

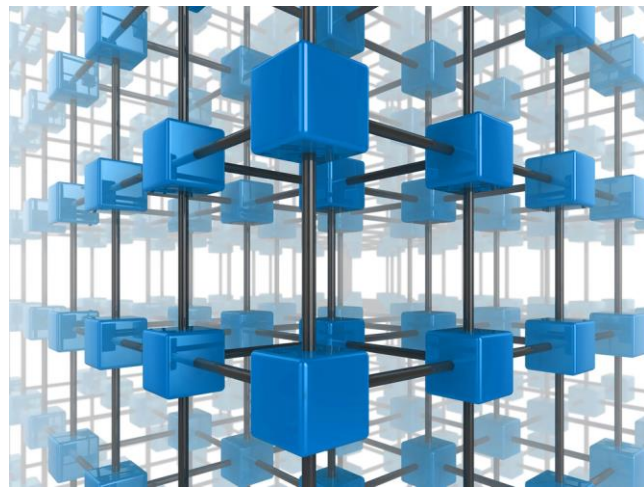
The Cyclix N-Plus™ Architecture: A Fault Tolerant High Transaction SIP Network

Peter Sandstrom, Chief Technology Officer, Cyclix Networks

Rev. 170109

Synopsis

VoIP Technology offers your business some wonderful new advantages over TDM switching architectures. One of those advantages is the ability to have a customer's CPE equipment be dynamically tied to a group of "N" SIP switches, and allow calls to be distributed in real-time across that switch set.



Realizing such an architecture with "N" SIP switches offers redundancy and throughput advantages that are not possible with circuit based technologies. The following report describes how Cyclix achieves this N-Plus™ redundant architecture for its client base.

Today's SIP Based VoIP

VoIP Networks and services have grown beyond the point of curiosity. In fact, the technology is radically changing the telecommunications industry by attempting to rival and compete with, legacy circuit-switched PSTN networks.

As with any emerging technology, hurdles present themselves as the use of the technology evolves. With VoIP, a novel approach is now needed to overcome the issues relating to SIP throughput and redundancy—two areas that have become a significant issue.



Specifically the problems that arise are:

- **Heavy Bandwidth Utilization**—SIP utilizes an abnormally high rate of bandwidth for signaling; i.e. ~15 kbs for each sustained single call per second, which is an astronomical amount of data to process per call.
- **Character Clumsy**—SIP is somewhat difficult for computers to handle. The protocol is all text, which must be parsed using relatively compute-intensive text manipulation software.

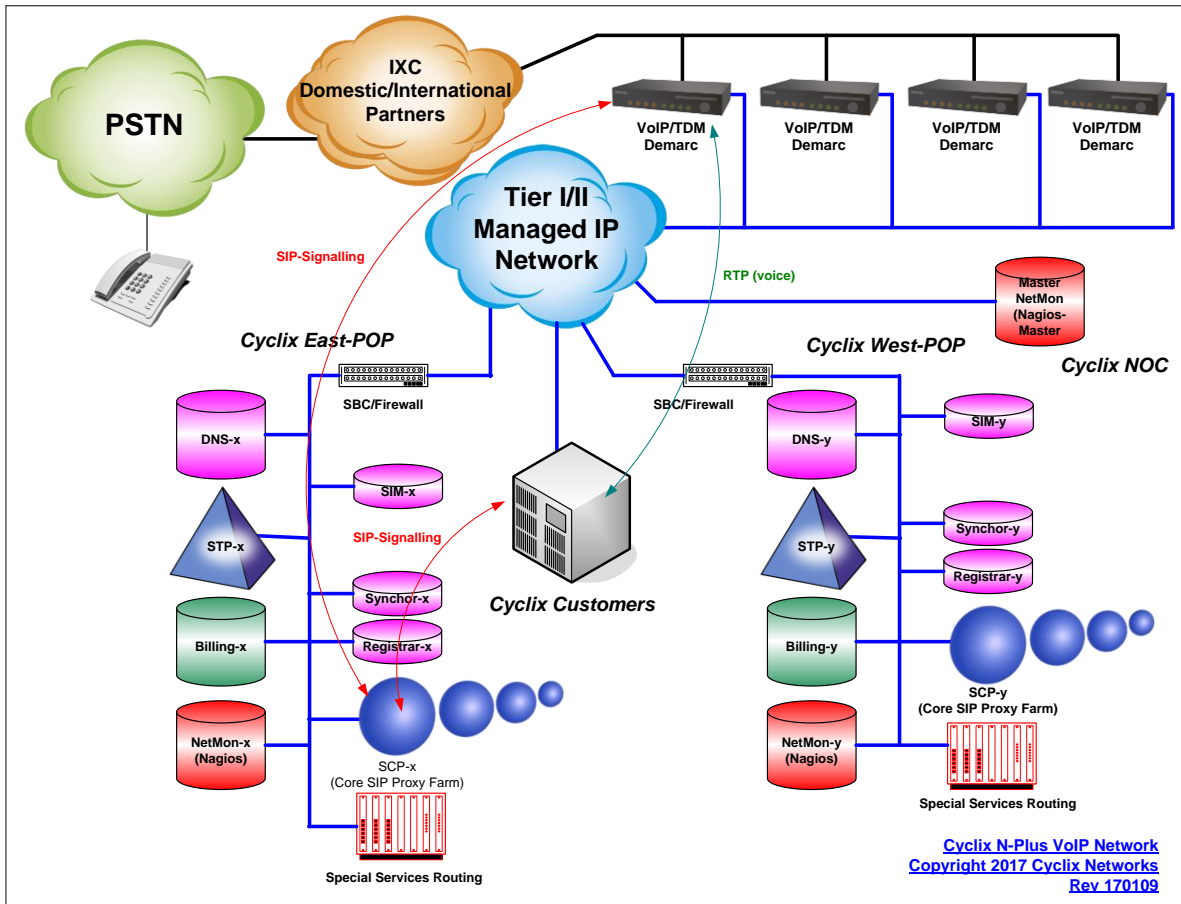
As a result of these issues, today's fastest servers are being challenged when attempting to rival switching speeds of the SS7-ISUP based TDM networks.

Thus far, the general solution has been to give end point SIP devices hard coded IP addresses to the SIP carrier's proxy (i.e. the SIP Further, when the SIP carrier's proxy runs out of cycles and can no longer handle any further load, the SIP carrier asks the end user to use another IP address to another SIP proxy.

This approach is problematic as it requires the SIP endpoint device to now manage its own traffic termination. At the same time, this also creates single points of failure for the end user. Cyclix has found a way to resolve this dilemma by using a clustered architecture.

The N-Plus™ Matrix

At the core of Cyclix's network there are a pair of DNS servers that direct the SIP end point user agents (UA). The Cyclix DNS servers resolve to (what appears to be) a Cyclix proxy address for the UA. In reality, the UA is pointed to something new in SIP space, a Signaling Transfer Point, or STP.



This mnemonic/name was adopted from SS7 space when Cyclix engineering realized it did something similar to its SS7 counterpart. Specifically, Cyclix STPs (deployed in groups for redundancy) actually decide which one of N proxies in the Cyclix proxy matrix will be used to process a given SIP call for a given SIP endpoint.

The STP functionality allows Cyclix to deploy a matrix of "N" SIP proxies to handle whatever load is required for any given task at hand. There is no limit to the calls per second (CPS) processing power within the Cyclix signaling domain.

Furthermore, there is no need for the UA's to hard code a carrier's proxy addresses into their configuration schemas. The UA no longer needs to be concerned whether or not a proxy has the capacity to handle its load.

A Fault Tolerant, High Transaction SIP Network, using this N-Plus™ approach, also eliminates any single point of failure, and realizes redundancy to the nth degree. Cyclix's



N-Plus™ Architecture solves some major technical hurdles beginning to surface in the SIP market place.

The Summation

As previously stated, Cyclix has deployed a matrix of proxies, with each call able to use any of the proxies in that matrix. This presents another issue. Each proxy must now know registration and routing information for all the SIP endpoints on the Cyclix SIP network.

To solve this problem, Cyclix has created the **Synchor** and **Registrar** services. These two services run redundantly in real time, keeping the registration and routing information current and equal across all Cyclix proxies.

Cyclix has realized another industry first in its approach to dealing with the problem of high capacity telephony signaling on an IP network. The ability to synchronize all proxies in real time creates a single virtual switching machine with unlimited call processing potential.

Finally, Cyclix ties this unique N-Plus™ Architecture back to the PSTN with a wide spectrum of tier 1 TDM national and international carriers for TDM network access. This gives advanced routing and termination/origination options for all Cyclix customers' to or from anywhere in the world.

Cyclix is able to fill a critical need for high volume SIP customers by offering:

- High capacity throughput
- PSTN or better redundancy & reliability
- Multiple routes to any global destination
- Least cost route to any given destination
- Ease of connection to the PSTN

Acting as a high-capacity homologated SIP switching point for SIP endpoints, Cyclix is now the "virtual IP central office to the world" for the SIP end user.

For further technical information, please contact Cyclix sales:

- 603-273-9292 opt 2
- sales@cyclixnet.com