



Andrew Williams – Team Leader Unified Communication Services



# Highly Available IP Telephone services in multi-campus environments

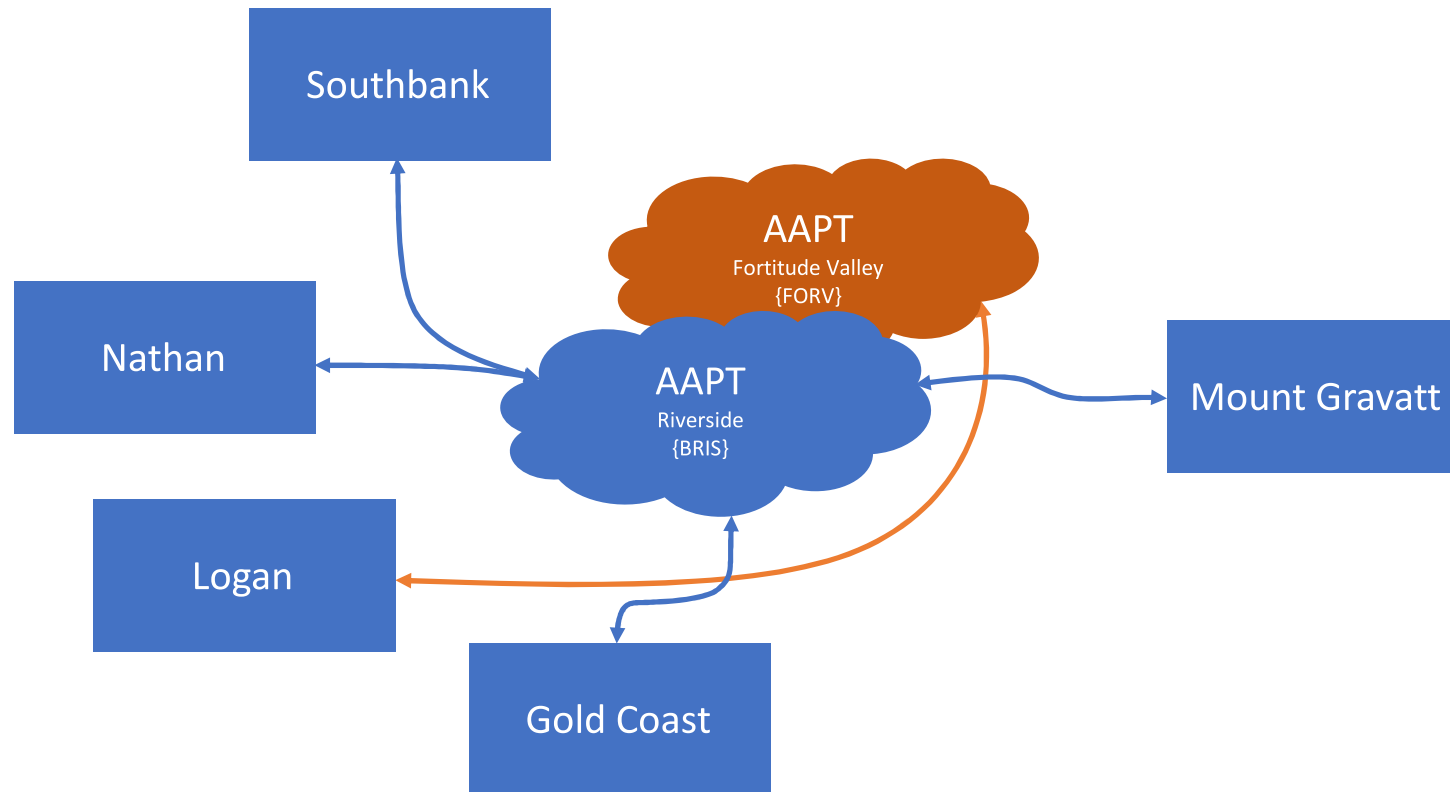
The Griffith experience

(TDM to IP and the ABC's in between)

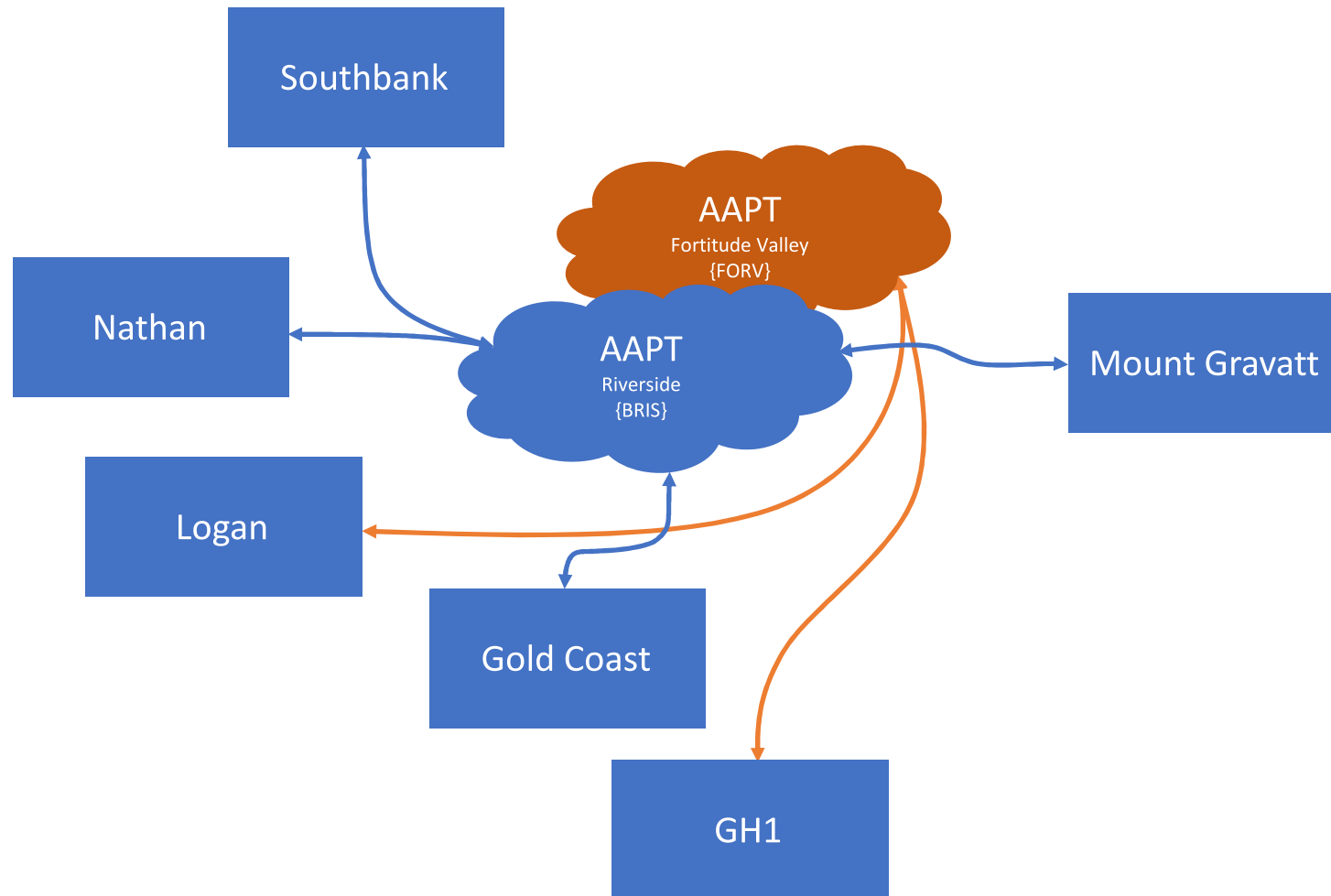
# Foreword

- Griffith University provides Telephone services to a large IT community (80,000+) spread across five metro campuses and several regional locations. These services include 8,500+ Endpoints, including 6,300 Video enabled endpoints, voicemail, and 10+ business critical call centers.
- The University moved to IP backbone with IP handsets in 2012-13, and from ISDN to SIP Carrier Trunking in 2016.
- The fixed line carrier network was largely untouched due to an exceptional Highly Available record within the TDM environment.  
This presentation will cover the business drivers for reviewing current Telephone service infrastructure, the Highly Available and Disaster Recovery design requirements, the vendors evaluated, the implementation, success criteria, and lessons learnt.

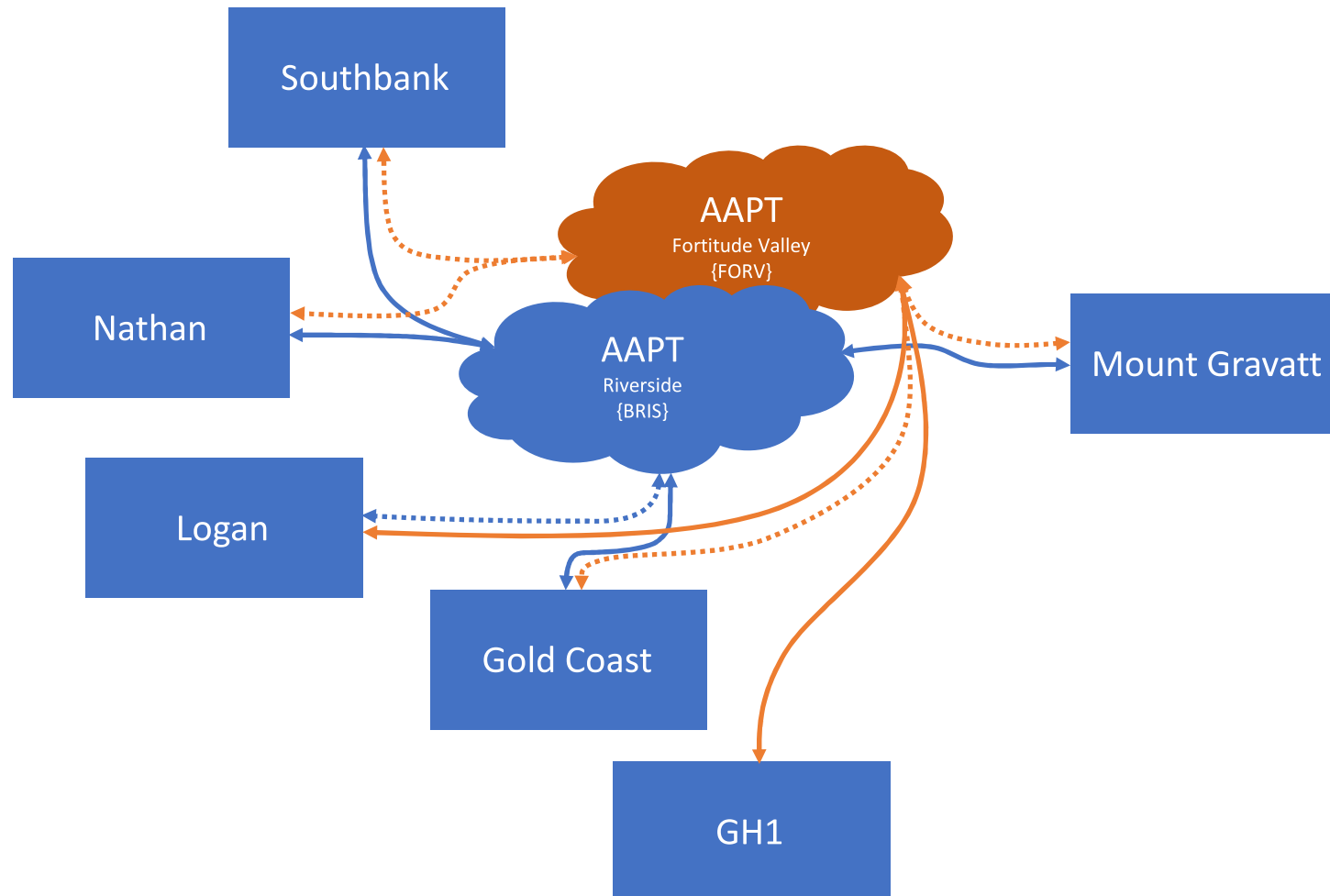
# 2004 AAPT ISDN



# 2005 AAPT ISDN



# 2006 AAPT ISDN





## 2006 to 2014

### Southbank

1600 Numbers delivered via 180 ISDN channels  
(90 Fortitude Valley, 90 Riverside – 60 IN, 60 BW, 60 OUT)

### Mount Gravatt

1700 Numbers delivered via 60 ISDN channels  
(30 Fortitude Valley, 30 Riverside – 60 BW)

### Nathan

6700 Numbers delivered via 180 ISDN channels  
(90 Fortitude Valley, 90 Riverside – 60 IN, 60 BW, 60 OUT)

### Logan

3000 Numbers delivered via 60 ISDN channels  
(30 Fortitude Valley, 30 Riverside – 60 BW)

### Gold Coast

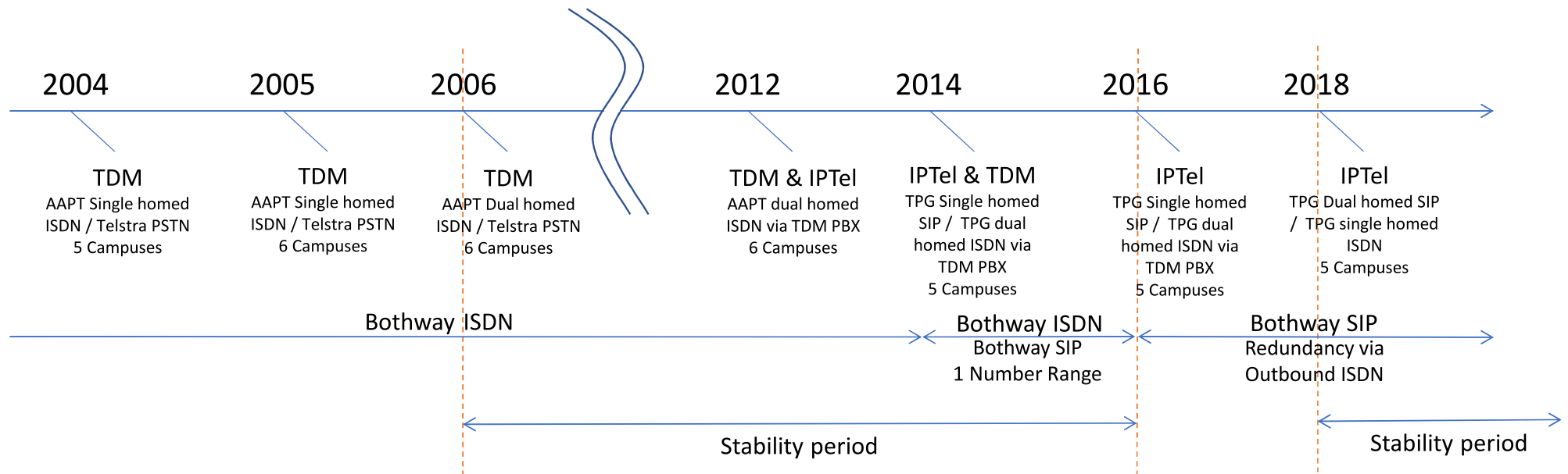
3200 Numbers delivered via 120 ISDN channels  
(60 Fortitude Valley, 60 Riverside – 30 IN, 60 BW, 30 OUT)

### GH1

1000 Numbers delivered via 30 ISDN channels (8800 numbers reserved)  
(30 Fortitude Valley – 30 BW)

# Technology Journey

TDM with ISDN → IPTEL with ISDN → IPTEL with ISDN & SIP → IPTEL with SIP & ISDN







## 2011 to 2017

### Southbank

1600 Numbers migrated from 180 ISDN channels to 180 SIP sessions  
(~~90 Fortitude Valley, 90 Riverside — 60 IN, 60 BW, 60 OUT ISDN~~)

### Mount Gravatt

1700 Numbers migrated from 60 ISDN channels to 60 SIP sessions  
(~~30 Fortitude Valley, 30 Riverside — 60 BW ISDN~~)

### Nathan

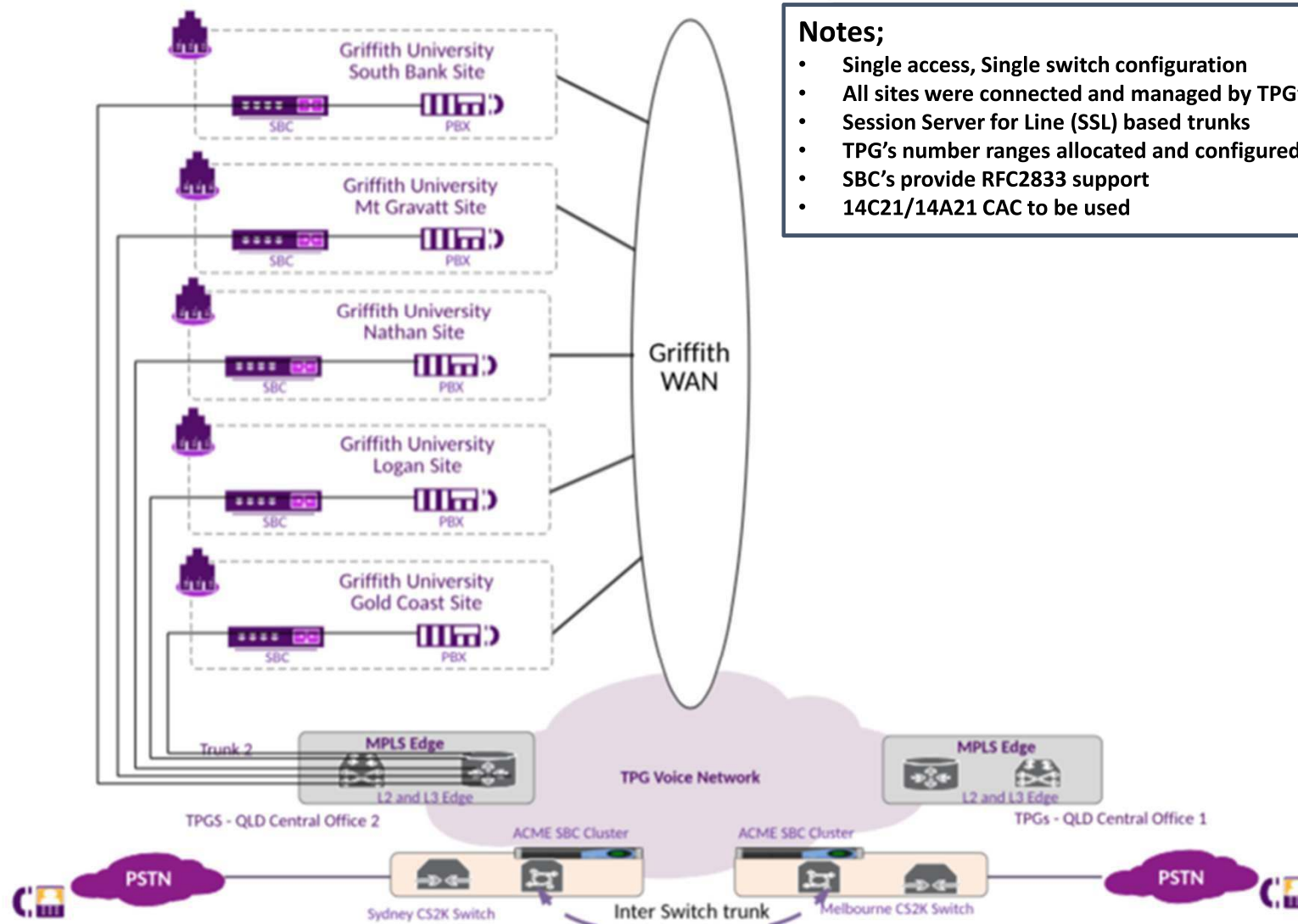
6700 Numbers migrated from 180 ISDN channels to 180 SIP sessions  
(~~90 Fortitude Valley, 90 Riverside — 60 IN, 60 BW, 60 OUT ISDN~~)

### Logan

3000 Numbers migrated from 60 ISDN channels to 60 SIP sessions  
(~~30 Fortitude Valley, 30 Riverside — 60 BW ISDN~~)

### Gold Coast

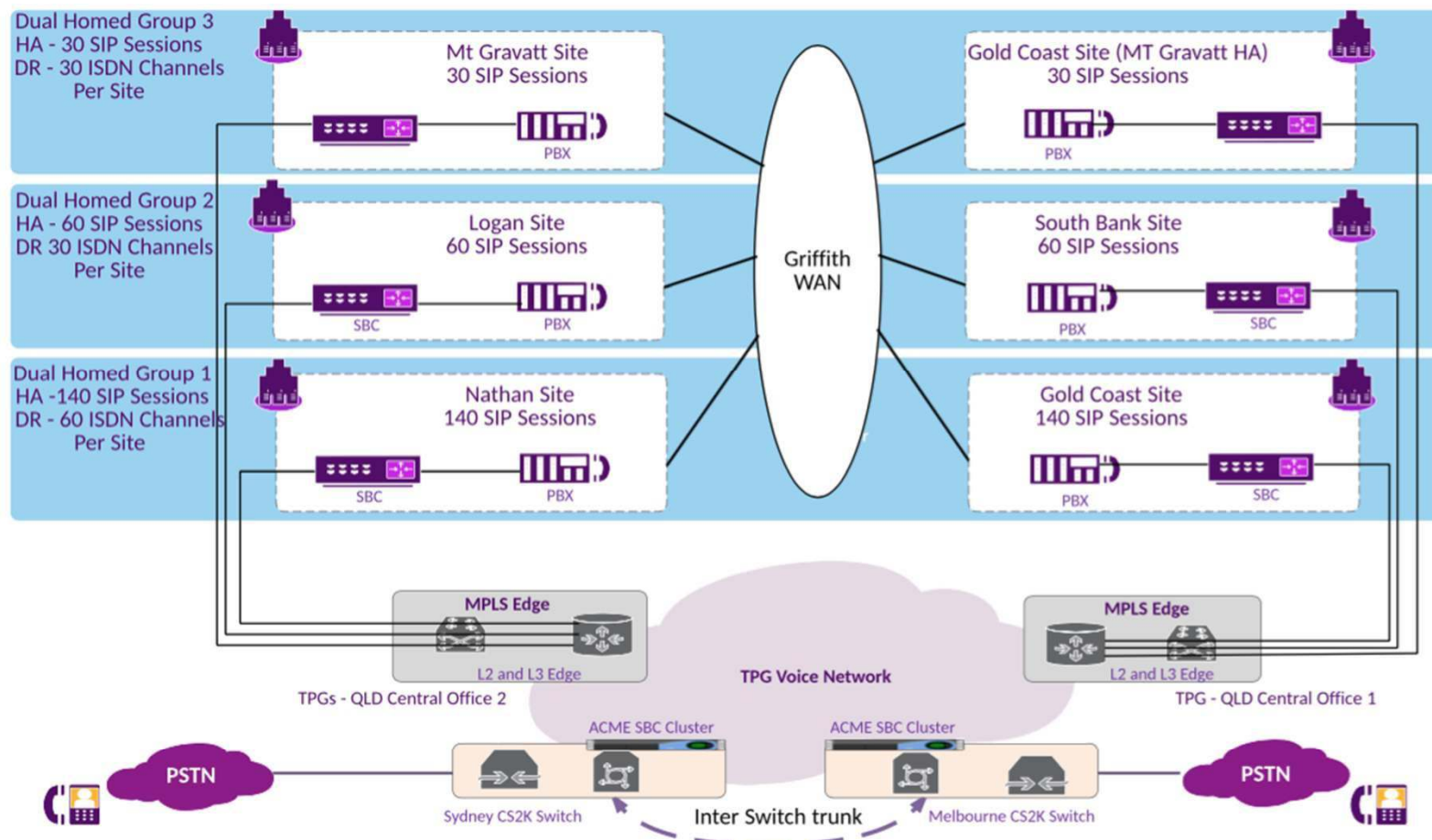
13000 Numbers migrated from 120 ISDN channels to 120 SIP sessions  
(~~60 Fortitude Valley, 60 Riverside — 30 IN, 60 BW, 30 OUT ISDN~~)



#### Notes;

- Single access, Single switch configuration
- All sites were connected and managed by TPG's Sydney switch
- Session Server for Line (SSL) based trunks
- TPG's number ranges allocated and configured for each site individually
- SBC's provide RFC2833 support
- 14C21/14A21 CAC to be used

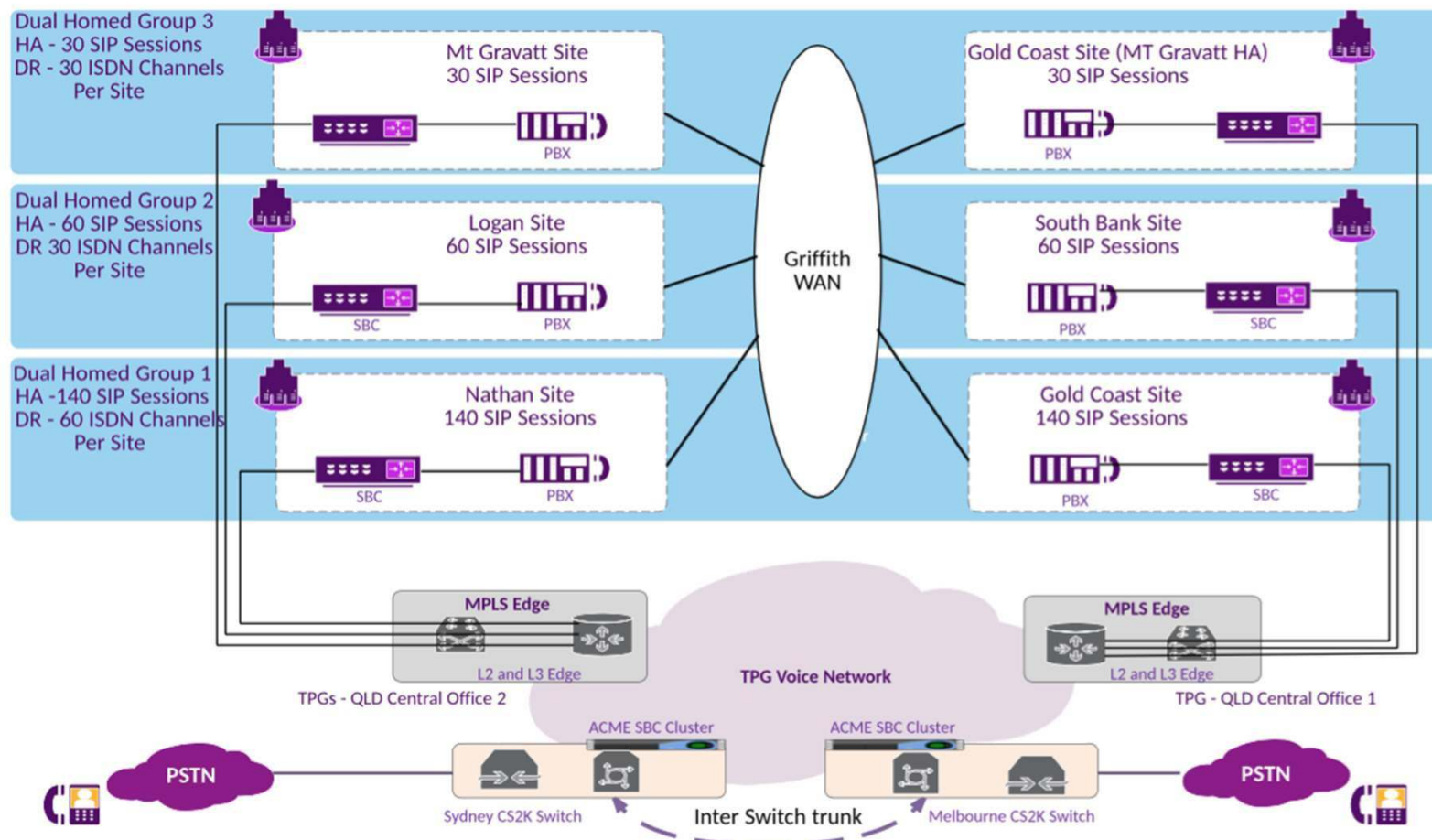
Image courtesy of 



#### Notes

- Single access, Single switch configuration per site except Gold Coast with 2 accesses (one with Nathan and the other with MT. Gravatt)
- Sites were split in 3 groups of 2's to be supported by TPGs diverse switches (Sydney and Melbourne), Dual Homed Solution, see below:
- Gold Coast with Nathan and Mt. Gravatt and South Bank with Logan
- Griffith Uni. will use their data network to support inter-site calls
- Session Server for Line (SSL) based trunks
- National Number Hosting (NNH) will be configured on each of the 3 groups as above (Gold Coast with Nathan, Gold Coast with Mt Gravatt with South Bank shares with Logan)
- Sessions Border Controller (SBCs) provide RFC2833 support
- TPGs number ranges will be allocated as part of the build for testing
- Diverse SBCs Managed by Diverse Soft switches
- 14C21/14A21 CAC to be used

Image courtesy of **TPG**

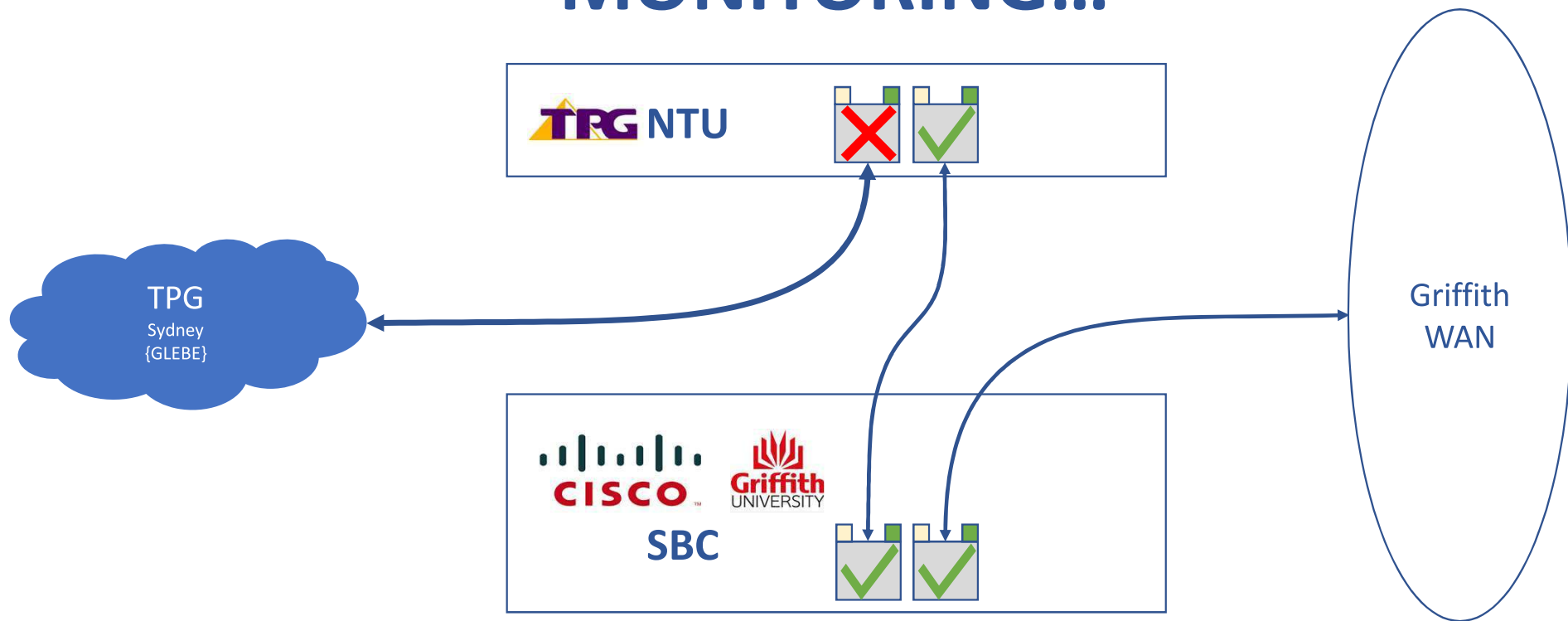


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Image courtesy of **TPG**

# MONITORING...





# MONITORING...

 Sun 10/12/2017 1:42 AM  
[redacted]@griffith.edu.au  
SIP DIALPEER STATUS CHANGE  
To  [redacted]@griffith.edu.au

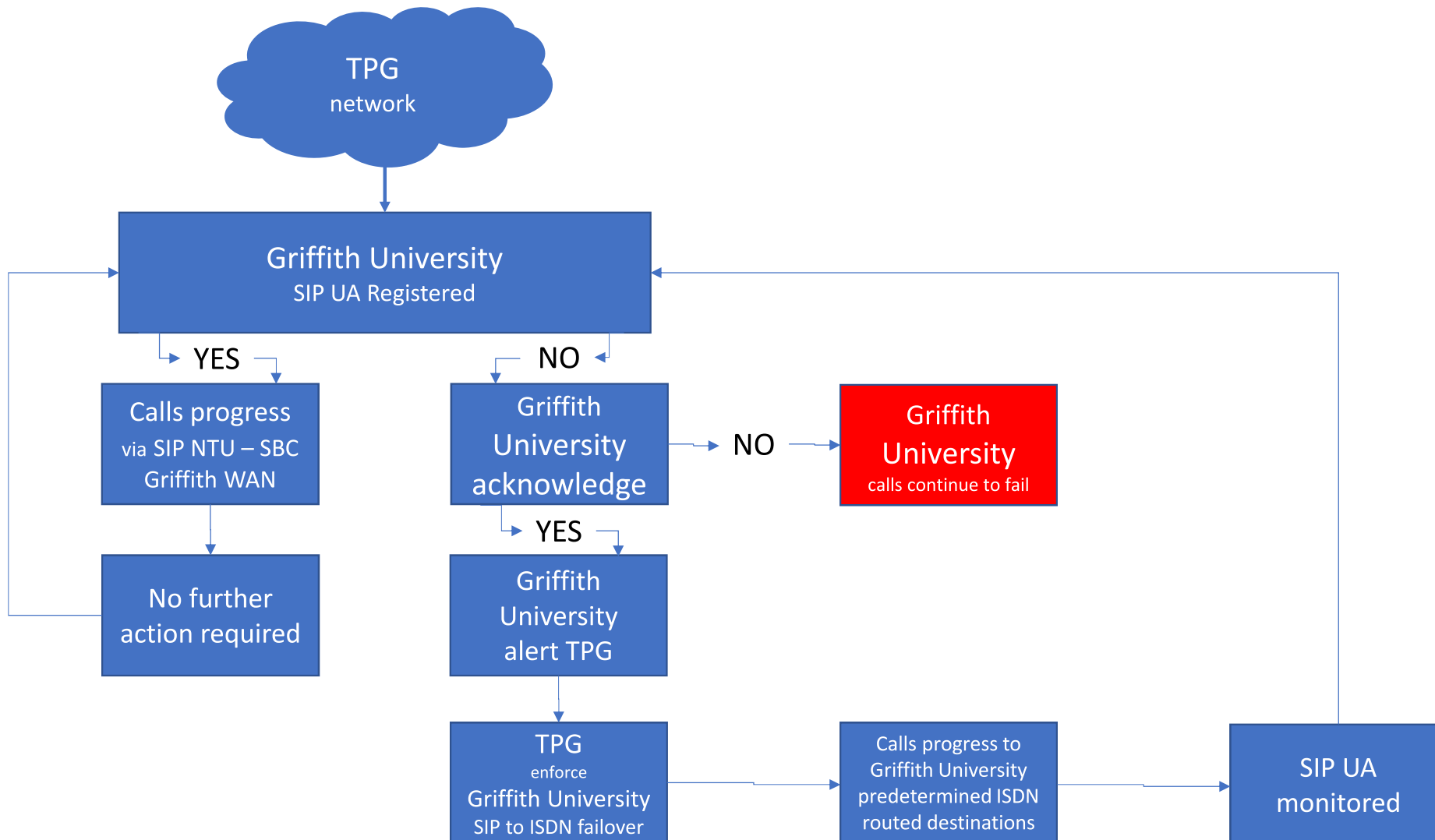
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2017-12-10T01:42:04+10:00 [redacted].gw.griffith.edu.au Dec 10 01:42:03.813: %SIP-5-DIALPEER\_STATUS: VoIP dial-Peer <200> is Busied out

 Sun 10/12/2017 1:54 AM  
[redacted]@griffith.edu.au  
SIP DIALPEER STATUS CHANGE  
To  [redacted]@griffith.edu.au

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2017-12-10T01:53:53+10:00 [redacted].gw.griffith.edu.au Dec 10 01:53:52.809: %SIP-5-DIALPEER\_STATUS: VoIP dial-Peer <200> is Up



*Thank You*



Andrew Williams – Team Leader Unified Communication Services



# Griffith University

## Case study of voice resilience options

**Josh Reed – National Customer Engineering Manager**

*We're for Enterprise + Government*



# Agenda

- Resilience in voice networks
- Griffith University – carrier perspective
- SIP resilience

# Resilience in voice networks

- Very different to IP resilience
- Direct In-Dial (DID) numbers are tied to a *single* carrier
  - Port numbers between carriers
  - ISDN Standard Zone Units (SZU) impact resilience options
  - IPND update responsibilities
- Single carrier inbound, multiple carriers outbound is possible
- When selecting inbound carrier scrutinize their resilience closely

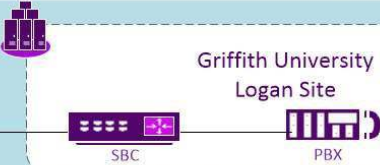
# Griffith University design – carrier perspective



Dual Homed Group 3  
HA – 30 SIP Sessions  
DR 30 ISDN Channels  
Per site



Dual Homed Group 2  
HA – 60 SIP Sessions  
DR 30 ISDN Channels  
Per site



Dual Homed Group 1  
HA – 140 SIP Sessions  
DR 60 ISDN Channels  
Per site



Griffith  
WAN

Gold Coast Site (Mt Gravatt HA)  
30 SIP Sessions



Griffith University  
South Bank Site



Griffith University  
Gold Coast Site



MPLS Edge

L2 and L3 Edge

TPG's - QLD Central Office 2

TPG Voice Network

MPLS Edge

L2 and L3 Edge

TPG - QLD Central Office 1

PSTN



Sydney CS2K Switch



Inter Switch trunk



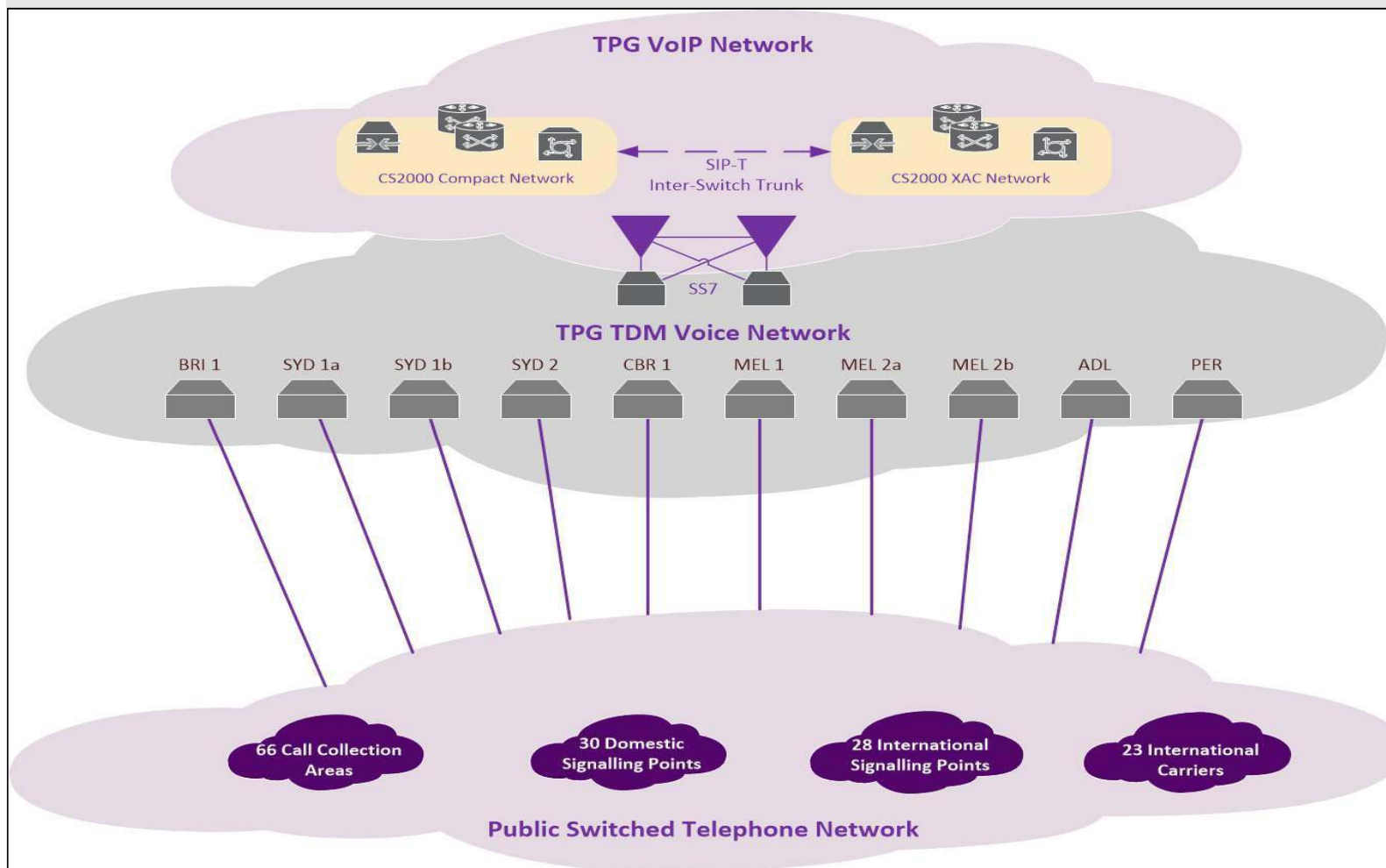
Melbourne CS2K Switch

PSTN



- Physical resilience
- # range resilience
- Technology resilience
- Dual PE
- Dual SBC
- Dual Class 5 switch
- Carrier interconnection resilience

# Carrier interconnection



- Dual SBC
- Dual Class 5 switch
- Carrier interconnection resilience

# Designing resilient solutions in a SIP world

- SIP offers failover between multiple paths (and sites)
  - Delivered on TPG's fibre network as well as Telstra and NBN (future)
  - Number range flexibility
- TPG has been busy deploying an updated core soft-switch – Metaswitch
  - Virtualised = greater resilience, and easier capacity expansion
  - More granular CLI control
  - More granular redirection capability
- ISDN dying but still available
  - Via SDH - \$\$, restricted footprint
  - Via SIP – Ease transition to SIP

Questions?









