

The VoIP Peering Puzzle◆Part 9: NetNumber TITAN Services

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In our last few tutorials, we have examined one of the key technical challenges to VoIP Peering—the process of converting telephone numbers to Internet Protocol (IP) addresses so that end-to-end voice calls can occur. This process is called ENUM, short for Electronic Numbers, and is based upon the E.164 standard from the International Telecommunications Union—Telecommunications Standardization Sector, or ITU-T (see <http://www.itu.int/osg/spu/enum/index.phtml>), plus RFC 3761, published by the Internet Engineering Task Force, or IETF (see <ftp://ftp.rfc-editor.org/in-notes/rfc3761.txt>). We also discovered that there are several industry groups that are working on advancing this technology, including the ENUM Forum (www.enumf.com), and the Country Code 1 ENUM Limited Liability Company, which is conducting trials of both the infrastructure and end-user versions of ENUM (www.enumllc.com).

In addition to the standards bodies and industry organizations that are supporting ENUM technology, there are a number of commercial ventures that are promoting number translation services in general, and ENUM services in particular. In this, and following tutorials, we will examine some of these services, and the companies that are behind them.

NetNumber, Inc., headquartered in Lowell, Massachusetts, is comprised of a team of seasoned industry experts that have developed an impressive portfolio of United States and foreign patents for address translation, voice messaging, and push-to-talk (PTT) technologies. Equally impressive is their client list, which includes such heavyweights as Cablevision, Comcast, Cingular, Cisco Systems, Ericsson, Level 3, Motorola, Nokia, T-Mobile, Telcordia, and many others.

One of NetNumber's flagship products is a system they call TITAN, an acronym representing Transactional IP-Telephony Addressing & Numbering. TITAN is a software solution for deployment on off-the-shelf hardware that provides a common addressing infrastructure for multiple Signaling System 7 (SS7, sometimes called C7) and IP applications. TITAN software can be licensed for use with one or more applications directly from NetNumber, or through authorized systems integrators who can provide deployment and ongoing first-line and second-line support services. Hosted TITAN services are also available.

TITAN is deployed on two servers: one called the TITAN Master, and the other called the TITAN Edge. With these, the TITAN platform delivers on the next-generation promise of lower cost, faster response time and greater scalability/flexibility than existing telephony addressing solutions based on Service Control Point (SCP) or Signal Transfer Point (STP). TITAN Master and Edge servers represent the core of an operator's next-generation addressing infrastructure. This software enables an operator to provide operator-controlled ENUM address resolution services, SIP redirect services, and legacy SS7/C7 addressing services on the same set of Master and Edge servers. Control over these servers gives an operator the ability to define exactly who gets access to their addressing data and the ability to fully control the reliability and performance of the end-to-end address discovery process.

The TITAN Master server provides the centralized database for ENUM data and portability data within an operator's network. The Master provides a set of standardized interfaces for the provisioning of address resolution services, and it is responsible for the replication of its database to a constellation of Edge servers. The Active Master handles all administration requests. In the event the Active Master fails, the Standby Master automatically picks up all responsibilities. Updates are performed through the Active Master and asynchronously replicated to distributed Edge servers in near real-time.

The TITAN Edge server provides a highly efficient and cost-effective query infrastructure for the discovery and location of any number of services associated with an E.164 number or block of numbers. High availability of query access is achieved through the deployment of multiple, geographically dispersed, fully replicated Edge servers, each of which is independently capable of responding to queries despite losing connectivity to the Master server. Secure, multiprotocol query services supported by the TITAN Edge include: Domain Name Service (DNS), Electronic Number (ENUM), Session Initiation Protocol (SIP), Simple Object Access Protocol (SOAP/XML) and Transaction Capabilities Application Part (TCAP/MAP) over Ethernet, T1/E1 low-speed link, and high-speed Signaling Transport (SIGTRAN - M3UA) interfaces.

The ENUM (DNS) service on the TITAN server can be configured to support both Internal ENUM (an ENUM implementation that utilizes locally provisioned subscriber data to enable efficient routing of traffic inside a given carrier/operator network) and Interconnect ENUM, (where the addressing requirements utilize information from multiple third-party data sources). In addition, the resolution logic in the ENUM (DNS) service can be quickly modified to meet service provider-specific requirements like origin-based routing, least-cost routing, and so on.

TITAN also has an impressive set of benchmark results: Master update/replication performance of 50–250 updates/second depending on the platform; Edge query performance of 10,000–50,000 queries/second, depending upon the hardware selection, query protocol and network interface; and a database capacity in excess of 500 million records.

Further details on the TITAN architecture and other NetNumber products are available at (www.netnumber.com). Our next tutorial will continue our examination of some of the commercial enterprises that are offering ENUM and other directory services.

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Author's Biography

Mark A. Miller, P.E. is President of DigiNet® Corporation, a Denver-based consulting engineering firm. He is the author of many books on networking technologies, including Voice over IP Technologies, and Internet Technologies Handbook, both published by John Wiley & Sons.