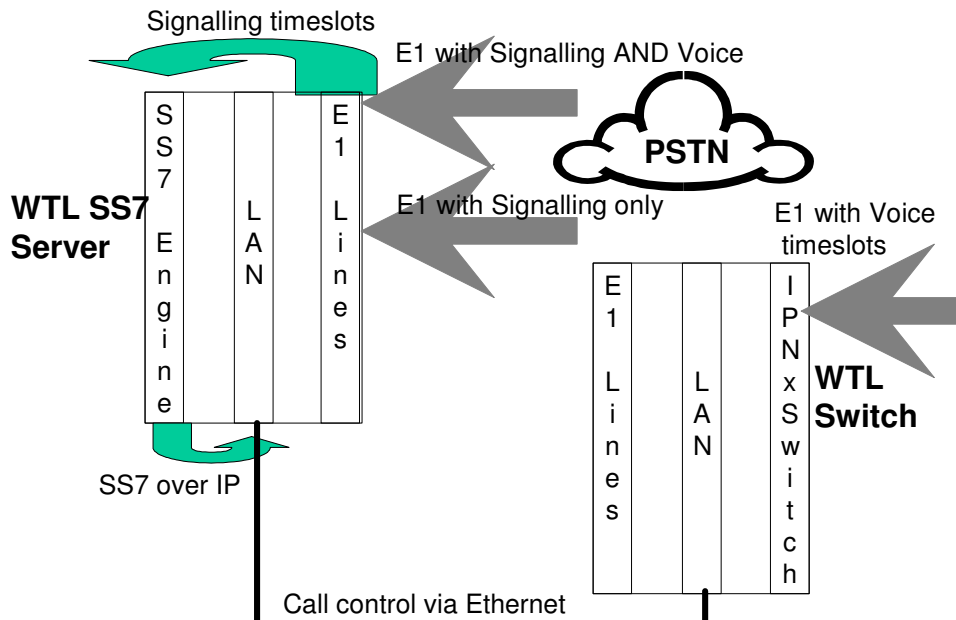


**No. 14 – SoIP & IPNx SS7 Server as SSP or STP**

The SoIP/IPNx SS7 Server interworks with carriers' SS7/ISDN networks to carry call control information. It can be used as a Service Switching Point (SSP) or a Signalling Transfer Point (STP). The message transfer parts (MTPs) have been implemented and are also part of the SoIP/IPNx SS7 Server. These elements together can be seamlessly deployed by carriers to interconnect with any existing SS7 network.

As an SSP the SoIP/IPNx SS7 Server integrates an ISDN User Part Version 2 (ISUP V2) for call control and management of the transmission of signalling information between SS7 nodes. To achieve greater control of a key part of the product and to overcome problems with off-the shelf ISUP implementations, World Telecom Labs has written its own ISUP signalling stack. Enhanced Transaction Capabilities Applications Part (TCAP) features are not currently supported. The WTL software toolkit also supports OSST (Optimised SS7 Transport) a proprietary call control protocol based on UDP that allow the service provider to carry SS7 and ISDN messages transparently between WTL platforms over IP.



**WTL SS7 Server as SSP**

**System Capacity - SoIP**

- 32 E1s can be connected to the SoIP SS7 Server. Each E1 can be configured as 1) signalling + voice, 2) signalling alone or 3) voice only line.
- The SS7 over IP call control can then be used to control voice-only E1s on other WTL switches in the network
- Each E1 can carry 0, 1 or more signalling links on any timeslot

- Each SoIP is capable of up to 1000 messages per second
- One SoIP can control up to 300 E1s
- Up to 1000 E1s can be controlled by a single WTL switch acting as an SS7 server

### **System Capacity - IPNx**

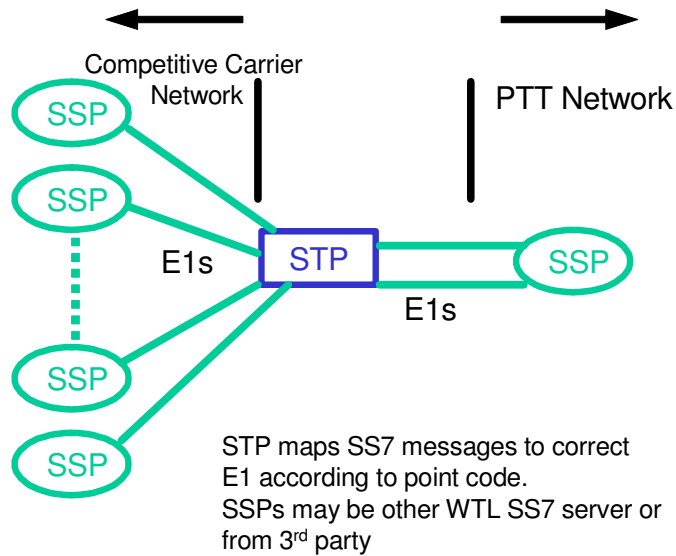
- 96 E1s can be connected to the IPNx SS7 Server. Each E1 can be configured as 1) signalling + voice, 2) signalling alone or 3) voice only line.
- The SS7 over IP call control can then be used to control voice-only E1s on other WTL switches in the network
- Each E1 can carry 0, 1 or more signalling links on any timeslot
- Each 8/16 x E1 card is capable of up to 1000 messages per second
- One 8/16 x E1 card can control up to 300 E1s
- Up to 1000 E1s can be controlled by a single WTL switch acting as an SS7 server

### **SoIP/IPNx SS7 Server as STP**

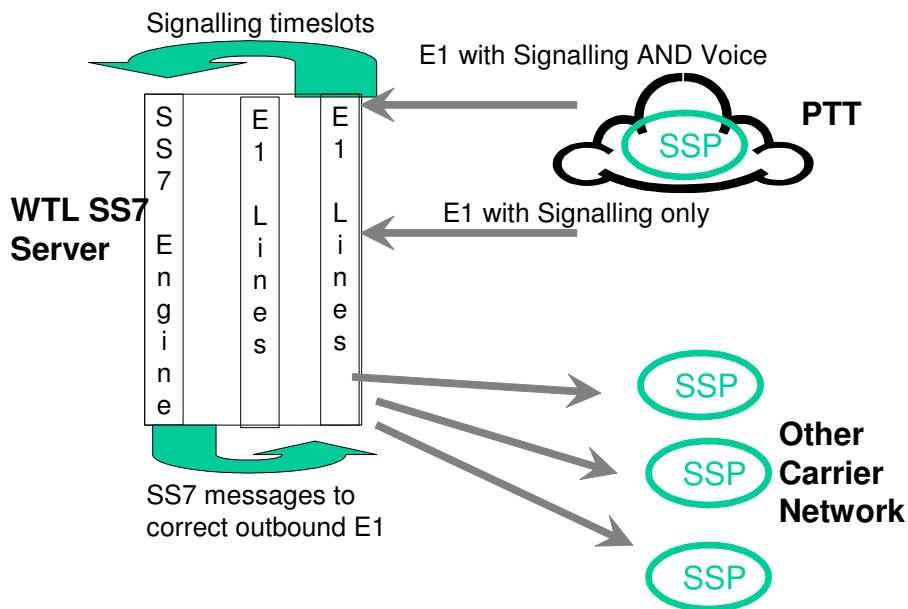
The SoIP/IPNx SS7 Server can also be used as a STP. In this case there is no ISUP stack required. The STP routes SS7 messages to a number of SSPs each connected to it via E1s. The routing of messages is done by point code.

This method of working allows concentration of SS7 traffic from many SSPs onto a few links. This is used to make the greatest use of scarce or expensive SS7 links, for example from a PTT. Using the SoIP/IPNx SS7 Server-STP as a point code switch is also a good method of providing redundancy in the network design. It would be impractical to do this otherwise as every individual link would have to be duplicated. In STP mode the SoIP/IPNx SS7 Server can share a link from a single SSP with up to 30 other SSPs.

Connection to multiple types of SSP is supported. These SSPs can be existing, 3<sup>rd</sup> party SSPs or could be the SoIP/IPNx SS7 Server working in SSP mode.



### WTL SS7 Server as STP



### WTL SS7 Server as STP

## Software Certification

- Fully compliant with ITU-T MTP standard Q701 version 93
- Can route 1500 messages per second. This corresponds to 150 call setups and teardowns per second.

The World Telecom Labs SS7 Server has passed formal interconnect testing in the following countries:

- Austria
- Belgium
- Denmark
- Holland
- Nigeria
- Pakistan
- Spain
- UK

Successful interconnects have also taken place with more than 80 operators.

## MTP layer

The WTL switch is conformant to ITU Q704 specification. The WTL switch can be used as an STP.

Level 1 with CRC-4 or standard frame:	Both frames are supported
Type of error correction:	Basic error correction
Load sharing within a linkset:	Always
Load sharing across linksets:	Possible
Timeslot for signalling	Any from 1 to 31
Maximum number of signalling links	56
Maximum number of linksets	56
Maximum number of destination point codes	128
Maximum number of routes	Unlimited

## Circuit information

Digit send mode (en bloc or overlap):	Both en bloc and overlap sending and receive supported.
CIC coding	WTL supports flexible CIC coding but prefers coding equal to timeslot.
Circuit selection order:	WTL supports ascending, descending, least used controlled circuit first
Dual seizure control:	controlling SP proceeds with the call
Continuity check	incoming continuity test supported. No outgoing continuity check performed
number of circuits	Maximum 16384 circuits.

## ISUP layer

The WTL switch is conformant to ITU-T Q763 and Q764 1992 version and ISUP Ver 2.

There follows a list of supported messages and parameters. In conformance with ISUP V2 the parameter compatibility procedure is supported to allow the transparent passing of parameters and messages through transit switches that do not understand them.

### Supported messages

Message type	WTL
Address complete	Y
Answer	Y
Blocking	Y
Blocking acknowledgement	Y
Call modification completed	
Call modification request	
Call modification reject	
Call progress	Y
Circuit group blocking	Y
Circuit group blocking acknowledgement	Y
Circuit group query	Y
Circuit group query response	Y
Circuit group reset	Y
Circuit group reset acknowledgement	Y
Circuit group unblocking	Y
Circuit group unblocking acknowledgement	Y
Charge information	
Confusion	Y
Connect	Y
Continuity	Y
Continuity check request	Y
Delayed release	
Facility	
Facility accepted	
Facility reject	

Message type	WTL
Facility request	
Forward transfer	
Identification request	
Identification response	
Information	Y
Information request	Y
Initial address	Y
Loop back acknowledgement	
Loop prevention	
Network resource management	
Overload	
Pass-along	
Release	Y
Release complete	Y
Reset circuit	Y
Resume	Y
Segmentation	
Subsequent address	Y
Suspend	Y
Unblocking	Y
Unblocking acknowledgement	Y
Unequipped CIC	Y
User Part available	Y
User Part test	Y
User-to-user information	

**Supported parameters**

Parameter name	WTL
Access delivery information	1)
Access transport	Y
Automatic congestion level	Y
Backward call indicators	Y
Backward GVNS	
CCSS	
Call diversion information	1)
Call diversion treatment indicators	
Call history information	1)
Call modification indicators	
Call offering treatment indicators	
Call reference	1)
Call transfer number	
Call transfer reference	
Called IN number	
Called party number	Y
Calling party number	Y
Calling party's category	Y
Cause indicators	Y
CCBS parameter	
Charged party identification	
Circuit assignment map	
Circuit group supervision message type	Y
Circuit state indicator	
Closed user group interlock code	1)
Collect call request	
Conference treatment indicators	
Connected number	1)
Connection request	1)
Continuity indicators	Y
Correlation id	
Display information	
Echo control information	Y
End of optional parameters	Y
Event information	Y
Facility indicator	1)
Forward call indicators	Y
Forward GVNS	
Freephone indicators	
Generic digits	1)
Generic notification indicator	1)
Generic number	Y

Parameter name	WTL
Generic reference	1)
Hop counter	Y
Information indicators	Y
Information request indicators	Y
Location number	1)
Loop prevention indicators	
MCID request indicators	
MCID response indicators	
Message compatibility information	Y
MLPP precedence	Y
Nature of connection indicators	Y
Network management controls	
Network specific facility	
Optional backward call indicators	Y
Optional forward call indicators	Y
Original called number	Y
Origination ISC point code	1)
Parameter compatibility information	Y
Propagation delay counter	1)
Range and status	Y
Redirect capability	
Redirect Counter	Y
Redirecting number	Y
Redirection information	Y
Redirection number	1)
Redirection number restriction	1)
Remote operations	1)
SCF id	
Service activation	1)
Signalling point code	1)
Subsequent number	Y
Suspend/Resume indicators	Y
Transit network selection	Y
Transmission medium requirement	Y
TMR prime	1)
Transmission medium used	1)
UID action indicators	
UID capability indicators	
User service information	Y
User service information prime	1)
User teleservice information	Y
User-to-user indicators	1)
User-to-user information	1)

**Note 1:** These parameters are passed transparently without being checked or processed by the WTL switch.

**Supported services**

Function/service	WTL
<b>Basic call</b>	
Speech/3.1 kHz audio	Y
64 kbit/s unrestricted	Y
Multirate connection types	
Signalling procedures for connection type allowing fallback capability	Note
Compatibility procedure	Y
Confusion procedure	Y
Simple segmentation	
User part availability control	Y
Propagation delay determination procedure	Note
Dynamic echo control procedure	Note
Tones and announcements	Y
MTP pause and resume	Y
Access delivery information	Note
Transportation of User teleservice information	Y
<b>Supplementary services</b>	
DDI	Y
MSN	Y
CLIP/CLIR	Y
COLP/COLR	Note
MCID	
Sub-addressing	Y
Terminal portability	Y
Call forwarding	Y
Call deflection	Note
Call waiting	
Call hold	
Conference calling	
Three party service	
CUG	Note
MLPP	
UUS, Service 1 (implicit)	Note
UUS, Service 1 (explicit)	
UUS, Service 2	
UUS, Service 3	

Note: Although the WTL switch does not implement these services, it passes transparently the associated parameters.

## Miscellaneous

### *Number translation*

The WTL switch does not perform number translation for telephone numbers other than the called address. The calling address, redirecting number, original called number and redirection number are passed unchanged to the succeeding exchange.

### *Local number portability*

The WTL switch supports local number portability procedures based on a) the Transit Network Selection parameter b) the called address nature of address parameter and a called address prefix. In neither case does the WTL switch query a database to identify ported numbers, it simply detects and processes the ported number indicators that have been inserted in the IAM message earlier in the network before the call reaches the WTL switch.

## Other user parts

The WTL switch does not currently support other user part than ISUP.

## Test specification

WTL recommends the use of Q.781, Q.782 and Q.784 to test MTP and ISUP interconnection with another network and the ETR299 for compatibility testing.