RFLAN

REDFLAG LANFEST

FIBRE TO THE LAN PARTY

..and building a high-performance network for 24 hours.

Speakers: Brad Peczka / Tim Raphael, AusNOG 2019

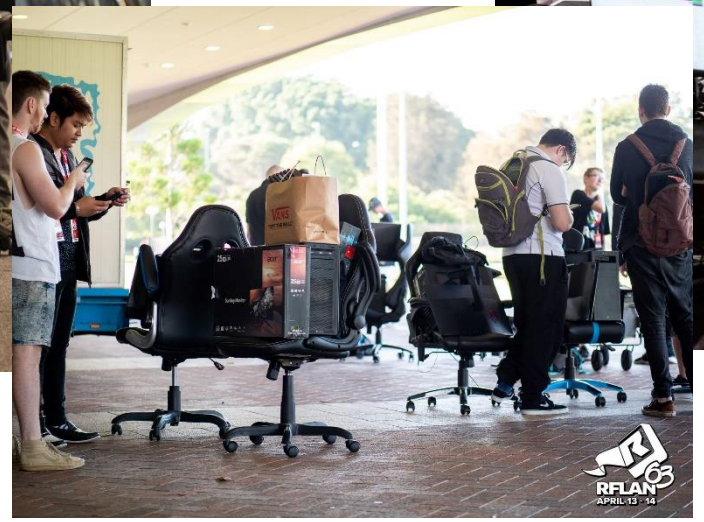
Overview

- RFLAN is a self-sustaining event, founded in 2002 and operating as a registered not-for-profit since 2005.
- We’re a 100% volunteer based organisation.
- Currently the largest BYOC event in the Southern Hemisphere

..but what's a 'BYOC' Event?

Bring Your Own Computer!

Lanners bring their PC, monitor, peripherals… and often chairs!



By The Numbers

	RFLAN 1	RFLAN 61
Attendees	~100	864
Duration	32 hours	24 hours
Internet Capacity	None	20Gbit
Number of Servers	3	32(ish)
Number of Staff	3	53(ish)
Number of Tournaments	10	25+
Peak Pizza™	66	120+
Prize Pool	$500	$15,000+
Games	Counter-Strike, Battlefield 1942, Quake III, Warcraft III, Unreal Tournament	Counter-Strike:G.O., Overwatch, Fortnite, PUBG, League of Legends, DOTA 2

RFLAN 1 vs RFLAN 61

RFLAN 1 – Late 2002

RFLAN 61 – July 2018

Challenges of running the network at a LAN event

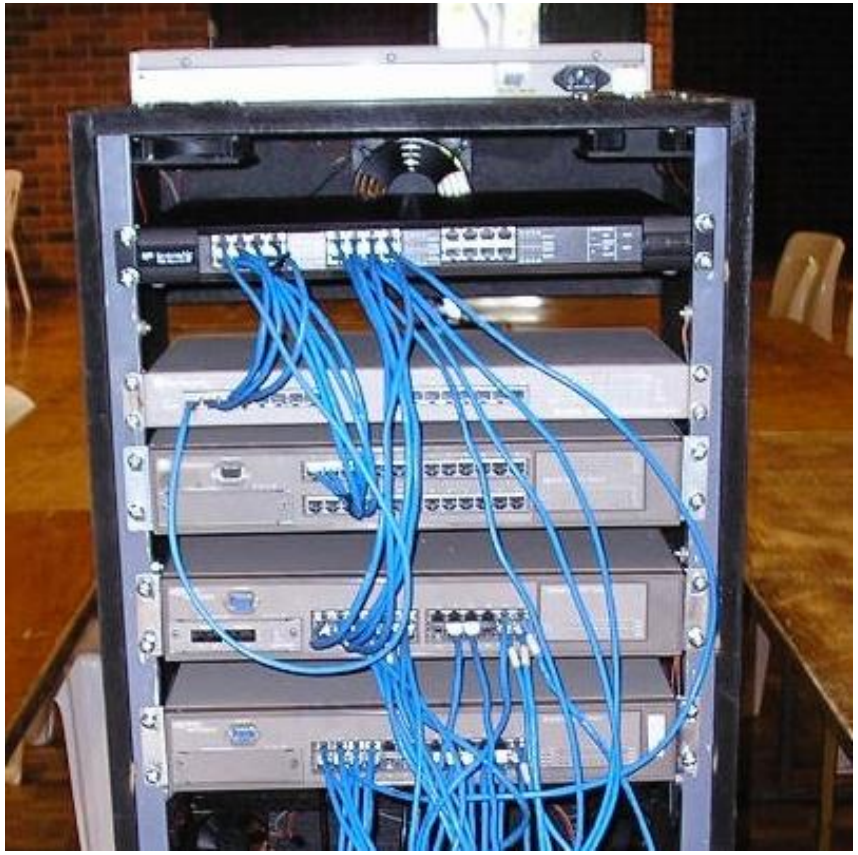
- **Gamers**
  - ISPs and readers of **Whirlpool** know what we mean…
- **Time**
  - **24 hour** event with **15 hours** to setup, **7 hours** to pack down
- **Money**
  - Not for profit, income only from ticket sales
- **Bandwidth** demand
- **Power** density
- **Hostile** technological environment
- '**Funky**' Layer 2 protocols

Early Designs

Let's just lob it together!

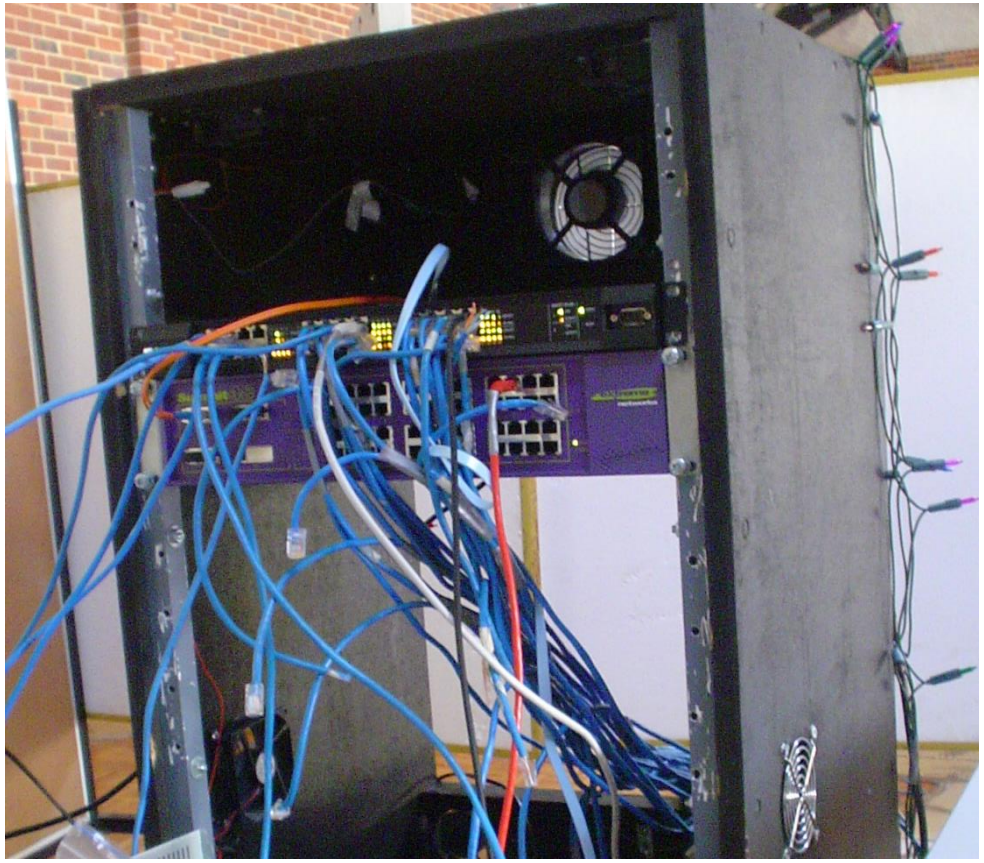
RFLAN 1

Nortel BayStack 350-24Ts



RFLAN 10

Extreme Networks Summit 48



Early Issues
Circa 2003-2005

- One big Layer 2 domain
- No STP
- Many Loops
- Rogue DHCP
- Latency/Congestion on the uplinks
  - But no real monitoring – educated guessing…

- Power/Generators/Attendees bringing random power boards that trip whole rows of attendees

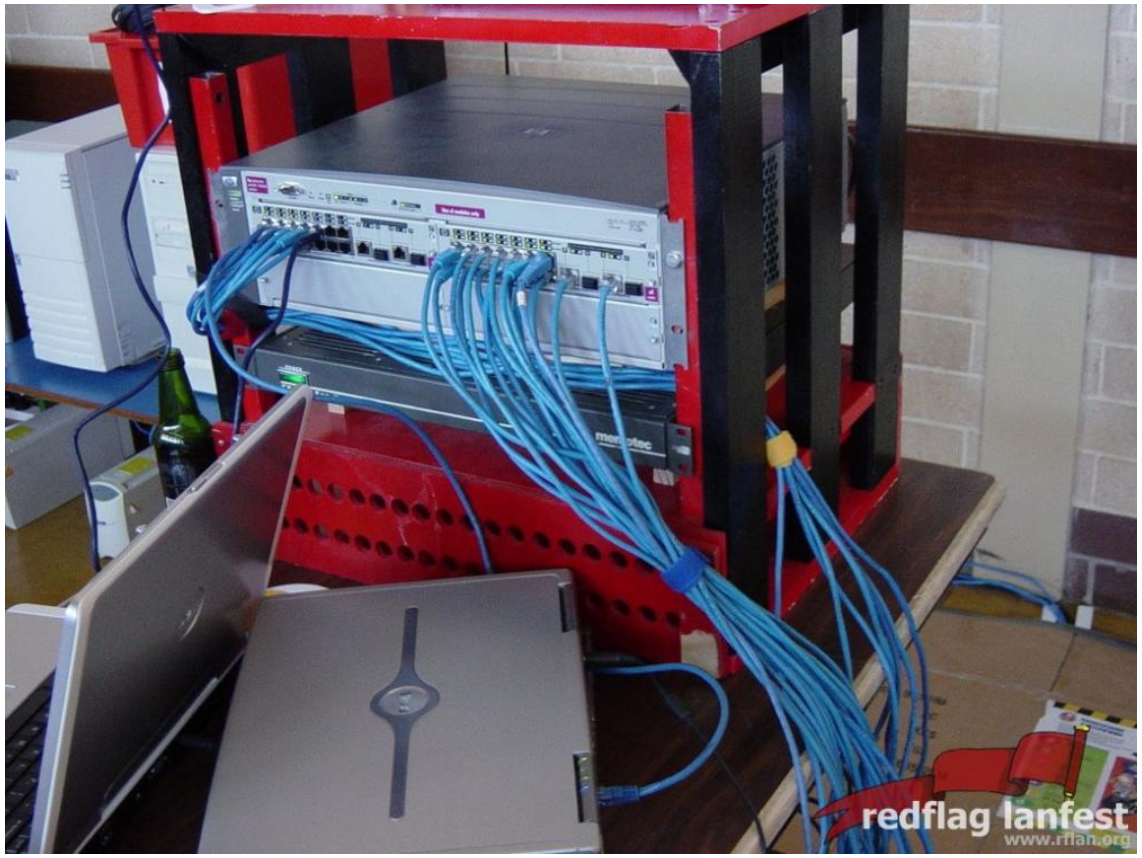
Moving to Full Gigabit

Circa RFLAN 10 (~2005)

- Competitor events were running 100Mbit switches with 1Gbit uplinks
- HP ProCurve 5304xl-32G for a core and Netgear GS724Ts for access
  - Original purchase price for the HP = $6,222
- HP Pentium 4-based laptops used as servers

Moving to Full Gigabit

Circa RFLAN 10 (~2005)



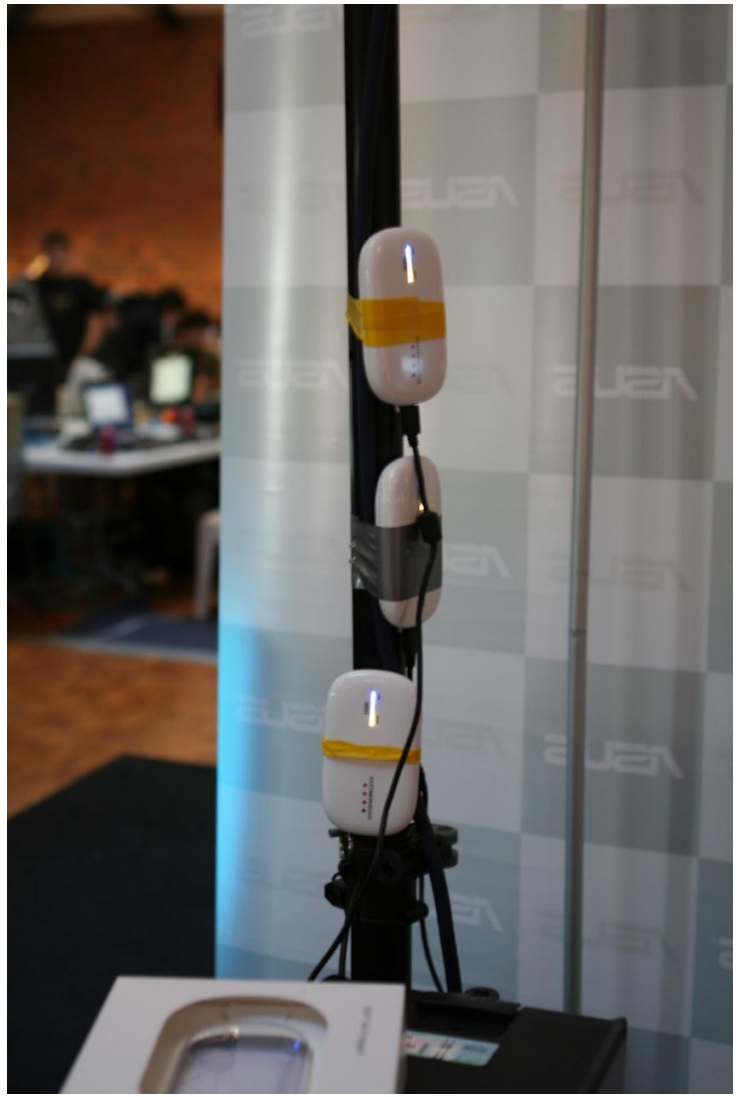
Gaining Popularity

Circa RFLAN 30 (~2010)

- Filling more and more of the Cannington Exhibition Centre
  - Taking up adjacent rooms to accommodate ~**400 people**
- Sponsor installed ADSL to the venue for us, but use was limited to ensure it wasn't overwhelmed
- Accompanied the ADSL with the… ***Leaning Tower of Vivid Power***
  - It didn't work at scale for AusNOG in 2017, and certainly didn't work for us either in 2010 ;-)
  - Also needed periodic modem swaps, once they ran out of quota!
- **Creative iptables rules** were required to split traffic across the internet options and manage congestion.
  - Vivid / WiMAX for HTTP Proxy + Cache, DSL for everything else.

Gaining Popularity

Circa RFLAN 30 (~2010)



New Venue, New Network

Circa RFLAN 35 @ Curtin University Stadium, Bentley

- As the event got bigger, we *started* to ***actually*** engineer the network instead of *#yolo*
  - Netgear table switches were replaced with HP 1810s
  - Uplinks upgraded to 4x 1G LAG from each table to the core using ‘magic’ HP auto-LACP business

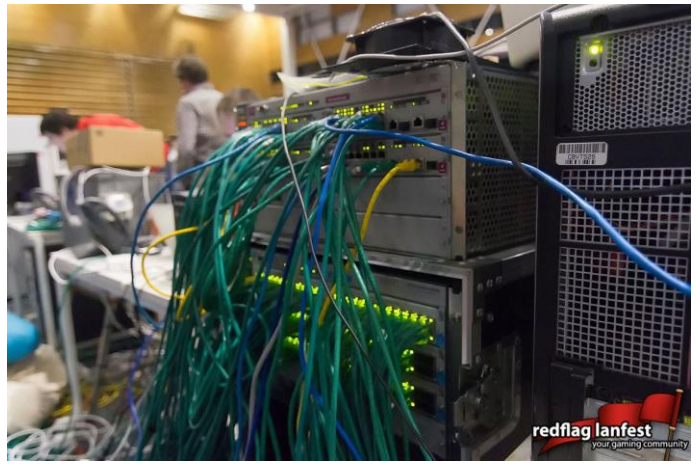
- But, we weren’t there **yet**:
  - ***Still*** no real monitoring of the network, due to slow switch CPUs and poor SNMP MIB support
  - ***Still*** no STP, so loops still killed the whole network
  - ***Still*** no routing due to games needing Layer 2 adjacency for discovery

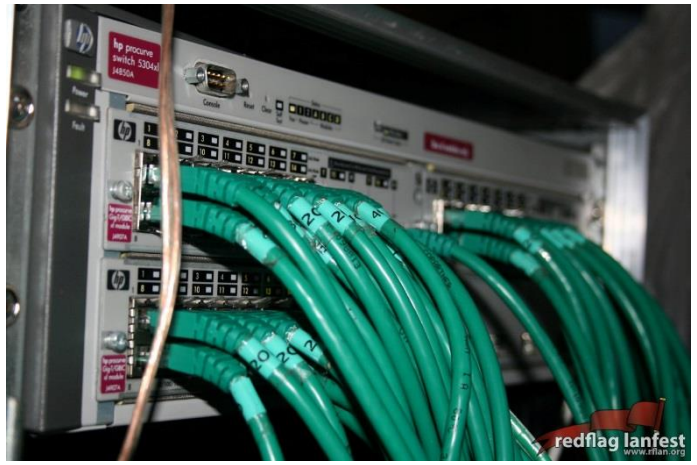
- Internet upgraded to a **40/40 fibre service** delivered on the **other side of the Curtin Campus**
  - Favours were required to get patched cross-campus to the Stadium

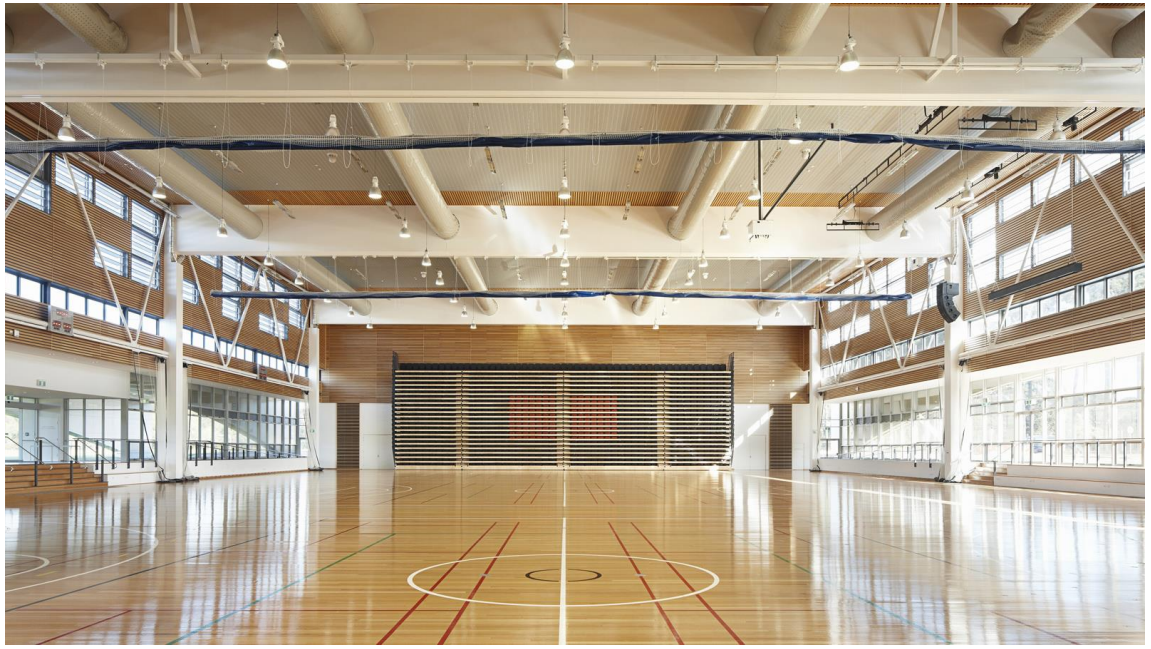
- Core Network “Upgrade”
  - We managed to max out the backplane on the HP 5304xl, so a 5408zl (and friends) arrived

New Venue, New Network

Circa RFLAN 35





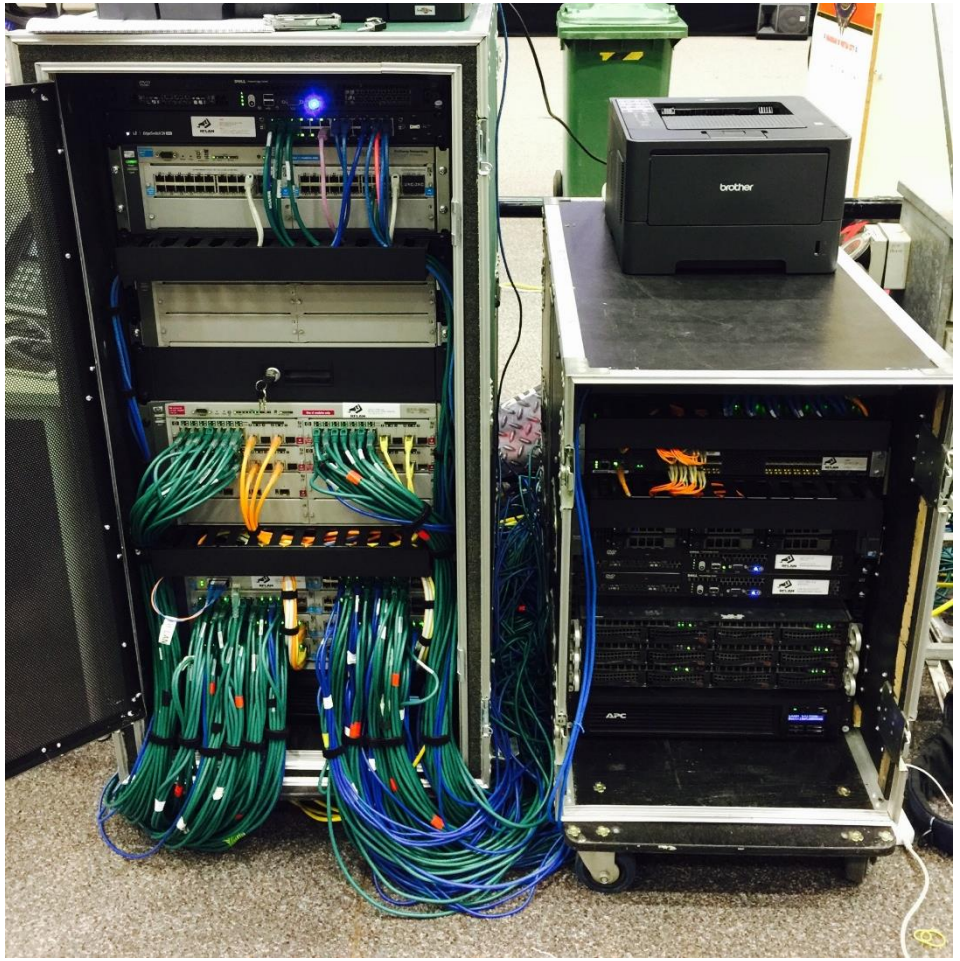


New Venue, New Network

Circa RFLAN 35

New Venue, New Network

Circa RFLAN 35



Incremental Improvements

RFLAN 44 (2013) – RFLAN 55 (2016)

- Decided to beat the NBN at their own game with FTTLP (Fibre to the LAN Party)
  - 10Gbit fibre internet installed to the venue - thanks **AARNet**!
  - Resolved a large number of internet issues, but others still persisted
  - Game updates killed the link, so we **rolled our own caching servers** (Steam)
  - **Cisco 4506-E** procured to replace the long-serving HP ~~Slow~~ProCurves

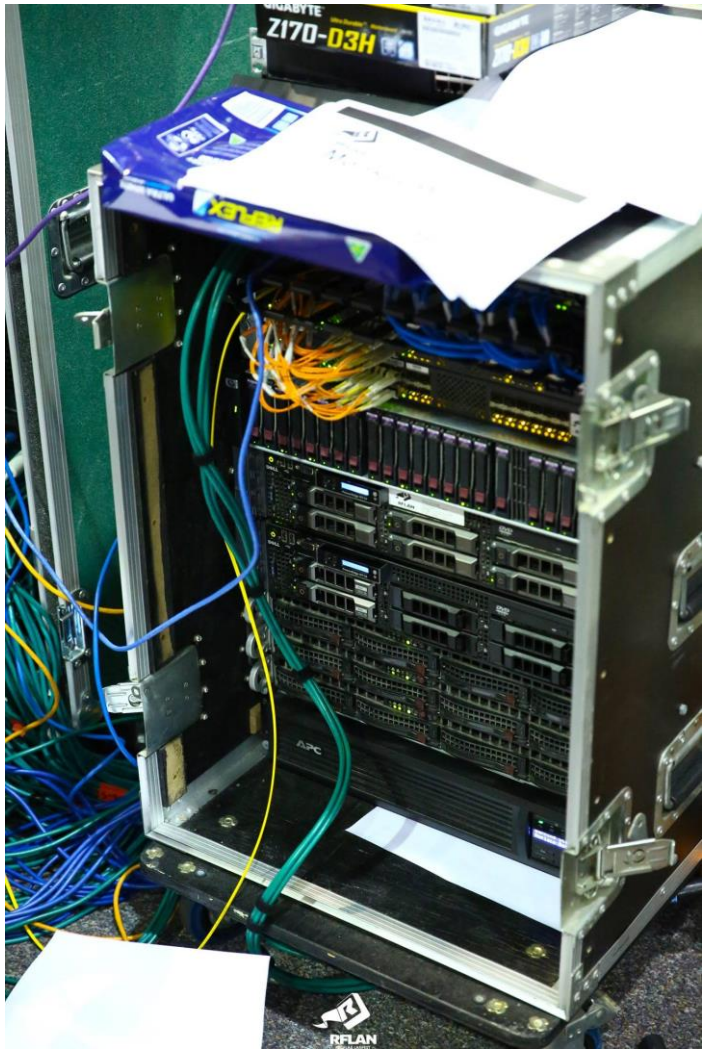
- RFLAN 55 (**792 people!**) highlighted major challenges, resulting in a proposal to fully redesign the network
  - Major issues with the **venue power** – earth leakage is a pain…
  - **Loops** repeatedly **killing the network**
  - Lack of full visibility into performance and conditions = **network wack-a-mole**

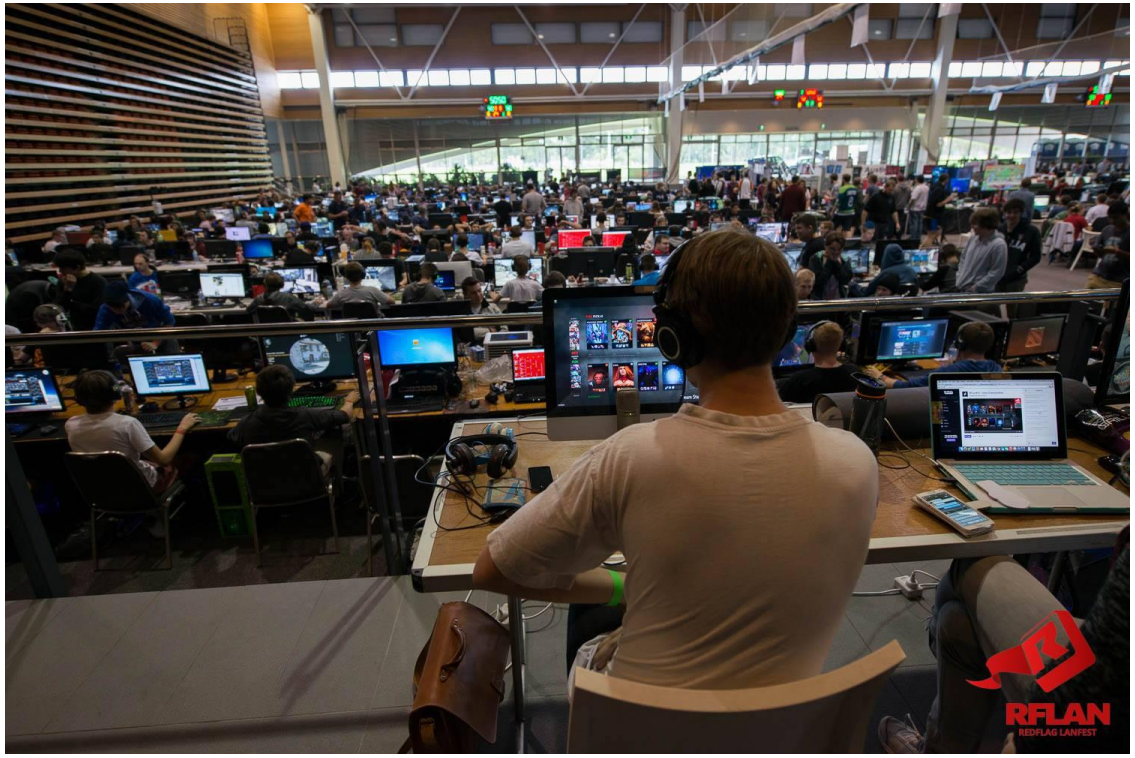
Incremental Improvements

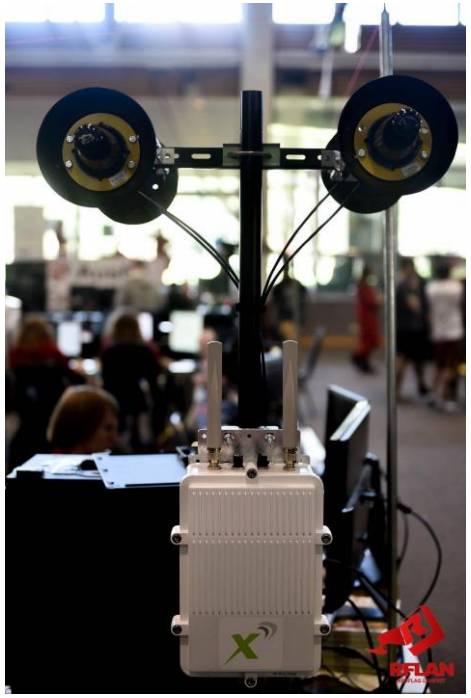
RFLAN 44 (2013) – RFLAN 55 (2016)

Incremental Improvements

RFLAN 44 (2013) – RFLAN 55 (2016)







"We've duct taped as much of the network together as we can to get us by until 10Gig was affordable... and now it is, so let's DO IT!!"

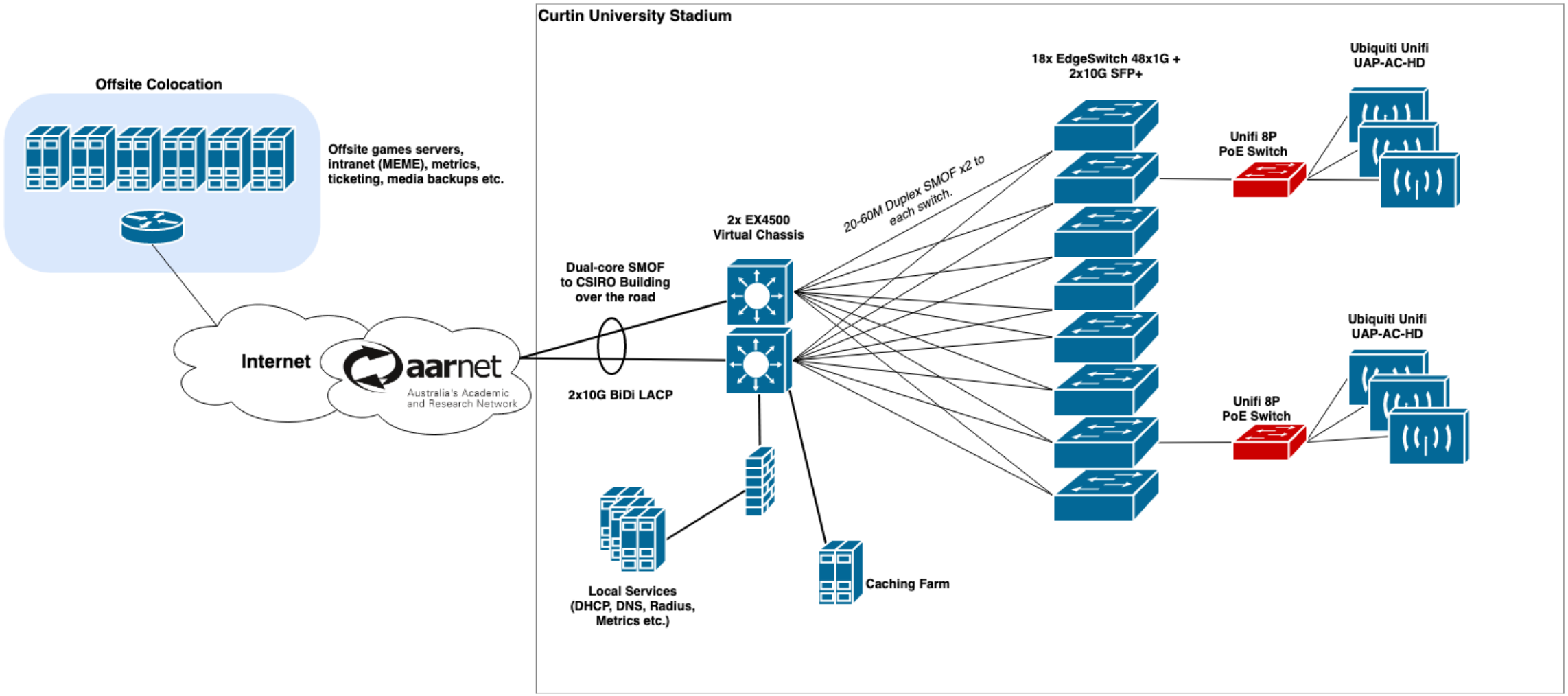
-Shane Short, RFLAN Network Upgrade Proposal TL;DR

Engineering for Scale
RFLAN 56 (2017)

- **BIGGEST** event yet (>800 attendees)!
- Redesigned the network ***from the ground up*** with some lofty goals
- Implemented **2x Juniper EX4500 cores**, and put **Ubiquiti Edgeswitches** on the tables
  - Allowed for **2x 10G to every desk switch**
    - 20Gbit per 40 attendees vs 4Gbit per 20 attendees – 1:5 over-sub improved to 1:2.4
  - Allowed for **improved monitoring**
    - 30 second SNMP polling of user ports, uplinks, optics, and all of IF-MIB per port.
  - Port security across the network (max MAC limits, broadcast limits etc.)
  - More configuration, more manageable, less issues!
- Internet upgraded to 2x 10Gbit links (thanks AARNet!!) using BiDi optics on existing dark fibre.
- Game servers moved into **offsite colocation** – less to move around, and always on between events.

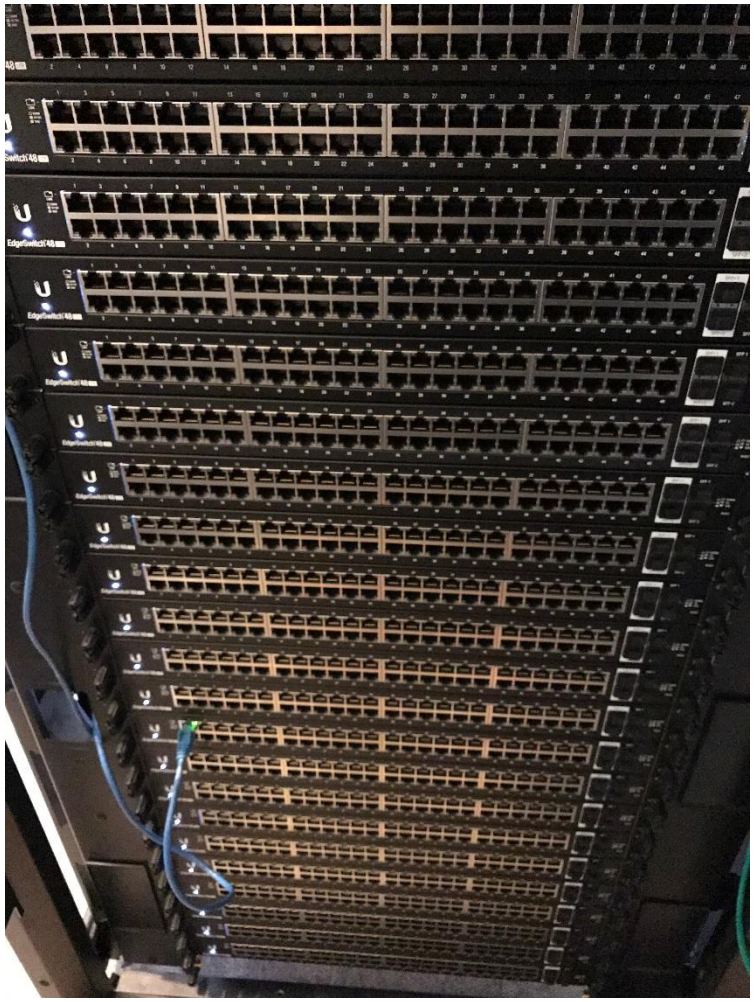
Engineering for Scale

RFLAN 56 (2017)



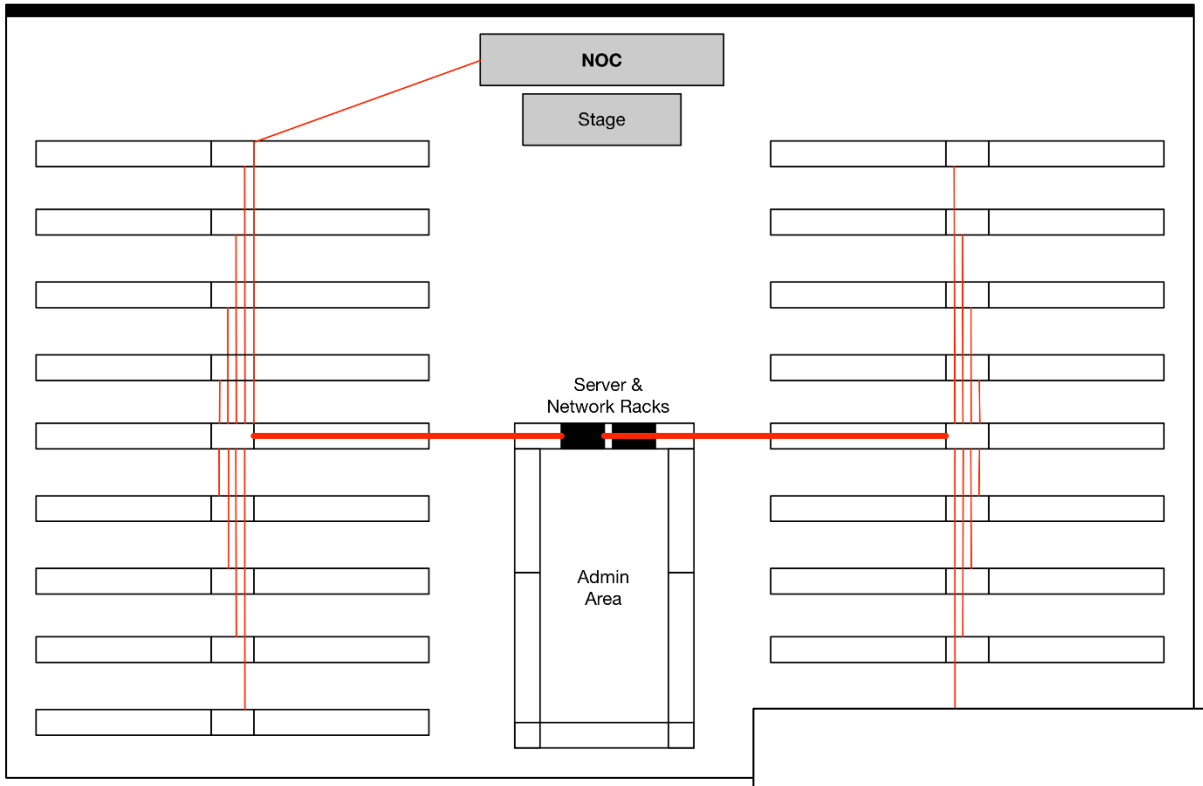
Engineering for Scale

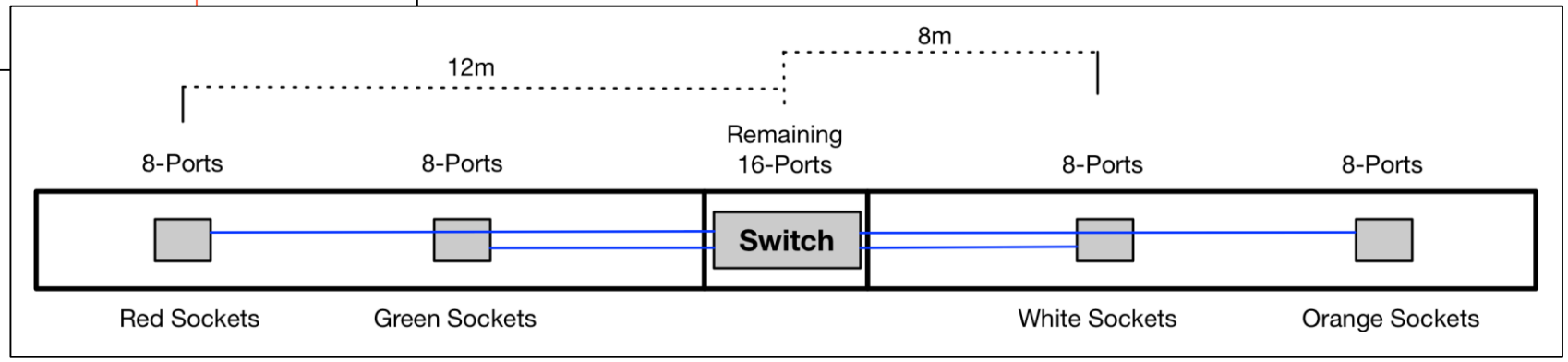
RFLAN 56 (2017)



Engineering for Scale

RFLAN 56 (2017)





Engineering for Scale

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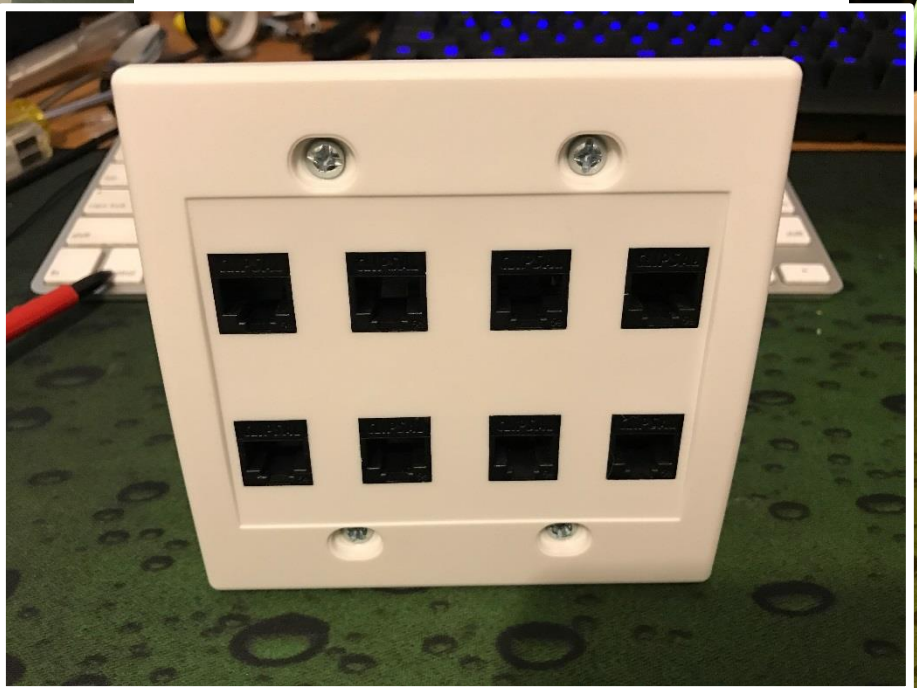

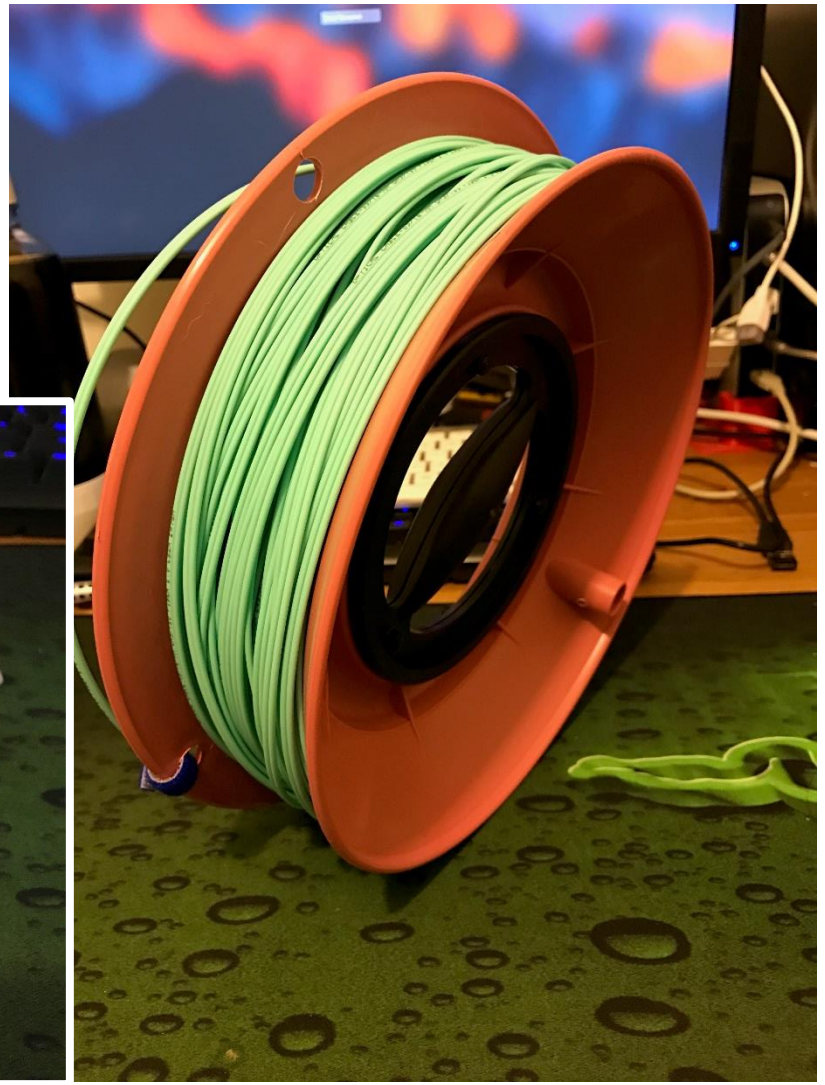

Engineering for Scale

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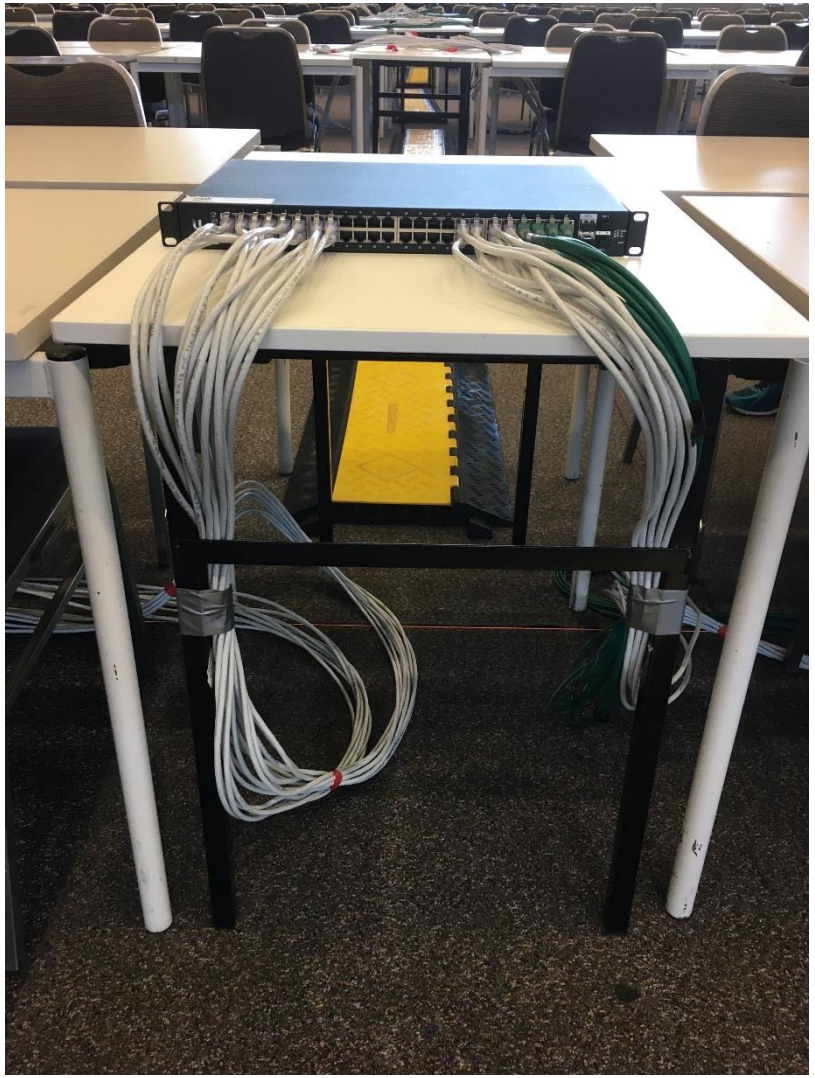

Engineering for Scale

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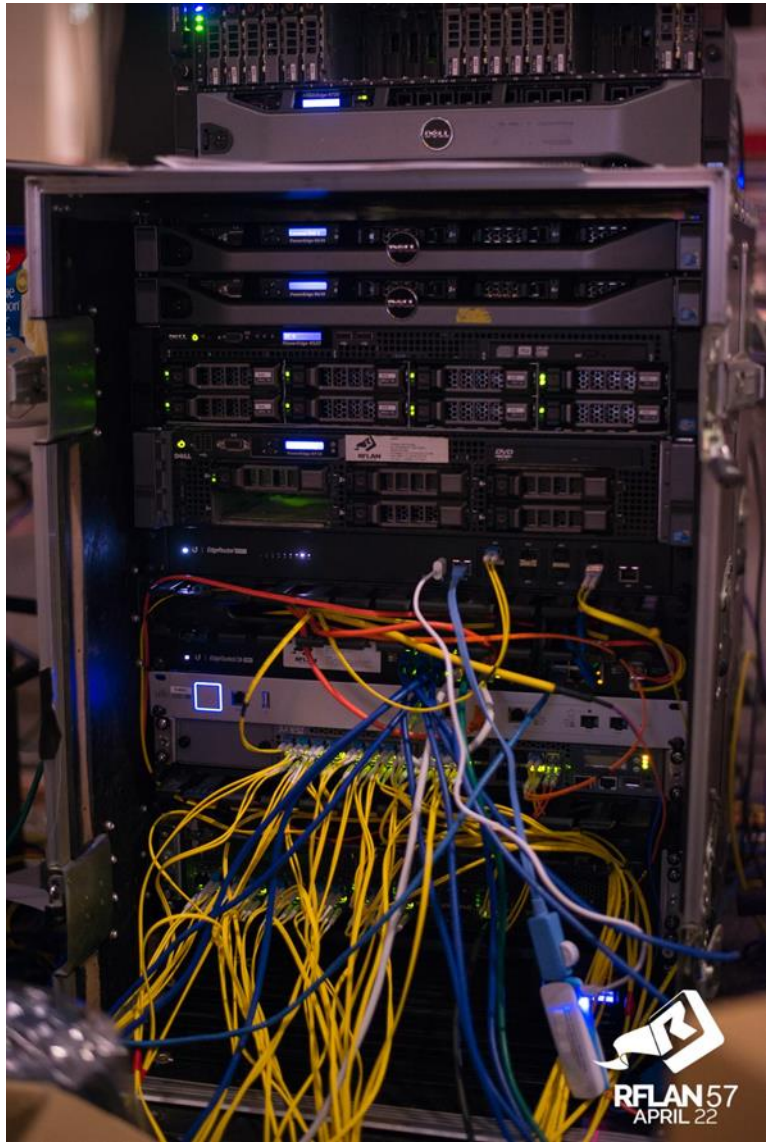


Engineering for Scale

RFLAN 56 (2017)

DELL
RFLAN 57
APRIL 22

Engineering for Scale

RFLAN 56 (2017)

Continued Growth

RFLAN 57 (2017) – RFLAN 63 (2019)

- **Wireless network upgrades**
  - 6x Ubiquiti Unifi AP-AC-HD (250 client capability per unit)
  - Needs to compete with venue wireless for spectrum
  - Overkill… maybe, but it works!

- **SAN failure** at our offsite colocation facility on the day of the event…
  - Rebuilt the environment with BBB hardware, at the event, and onto a different platform, with only an hours delay to the overall running of the event

- We **paid** the venue came to **upgrade their power infrastructure**
  - 5x 32A feeds added to the existing 10 feeds – total of 480A across the venue.
  - No more generators!

- **Stream Production**
  - 24 hours of live coverage on Twitch.tv – Frontpage position for AU on Event-day.
    - Restreamed to YouTube and Facebook.

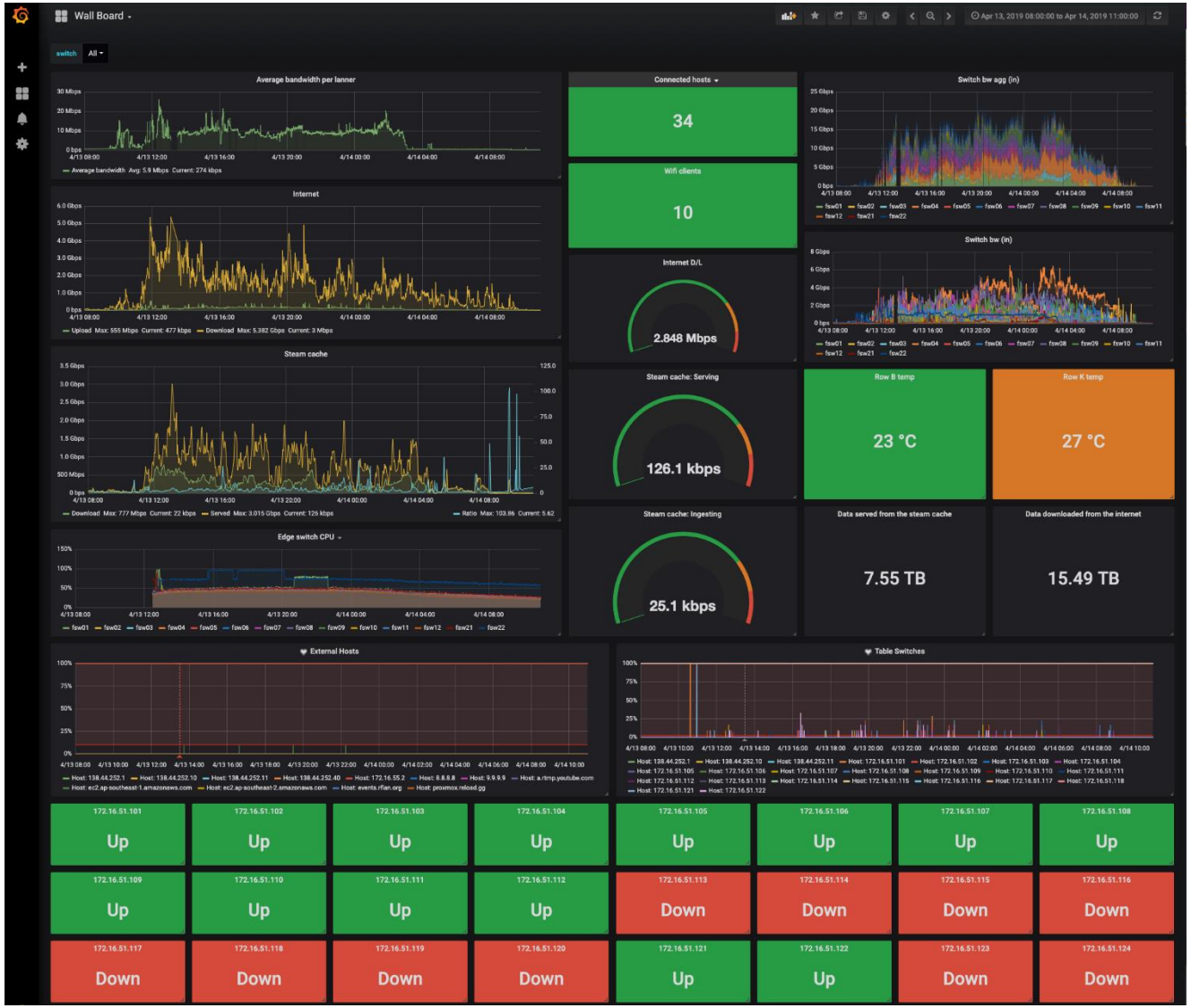
Continued Growth

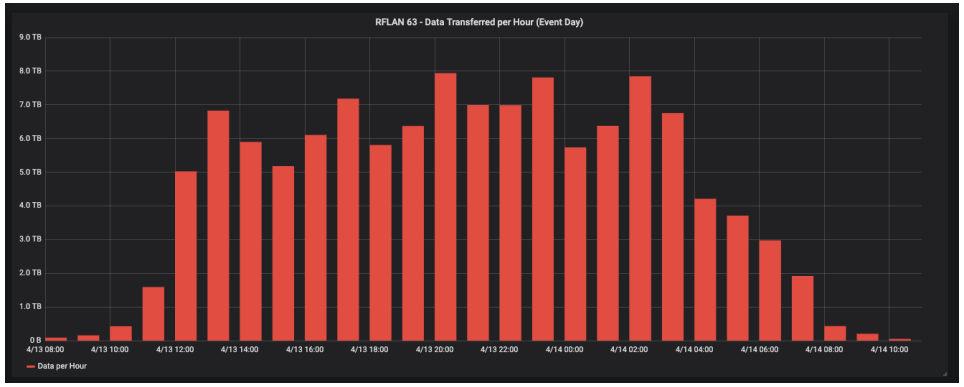
RFLAN 58 (2017) – RFLAN 63 (2019)

RFLAN
REDFLAG LANFEST

Continued Growth

RFLAN 58 (2017) – RFLAN 63 (2019)





120TB Transferred on **LAN**

@ 5TB per Hour (over 24 hours)

15TB from the **Internet**

8TB from **Steam** (via cache)

3TB to fill the Steam cache

Mad Hacks

Mad Hacks

- **Woodhouse – Port security on a budget**
  - Ruby script for ‘smart’ managed switches, built to locate potential loops.
  - Polls MAC tables and alerts via a chatbot providing a mechanism to shut the port.

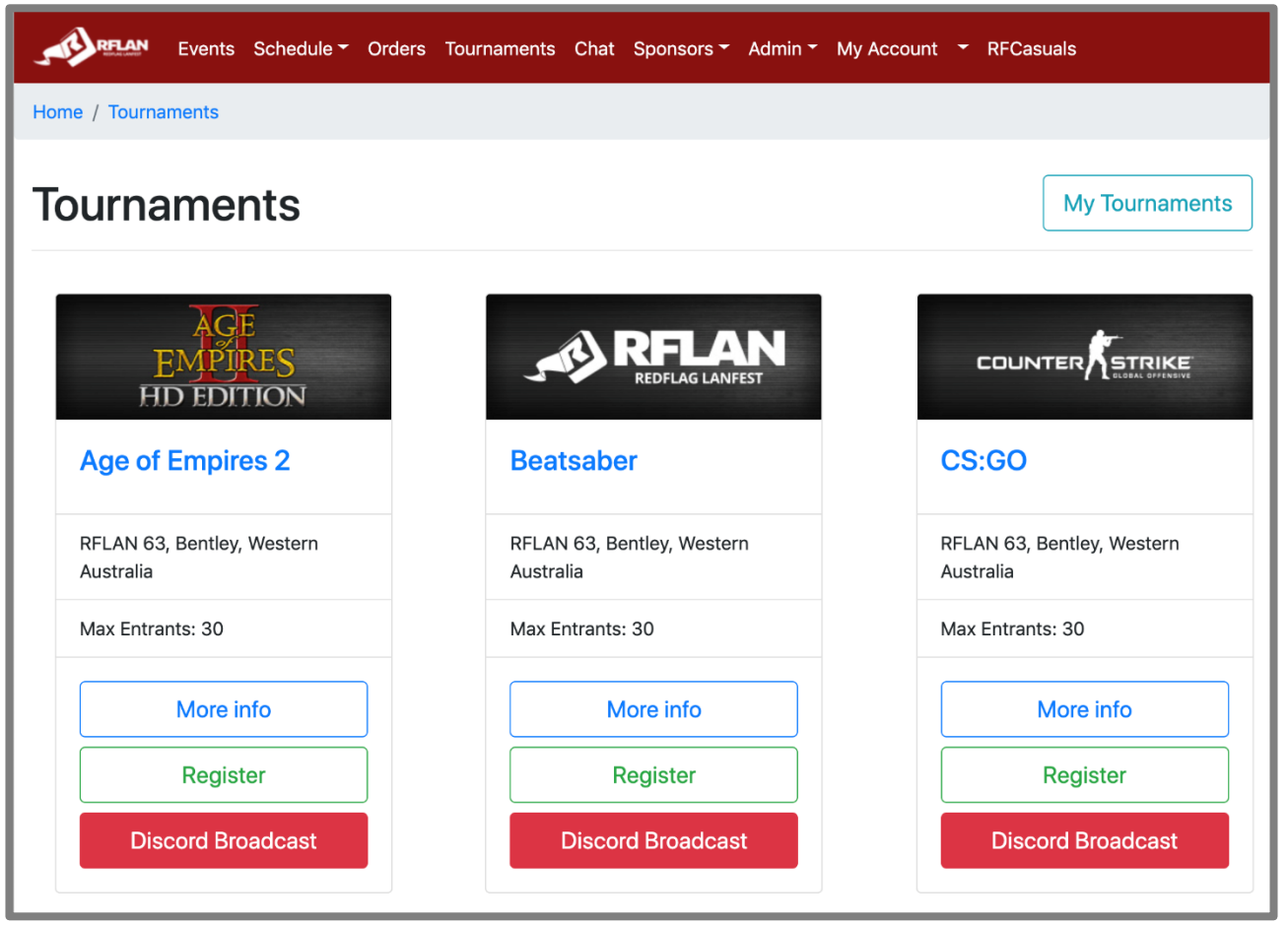
- LRM -> ALP -> ALP (RFLAN Edition) -> **MEME on Rails**
  - A CRM-esque system, currently on its 4th iteration, that drives the event
  - It runs attendee registrations, tournament administration, registrations and bracketing, food orders, announcements/news, and jukebox control
  - The latest version is built in Ruby, by team of in-house volunteer coders

- **Ghetto DRS** on Proxmox
  - Ain’t nobody got money for VMware
  - Load-balancing auto-created CS:GO Servers – upward of 30 at a time
  - https://github.com/tardoe/ghetto-drs

- Steam Cache
  - Only caches Valve Steam content – no Blizzard, Riot, Epic, Sony, Microsoft, Apple etc.
  - 30:1 caching ratios during the event.
  - 2x10G NICs with 12 Core 2.6Ghz Xeon, NVMe SSD total of > 4TB
  - Performance still a challenge and likely to remain so (but it mostly works)

Mad Hacks

redflag lanfest
Now Playing: Norma Jean - Blue prints for future homes
SAMSUNG
redflag lanfest
www.rflan.org


RFLAN
Events
Schedule
Orders
Tournaments
Chat
Sponsors
Admin
My Account
RFCasuals
Home / Tournaments
Tournaments
My Tournaments
Age of Empires 2
RFLAN 63, Bentley, Western Australia
Max Entrants: 30
More info
Register
Discord Broadcast
Beatsaber
RFLAN 63, Bentley, Western Australia
Max Entrants: 30
More info
Register
Discord Broadcast
CS:GO
RFLAN 63, Bentley, Western Australia
Max Entrants: 30
More info
Register
Discord Broadcast

So What's Next?

- Event sizing is currently capped at **864 attendees** (+80 sponsors and staff)
- The network has been designed for **scalability** – 60 tables / ~ 2400 lanners(ish)
- Better **metrics and monitoring**
  - Generate efficiencies around troubleshooting and diagnosis
- Event **optimisation**
  - Set up quicker, pack up quicker, provision all the things quicker
- Let's go **national**?
  - Has been investigated – can we bring the fun to Sydney/Melbourne?
  - …We'll just have to see…

Us

Brad Peczka

- Gamer
- Infrastructure Architect
- First RFLAN: #8
- Long-standing committee member
- Involved in Incorporation and Governance aspects

Tim Raphael

- Gamer
- Network Engineer
- First RFLAN: ~ 40s as a lanner
- Experience in Event Networking:
  - ESL – Intel Extreme Masters / Melbourne eSports Open
  - PAX – PC Freeplay Area
  - ~ 15 RFLANs

$15 000+ OF PRIZES
700+ GAMERS
AUSTRALIA'S LARGEST BYOC LAN PARTY
MORE INFO AT - RFLAN.ORG
RFLAN 64
SEPTEMBER 28 - 29
CURTIN STADIUM
BENTLEY, WA
TICKETS AVAILABLE
12PM AUGUST 31ST
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