loyalty.

MasterVox™

Signaling and Service Engine

The MasterVox™ engine delivers the features and functions as specified in a service created in the SCE. In order to do this, it must bring many different and disparate technologies to bear.

Signaling

Signaling refers to our platform's ability to communicate with various types of telecom and data networks. There are many different signaling protocols and protocol variants in use around the world. MasterMind Technologies is constantly striving to evaluate, and include support for, new signaling protocol standards as they emerge. Currently supported signaling protocols include:

Telecom Network Signaling Protocols

Channel Associated Signaling (CAS)

- ✓ Analog Loop-Start (North American and International Variants)
- ✓ Analog Station
- ✓ Analog E&M Wink-Start
- ✓ Digital/Analog Wink-Start
- ✓ Digital/Analog DID Wink-Start
- ✓ Digital/Analog Outbound Wink-Start
- ✓ Digital European CAS
- ✓ Feature Group D
- ✓ Digital Ground-Start (OPS-FX)
- ✓ Digital Ground-Start (OPS-SA)
- ✓ Digital Loop-Start (OPS-FX)
- ✓ Digital Loop-Start (OPS-SA)
- ✓ Digital Pulsed E&M
- ✓ MFC-R2 (Many Variants)

Common Channel Signaling (CCS)

- ✓ ISDN PRI (N.Am., Euro, & Japanese)
- ✓ SS7 (ISUP, TCAP, many variants)

MasterVox™

IP Network Signaling Protocols (VoIP)

- ✓ H.323 (H.225, H.245, H.450, and more)
- ✓ MMT Simple-VoIP Protocol
- ✓ SIP*
- ✓ MGCP/SGCP*

* Not currently supported, but on near-term technical roadmap

Communications Service Technologies

While signaling deals with establishing, redirecting, and terminating communications links, communications service technologies enable the actual service application functions. Among the technologies and related features supported by MasterVox™ are:

Interactive Voice Response (IVR)

- ✓ DSP-based (scalable) voice record/playback
- ✓ DTMF and custom tone recognition/emission

Advanced Voice Functions

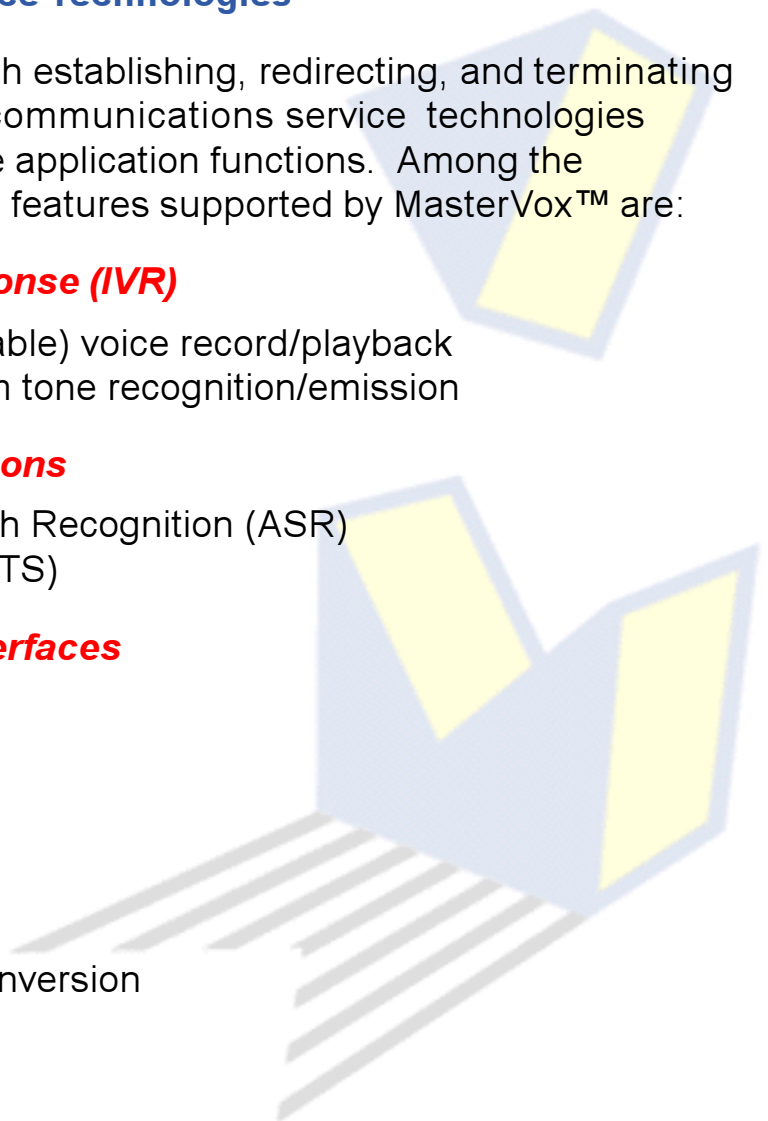
- ✓ Automated Speech Recognition (ASR)
- ✓ Text to Speech (TTS)

Email Management Interfaces

- ✓ POP
- ✓ IMAP
- ✓ SMTP

Fax

- ✓ Group III
- ✓ Image Format Conversion
- ✓ T.37, T.38*



MasterVox™

IP Messaging

- ✓ TCP/IP
- ✓ UDP

Database Access

- ✓ SQL
- ✓ ODBC/JDBC

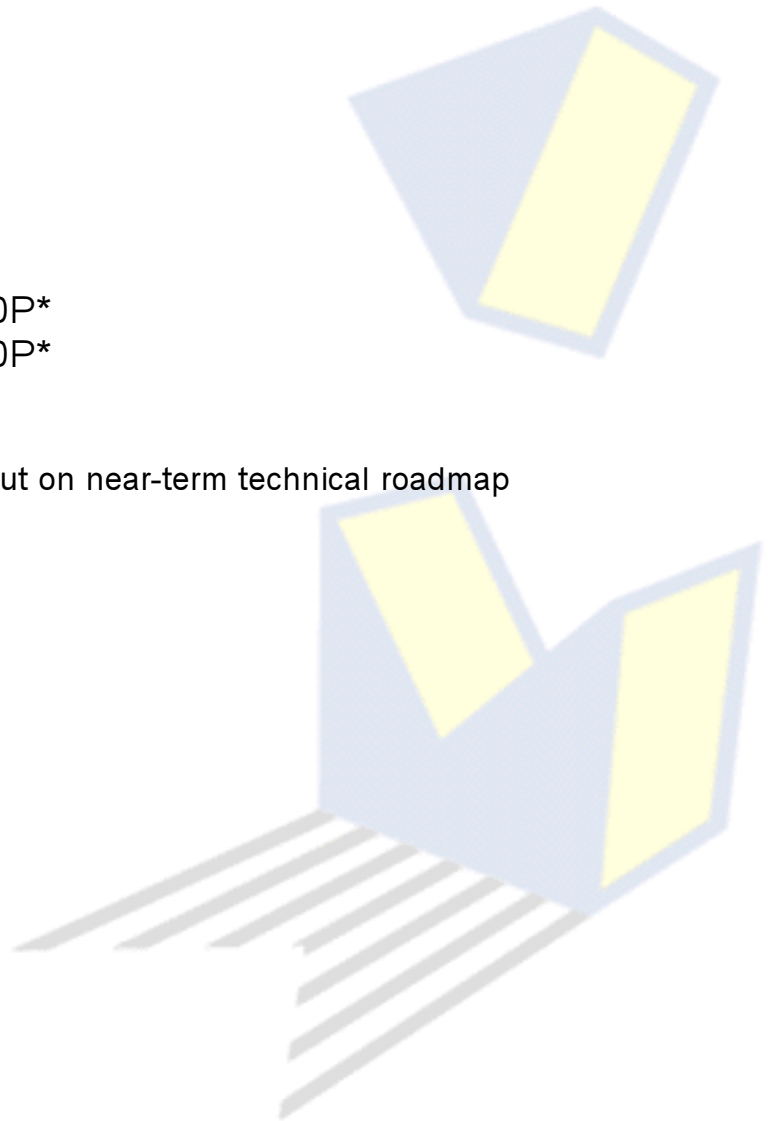
Switching

- ✓ H.100
- ✓ H.110

Vocoding

- ✓ G.711
- ✓ G.723.1
- ✓ G.729A
- ✓ Elemedia SX7300P*
- ✓ Elemedia SX9600P*
- ✓ MS GSM

* Not currently supported, but on near-term technical roadmap



MasterNet™

MasterNet is a fault-tolerant telephony and messaging services deployment platform, incorporating a service creation environment, a high availability hardware component of rack-mounted, field replaceable industrial computers, a distributed software architecture and a thin client boot process off of redundant servers.

MasterNet™ takes all the sophisticated signaling and communications service features of MasterVox™, and makes them available on a highly reliable, highly scalable architecture suitable for deployment in carrier and service provider environments.

MasterNet™ Sub-Systems

Available in a MasterNet™ are a number of sub-systems that provide specialized or advanced features. These sub-systems can be individually included or excluded in a given solution depending on the application and/or network infrastructure.

Reliability: MasterNet™ solutions remain available through network, software, or hardware failures as well as during routine upgrades and maintenance.

Scalability: MasterNet™ facilitates scaling a service from small port counts to thousands of ports without re-engineering the service application(s) or the software or hardware infrastructures.

Manageability: MasterNet™ solutions are manageable via any off-the-shelf SNMP management system and/or any web browser via the MMView™ remote management sub-system.

Carrier-Class Platform

MasterMind Technologies recognizes that the best feature set in the world is of little value if the platform on which it is deployed is not reliable, scalable,

MasterNet™

and manageable. Our multi-tier, fully redundant, highly scalable MasterNet™ hardware and software architecture ensures peace of mind for the service provider.

MasterNet™ Architecture

Our carrier-class architecture incorporates our own Link-Layer over IP™ (LLoIP™) redundant network protocol and MasterGuard™ signaling fail-over devices, as well as QuickConnect™ hot-swappable node technology.

Additional subsystems include **MM7**, a redundant SS7 network interface for signaling and call management, and **MMView**, a remote management interface to aid in configuration management, remote diagnostics, alert handling and notification, system performance, data utilization and system utilization monitoring.

MasterNet™ combines unique hardware and software components into an integrated system. These components can be categorized into four fundamental areas.

Hardware Component

The fundamental building block of the architecture is the field-replaceable unit (FRU) chassis. The chassis provides the smallest footprint in a standard equipment rack available in the industrial computer market. In addition, the chassis is fitted with a QuickConnect™ harness that effectively converts the equipment rack into a meta-backplane. Installation of a chassis into the rack is typically a 10 to 15 second process.

The rack is custom-designed for each installation, and is built and tested in a factory setting. The rack is shipped to the site with all cabling fully installed and tested. It is never necessary to modify this factory cabling in the field – and thus one of the

MasterNet™

prime causes of failure is avoided – poor cable connections and cable management. The factory also installs the mate for the chassis QuickConnect™ harness in each available slot. Thus, expansion of resources only requires that a new chassis be constructed and plugged in – there is no on-site preparation required until the rack capacity has been met. A typical rack configuration will include resources for 80 T1s distributed over 20 FRU chassis.

Each of these FRU chassis is known as either a “MasterNet™ client” or “MasterNet™ server”. Each site will have two MasterNet™ servers – and a virtually unlimited number of MasterNet™ clients.

Client Boot Software Component

Server pairs are loaded with all the software and configuration data required in the site. When MasterNet™ clients boot, they automatically determine their assigned configuration identifier. The MasterNet™ client automatically initializes the LAN interfaces, locates and transfers configuration and executable files from the MasterNet™ server to the local disk, and then boots the MasterNet™ client executables and applications.

The result of this “auto-boot” thin client architecture is that a FRU can be engaged by a system with absolutely no manual software configuration on the part of the technician performing the installation.

Distributed Service Software Component

After the MasterNet™ client has booted, the first action is to register shared system resources with the MasterNet™ servers.

MasterNet™

These include any local DS1 resources, VoIP vocoders, ASR engines, specialized applications, FAX converters, and TTS engines. By registering these resources, each MasterNet™ client becomes a part of the distributed service.

On the server side, negotiation between the servers will result in an Active server and a Standby server. The active server will host the active copy of the MasterNet™ subsystem options: MM7, MMDB, and MMStore. As part of this role, it is continually updating the backup server with checkpoint status information for each managed resource.

This dynamic, centralized, and redundant resource management supports incremental scalability not possible with non-distributed services.



MM7™

The MM7™ MasterNet™ sub-system leverages the fault-tolerance and scalability of MasterNet in support of the global “signaling system 7” (SS7) protocol. MM7™ enables seamless communication with worldwide carrier telecommunications networks.

Features include:

- ✓ ISUP call control
- ✓ Ability to act as Intelligent Peripheral (IP) or Service Switching Point (SSP) in carrier networks
- ✓ Redundant SS7 signaling servers in active/standby mode
- ✓ Ability to bridge SS7-based telecom networks with VoIP networks
- ✓ Delivers enhanced Intelligent Network (IN) feature set

Additionally, MM7™ delivers the following benefits:

Reliability: Installed in active and standby pairs, MM7™ Servers provide the redundancy to meet today’s high-availability requirements. With dual Ethernet LANS and a Link-Layer over IP (LLoIP) protocol, MM7™ assures the client/server communication path remains open and the SS7 messages are delivered reliably. The service quality achieved with LLoIP is equal to that of the MTP in the SS7 signaling network.

Flexibility: SS7 network elements possible with this platform include: Service Control Point, Intelligent Peripheral, Service Node, Service Switching Point, Network Switch, Feature Adjunct, Mobile Switching Center, HLR, VLR and Short Message Service. In addition, with the MasterVox™ service creation environment, a wide variety of service applications can be created and quickly brought online.

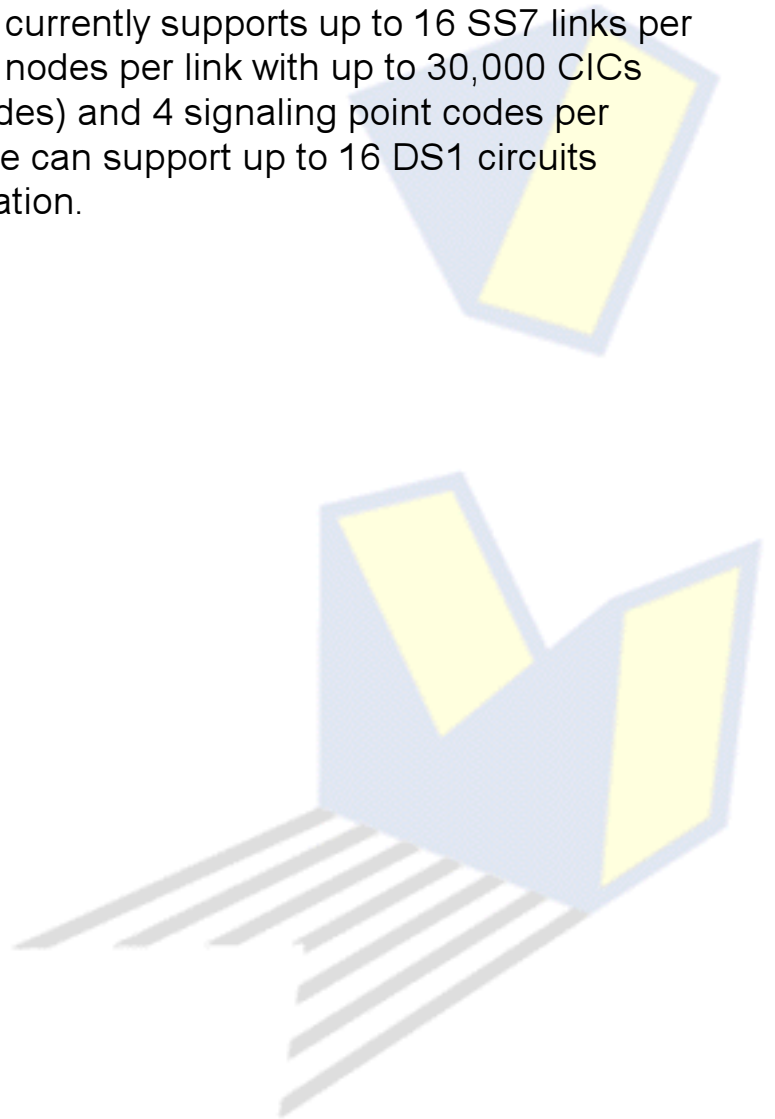
Scalability: Client nodes automatically register with the servers during initialization – acquiring dynamic circuit, application, and general setup configuration information. This enables them to be

MM7™

added to an existing platform, thus increasing capacity, with no performance impact. MM7™ can easily support a growing network without the need to take servers – or any other part of the system – off line.

High Performance: MM7™ connects to the signaling network via an F-Link (e.g., IP application) or via an A-Link configuration (e.g., advanced call routing). In operation, depending on the configuration, the system's ISUP layer can support from 500,000 to 1,500,000 busy-hour calls.

High Capacity: MM7™ currently supports up to 16 SS7 links per server pair and 16 client nodes per link with up to 30,000 CICs (Circuit Identification Codes) and 4 signaling point codes per system. Each client node can support up to 16 DS1 circuits depending on the application.



MMView™

MasterMind Technologies MMView™ is a comprehensive Remote Network Management Interface which works in conjunction with a customer-specified Remote Management System (RMS). MMView can be used as a general administration tool and as a system monitor, verifying system performance, data utilization, system utilization, and alert handling and notification.

MMView™ supports these general RNMS features:

Configuration Management

The core software executables, service applications and parameters controlling the system subject to modification are accessible via remote management of software upgrades with fail-safe recovery algorithms.

Fault Management

If a network fault, error condition, hardware failure, or any other problem occurs within the service application or within the service platform architecture, MMView™ will send a notification message to the responsible operations manager. The fault report will isolate the problem to a specific field-replaceable unit (FRU), or a specific configuration table. In cases where this is not possible, remote fault-isolation diagnostics are supported. In addition, solicited and periodic fault reports are produced.

Performance Management

MMView™ provides metrics to the RMS to support both operations and administration. Operation metrics provide quality of service (QoS) feedback to the RMS, while administration metrics identify system bottlenecks, busy hours, and resource utilization, to support expansion planning.

MMView™

Specific Features of MMView™

MMView™ incorporates the above-mentioned service and network management components through the use of the following remote management tools and features:

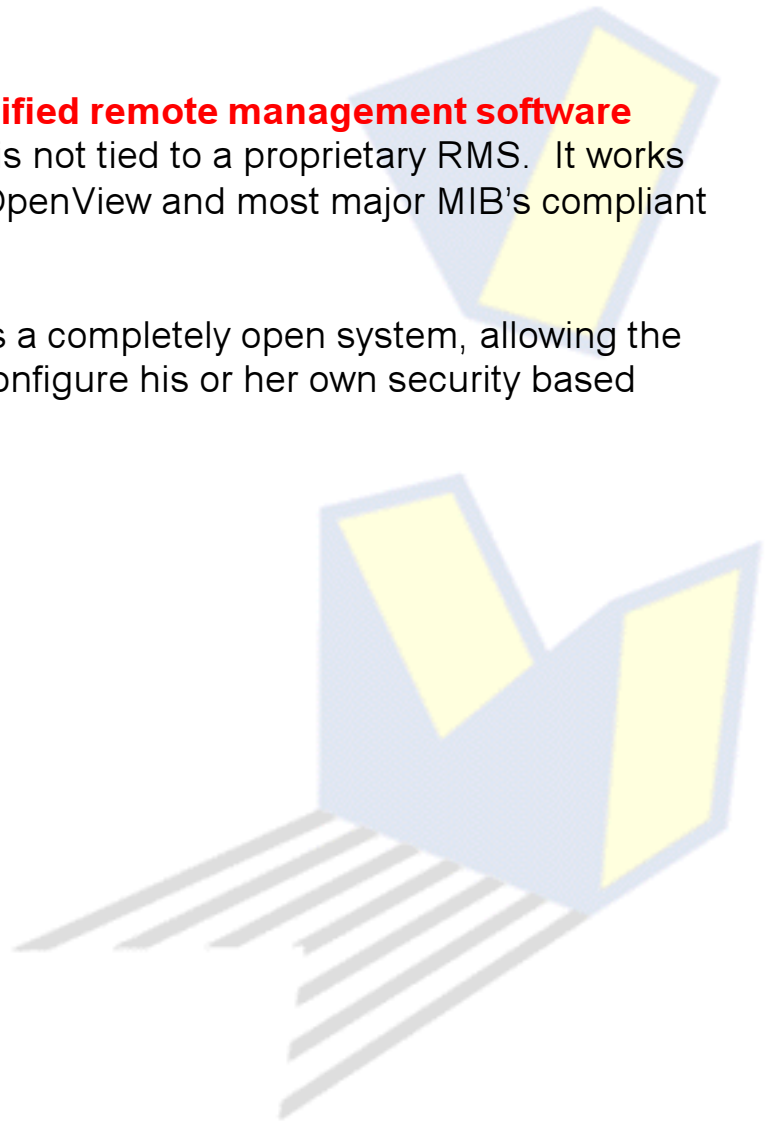
- ✓ **SNMP traps** – These traps provide periodic and event based status reports, listing current 'alarm' condition information. The traps are defined in standard MIB's syntax and can be imported into most commercial management stations. Support for network management standards such as SNMP are essential for flexibility, interoperability, and future compatibility.

MMView generates traps for the following types of events:

- Major MasterNet events – such as LloIP link failures and client registrations
 - Telephony, Hardware, and Signaling events
 - MasterVox application events – including a periodic trap containing statistical and performance information.
- ✓ **Remote configuration control** – A web browser based system will allow configuration of essential elements of the MasterNet servers
 - ✓ **Statistic collection and dissemination** – In addition to providing standard reports, MMView™ also provides the flexibility to create, custom reports. These reports are created with any standard report-writing tool. This gives the customer the flexibility to create and format a view of the data that is deemed most important to their particular business.

MMView™

- ✓ **Statistics collected can be broken down into two categories** –
 - Current Operations/QoS - designed to send traps when the system is about to encounter a problem. These statistics include such things as CPU utilization, disk utilization, resource utilization etc.
 - Planning – used for monitoring utilization over extended periods of time. This type of statistic collection is useful for determining bottlenecks and mapping out growth strategies.
- ✓ **Support for client-specified remote management software platforms** – MMView™ is not tied to a proprietary RMS. It works in conjunction with HP-OpenView and most major MIB's compliant RMS platforms.
- ✓ **Security** – MMView™ is a completely open system, allowing the customer the ability to configure his or her own security based standards.



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