Marketing Info No. 37–HA (High Availability) Architecture

Introduction to the HA Concept

The WTL SoIP Controller allows large scale VoIP gateways,up to multi-STM-1, to be created. The architecture consists of a SoIP Controller server acting as a SS7 to SIP signaling converter and Media Gateway Controller (MGC) for one or many Mediant media gateways (MG). The Mediant handles the physical connections to the E1 or STM-1 links and contains banks of DSPs to convert from TDM to VoIP. In this design however, the Mediant has no intelligence and is totally under the control of the SoIP Controller for all configuration, routing, authentication and other functions.

The large amounts of traffic that may be carried by the STM-1 gatewaysmeans that there is a need for redundancy to be included in the network design.

Both elements of the solution; the MGC and the MG can be offered in a High Availability (HA) mode.

The WTL Solution for HA

High Availability (HA) means that 2 MGCs can work in an active/passive configuration where the standby MGC is available to take over the control of the remote gateway in case of failure. In this first release, HA is built on top of the Linux "Heartbeat" framework. Heartbeat is based upon a robust ping mechanism that detects failures and, based on the results of this, decides which server should be active. It then stops and starts resources on the servers accordingly. Heartbeat guarantees that no resource will be running on both servers at the same time and strictly serializes the start and stop actions of each resource.

The diagram below shows the general network setup:
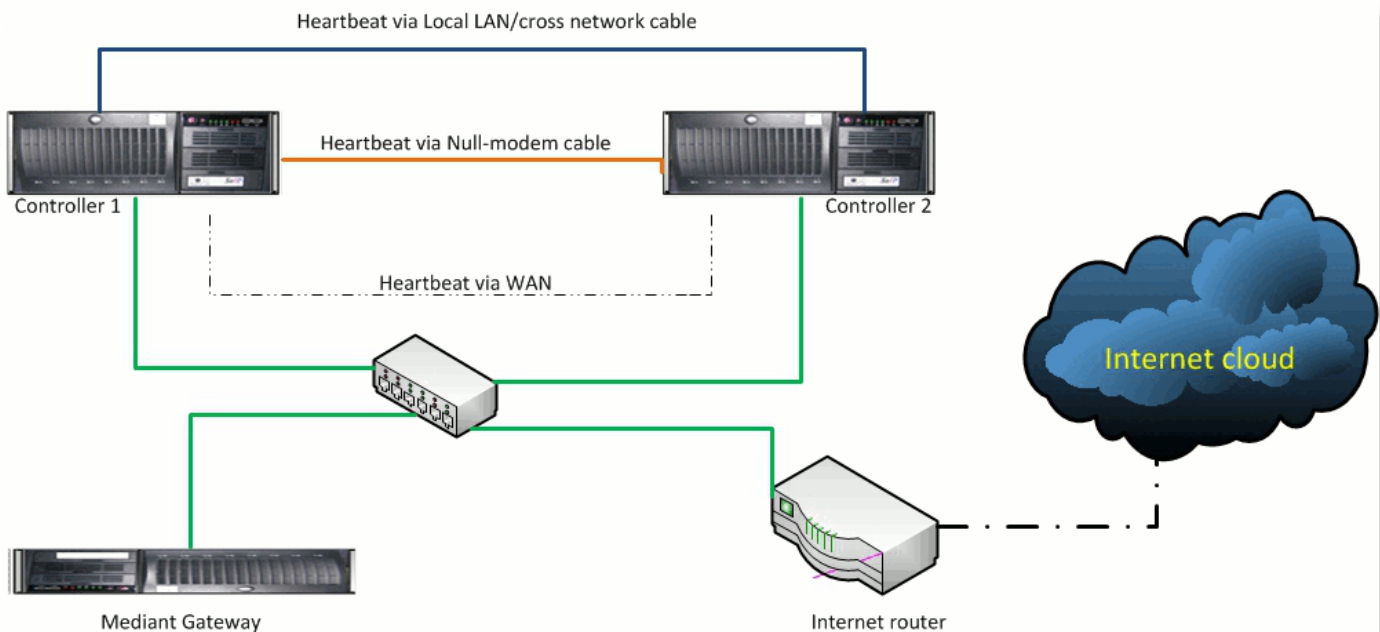
In the network setup, there are 2 MGCs present that can operate the Mediant gatewayshown.

The HA package is running on both controllers and they communicate with each other via a ping mechanism (or Heartbeat). The communication of the Heartbeat is based on UDP protocol and for security reasons is encrypted.

"Heartbeat" Operation

For proper operation 2 heartbeats must be set up to give greater resilience.

Currently the following 2 heartbeat types are supported:

Heartbeat via LAN/WAN interface(s) on the MGCs.

Heartbeat via serial port, where a null-modem cable connects the two MGCs to each other on the serial port.

Heartbeat via onlythe LAN/WAN connections is allowed, but 2 different physical network interfaces must be used.

The diagram above shows the 3 different options available to set up the heartbeat:

Heartbeat on local LAN (blue line), which can be connected to a hub or by using a crossed network cable plugged directly into one of the 2 available network interfaces of each controller.

Heartbeat on WAN (green line), which will be part of the network that is also accessible for customers. In this case, encryption of the heartbeat message exchange is very important.

Heartbeat on serial cable (orange line), where a null-modem cable is connected between both servers.

Resources Managed

In the current implementation of HA by WTL 2 types of resources are supported:

Floating IP Address: the script used makes sure the floating IP address is applied on the active server only. The web-based configuration utility, SWConfig, helps with the set-up and will verify that only valid addresses can be entered. For best results, you should also select a safe IP address to ping in the same network so that Heartbeat can detect when a switch is disconnected from the network. A safe address is for example the router: if one of the switch cannot ping the router it can obviously not host the floating IP and Heartbeat will move the resources to the other switch. The floating IP address should be used for VoIP binding on SIP/H323 trunks so that the carrier/customer will see the HA cluster as a single switch.

Switch software:a script is used to start/stop the WTL switching software to run in active or standby mode. The start command of this script restarts the software in full operation mode. The stop command restarts the software in a new "standby mode", where the hardware devices are not loaded. This is very useful to keep the databases of the Active & Passive MGCs synchronized. To allow normal support operations on the switches, you can stop the software manually without causing a switchover by the HA system and, conversely a switchovercan be forced if needed.