Benefits of VOIP Optimization

Simon Pearson,
Business Development Director
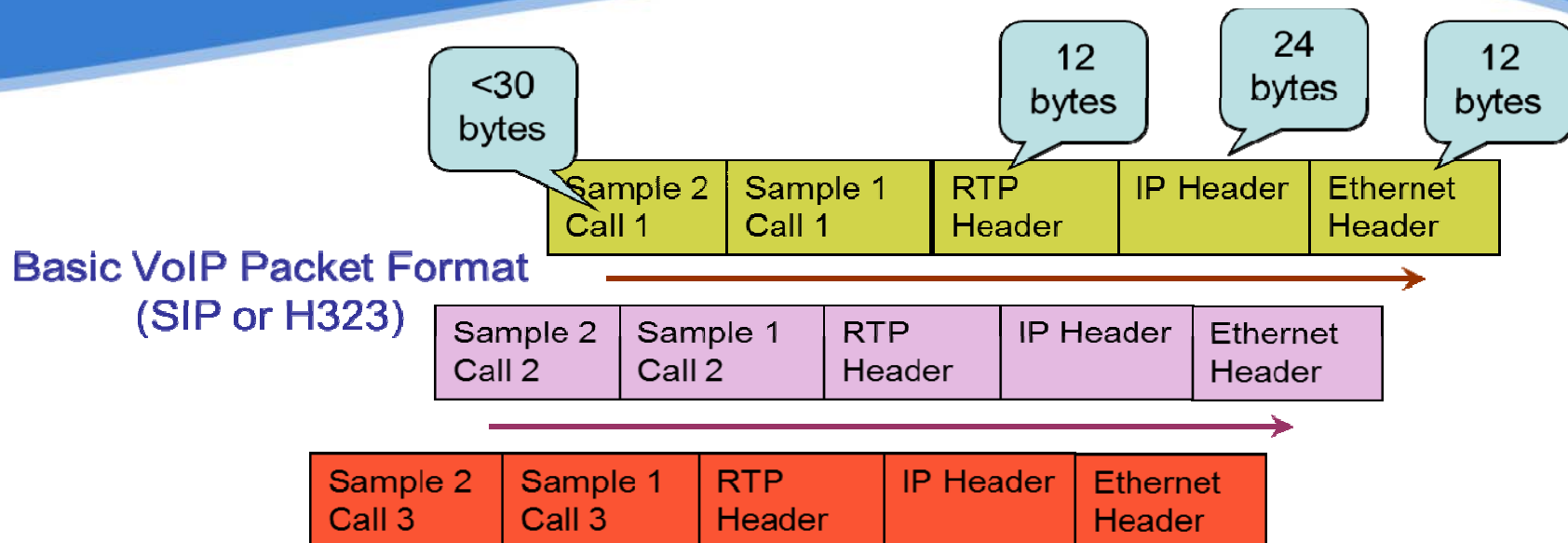World Telecom Labs

About World Telecom Labs

- Pioneer in VoIP for carriers (since 1997)
- Extensive installed base in Europe, Africa & Middle East
- Series of Industry Firsts & Patents
- Specialists in carrier solutions incl. satellite, Pre-Paid, SS7
- Loyal following in European competitive carrier market
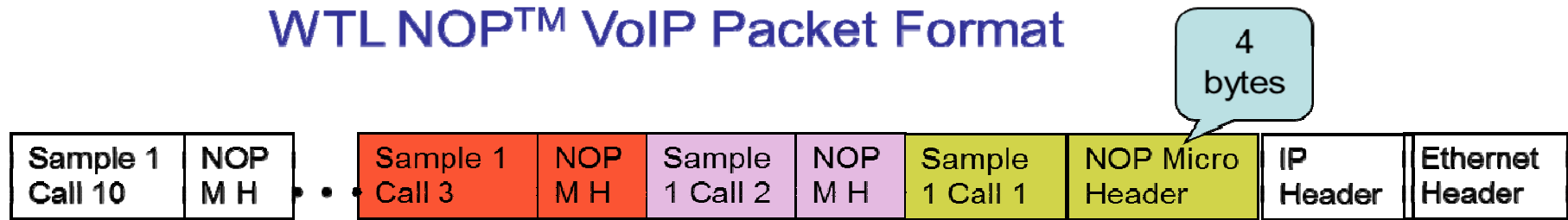
WORLD TELECOM LABS

Benefits of VOIP Optimization

- WTL has many real world VoIP projects
- VoIP <u>should</u> be the perfect solution for low tele-density (not a lot of copper)
- However VOIP can be inefficient in bandwidth use
- WTL has patented technology to improve the VOIP efficiency
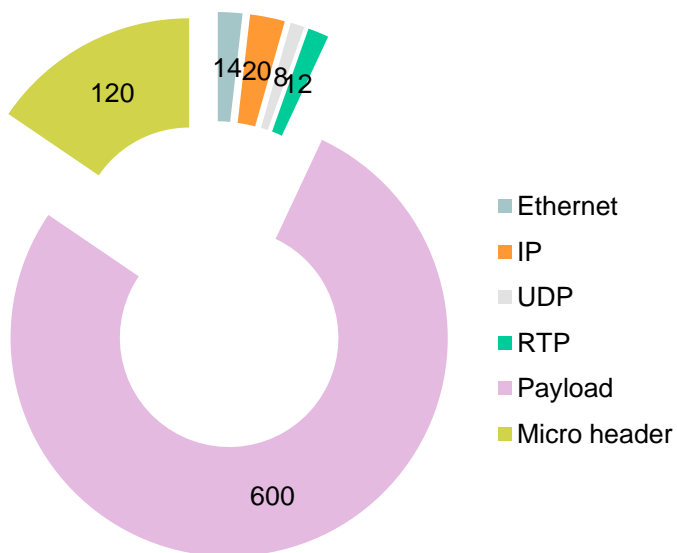- Also working on ESA (European Space Agency) funded VoIP developments

WORLD TELECOM LABS

A Bandwidth Saving Strategy

Compare NOP & SIP

NOP (G729 30 calls)

14 20 8 12
120
600

- Ethernet
- IP
- UDP
- RTP
- Payload
- Micro header

Total = 774 Bytes

SIP (G729 30 calls)

0
600
420
600
360
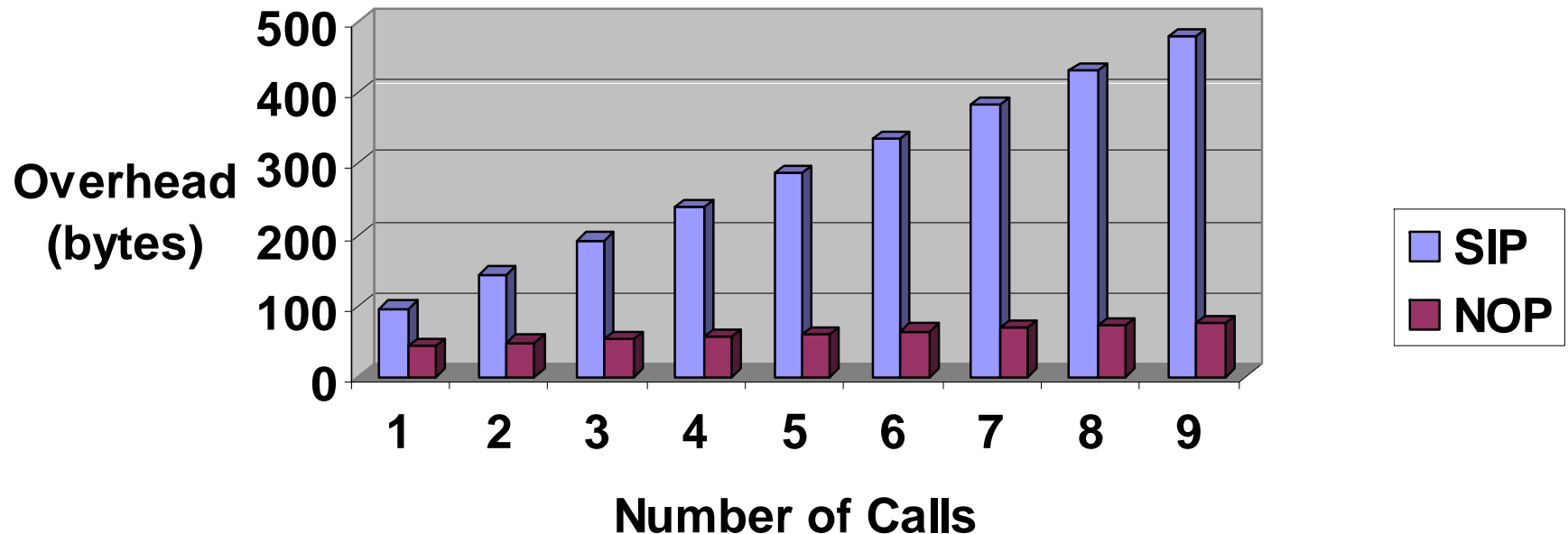240

- Ethernet
- IP
- UDP
- RTP
- Payload
- Micro header
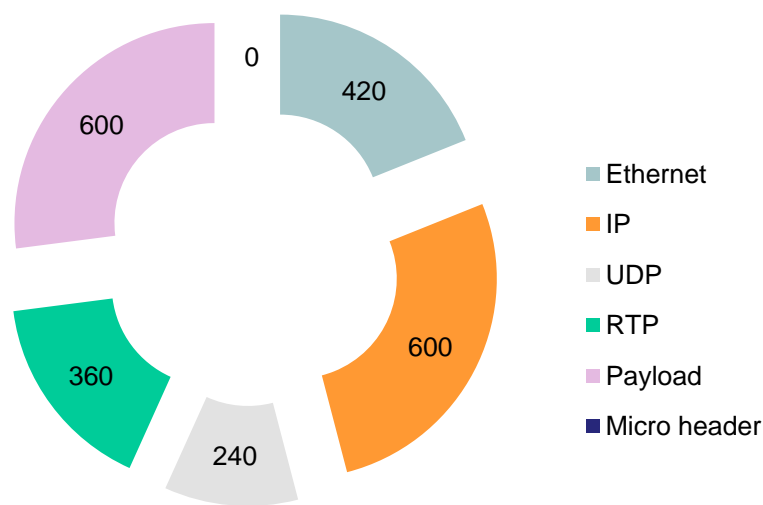
Total = 2220 Bytes

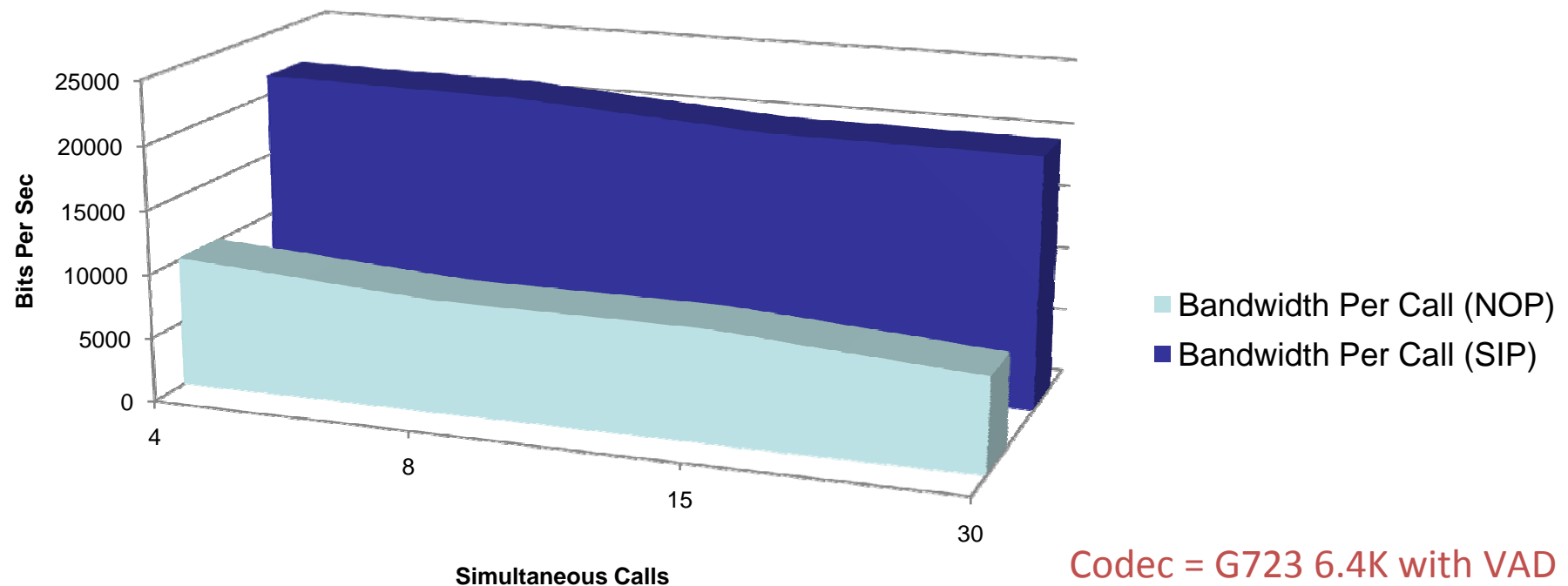WORLD TELECOM LABS

Effect of NOP

NOP v. SIP Efficiency

• Packing multiple samples per IP packet improves bandwidth efficiency ~ 50% but maintains audio quality & delay budget – SIP uses a linear model – NOP does not

WORLD TELECOM LABS

Bandwidth Per Call NOP v. SIP

Bandwidth Per Call (incl. Overhead)

Codec = G723 6.4K with VAD

	4 Calls	8 Calls	30 Calls
NOP (Kbps)	10.1	8.8	**7.3**
SIP	21.4	21.2	19.7

WORLD TELECOM LABS

Bandwidth Savings with NOP

Bandwidth Utilisation NOP v. H.323 (21 calls mixed G723 & G729)

WORLD TELECOM LABS
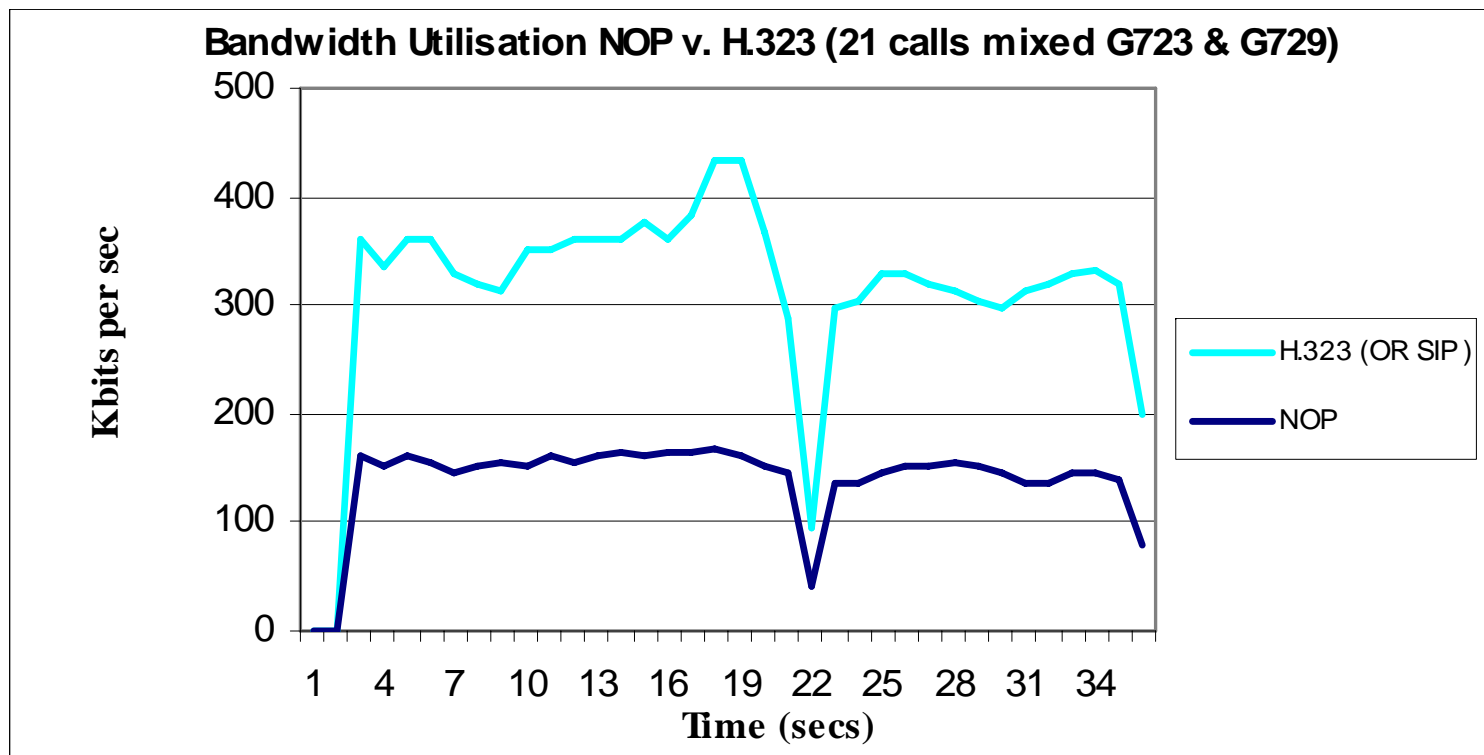
MOS For Poor Quality Link

Codec	Unloaded			Loaded		
	NOP	H.323	Diff (%)	NOP	H.323	Diff (%)
G.723.1	3.8	3.8	0	2.6	2.5	+4
G.729	3.8	3.8	0	2.8	2.9	-3
G.711	3.5	3.5	0	2.8	2.9	-3

Test: Head Acoustics (independent laboratory)
Conditions: 250 mS delay, 200 mS jitter and 3% packet loss
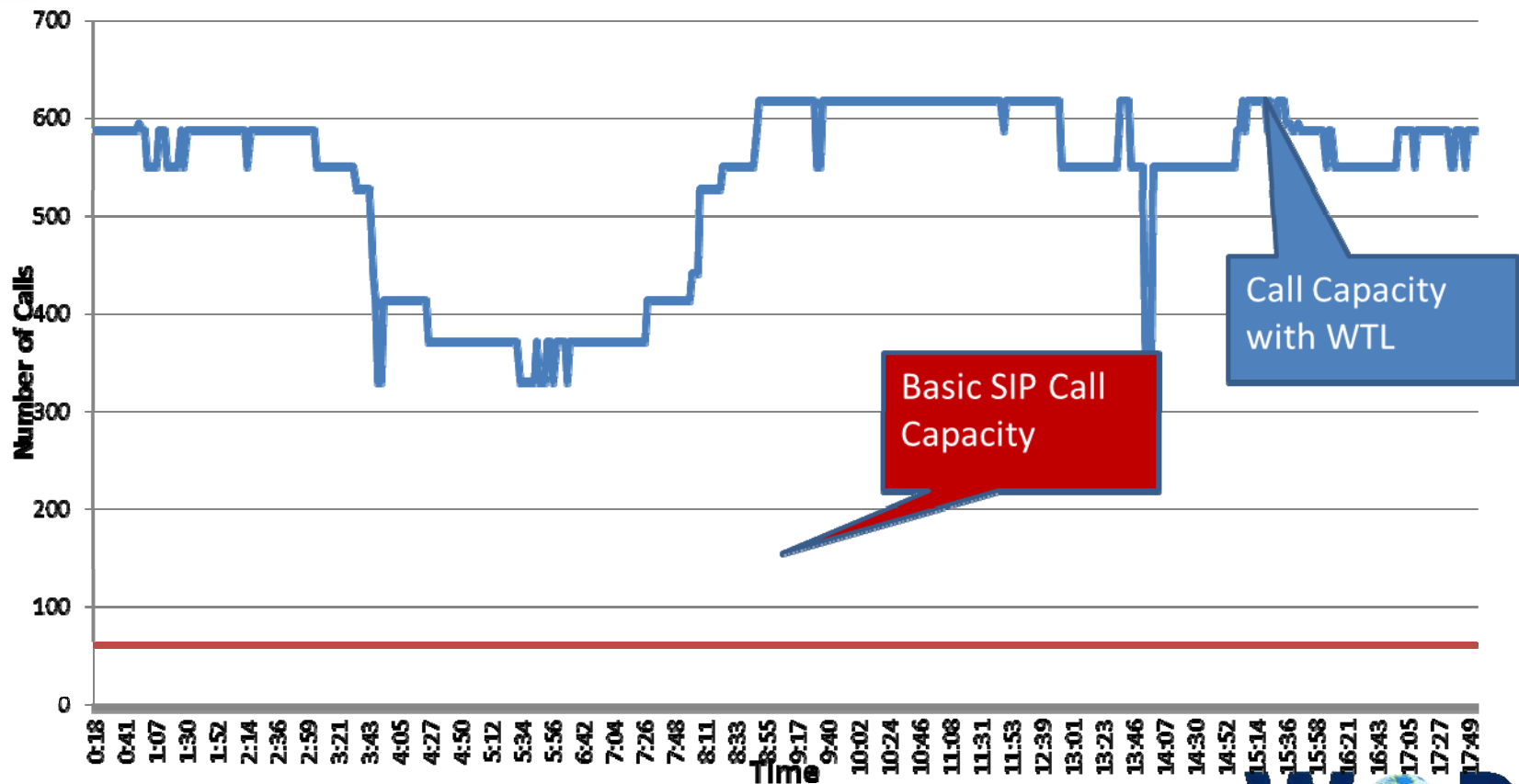
WORLD TELECOM LABS

DTC = "Rain-Proof" VoIP

- WTL developed DTC (Dynamic Trunk Capacity) to adapt to variable link conditions
- If too many VoIP calls on IP link then quality of <u>all</u> calls suffers
- Works for any IP link but ideal for rain-fade issue on satellite

WORLD TELECOM LABS

How DTC Works

- Samples link performance every 8 seconds
  — If small deterioration then no new calls accepted
  — … If serious quality loss then close calls
- As conditions improve more calls are allowed
- Number of calls is always the maximum for the current link performance
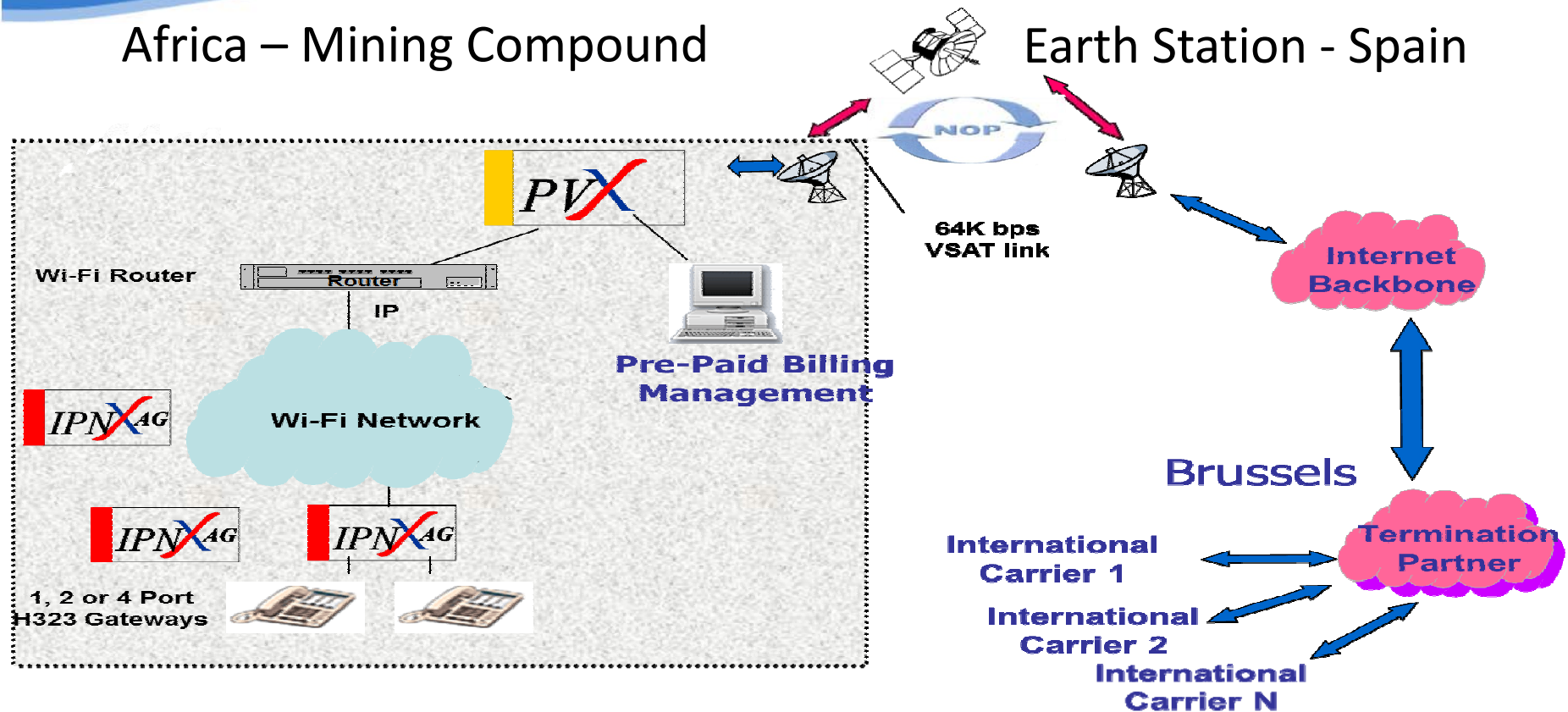
WRLD TELECOM LABS

Call Capacity with NOP + DTC

Network Design With NOP

- NOP is available:
— …as optimisation-only appliance, IP-only device (PVx)
— …as part of WTL integrated TDM/IP gateway (SoIP)
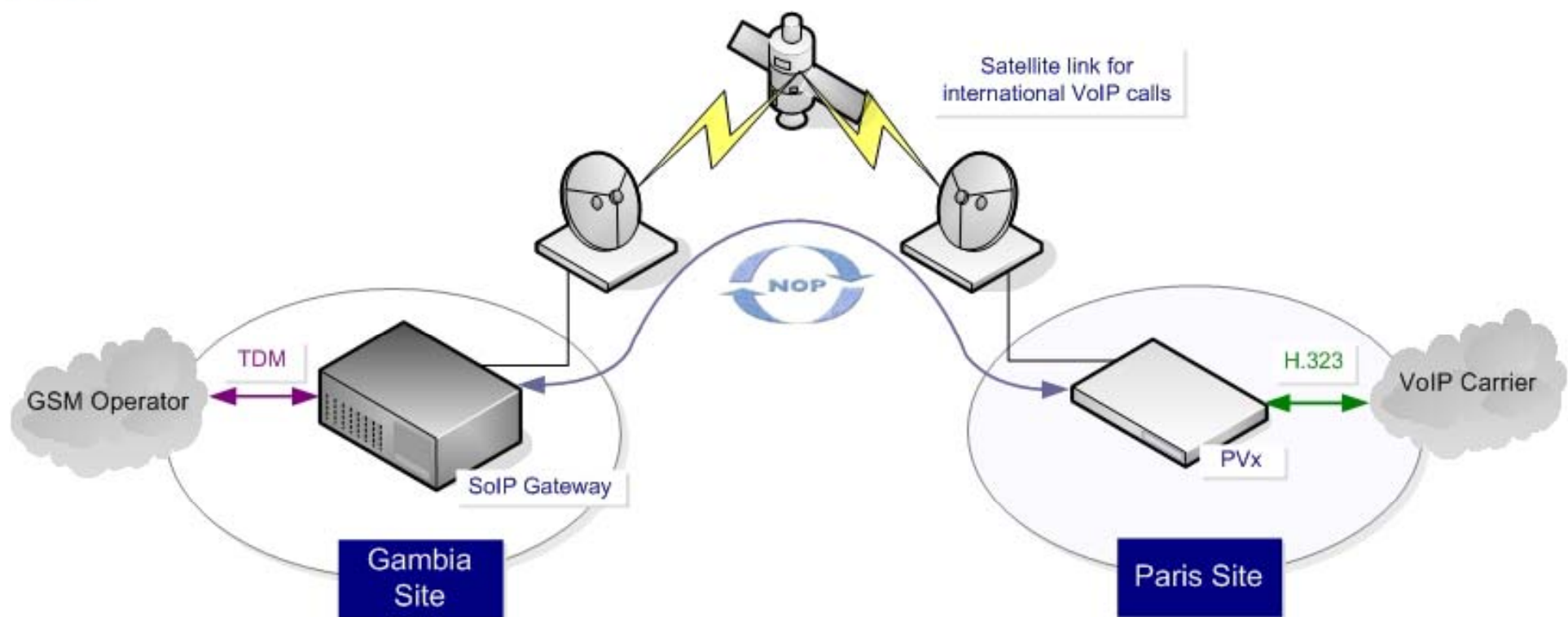— …inside WTL high-capacity switch (IPNx)

WORLD TELECOM LABS

VoIP In Hostile Environment

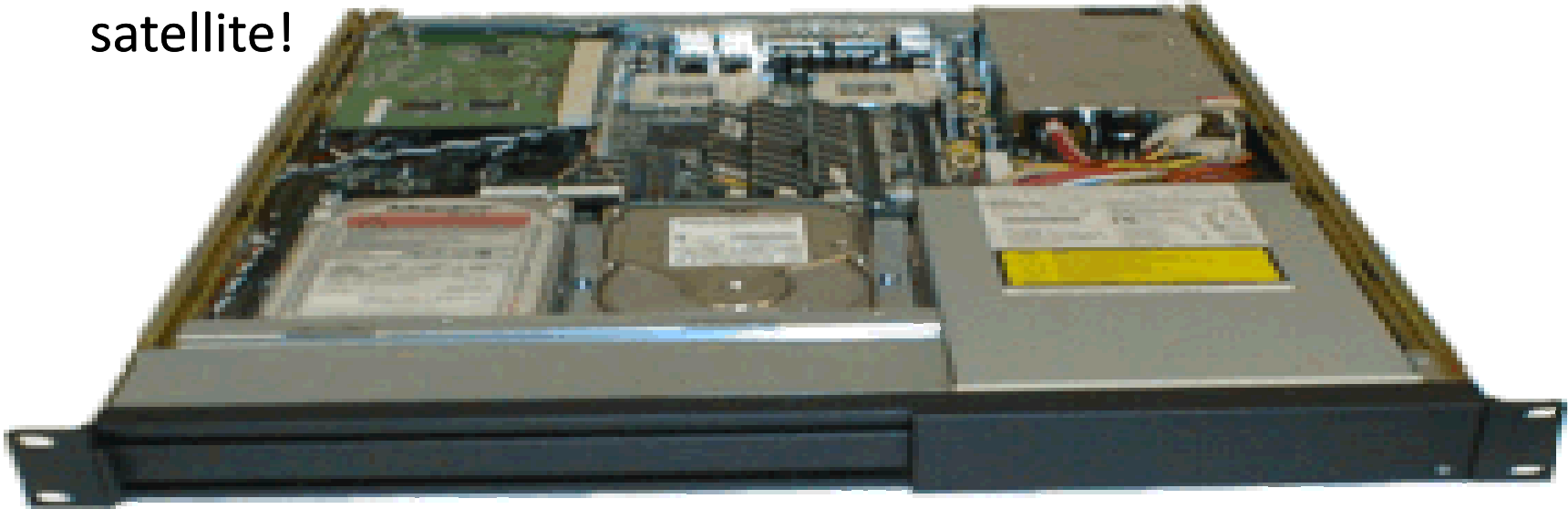Africa – Mining Compound

Earth Station - Spain

GSM Backhaul Network

PVx - Packet Voice Xcelerator

- Improve the performance of any VoIP link: less bandwidth per call, fewer packets per second, no loss of quality, even via satellite!

Totally compatible with CISCO, Audiocodes, Quintum, Mediatrixs, Teles, etc;

WORLD TELECOM LABS

Get more voice for less IP

- PVx designed for maximum payback in shortest time
- Small size, big punch – PVx is rackmount unit just 1U (45mm) high handles 240 simultaneous VoIP calls. Small size minimises rack costs in co-lo facility.
- Works with existing gateways - Support for SIP & H323 means all existing VoIP equipment can feed traffic to PVx
- Fewer packets are generated –means less bandwidth is used but also reduces the load on the router. This saves costs because a smaller router will do the job.

WORLD TELECOM LABS

SoIP Layout (Front)

CPU: Opteron
2 GHz

Triple 80GB
RAID5 Disks

SoIP

WORLD
TELECOM LABS

SoIP- Connecting the VoIP and PSTN worlds

- Compact, High Performance, Cost Effective SS7 to IP Gateway
- 1 to 16 Signalling Link Pairs
- 2 to 32 E1/T1 trunks
- SIP <u>AND</u> H323 on same SoIP
- 30 to 960 VoIP calls
- Managed by SW Config (web-based application)
- Uses OSST^{TM} from WTL (Optimised SS7 Transport) format
- Sigtran transparency possible

WORLD TELECOM LABS

Simple Set Up

- Simple set up, get started quickly – simple web-based configuration utility provided.
- Stackable, load sharing – As number of calls compressed increases just add extra units. Multiple units can automatically load share.
- Complete information on every call – Comprehensive CDR (Call Details Record) for every call made. Allows integration with conventional call billing system.
- Proven in service – World Telecom Labs has been supplying VoIP switching to many of the world's leading carriers for more than 8 years.

WORLD TELECOM LABS

VoIP In Space

- WTL recently completed an ESA funded development project
- Specifically aimed at improving VoIP service over DVB-RCS
- Aims:
  - Improve Voice Quality…but maintain low bandwidth usage
  - Better equipment management…but maintain low bandwidth usage
  - New technique for handling IVR
  - Independent lab tests for voice quality

WORLD TELECOM LABS

VoIP In Space 2

- WTL working with sat terminal manufacturer
- Exploiting DVB-S2 ACM feature
- First VoIP equipment vendor to add adaptive trunk capacity based on line quality
- If quality degrades VoIP trunk
  - rejects new calls
  - closes existing calls

W RLD
TELECOM LABS

Thank You

www.wtl.dk

WORLD TELECOM LABS