Trends in WISP Backhaul

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aka *Backhaul* – what keeps the ISP owner up each night

Galleryhip.com

AGENDA

- Brief History
- Current Status
- Observed Trends

The Backhaul Challenge

"How to provide world class internet to WISPs, wherever they are, at competitive pricing, given the *exponential* rise in demand"

General Challenges

- Quality
  - Consumers – general sensitivity and critical applications (trading, video streaming etc)
  - Corporates – world-class requirements (global miners, agriculture processing, medicine
  - VoIP is extremely sensitive to jitter and latency
- Price (to enable competition with mobile operators and ISPs)
- Reliability

WISP Specific Challenges

- Often smaller
- Geographically diverse

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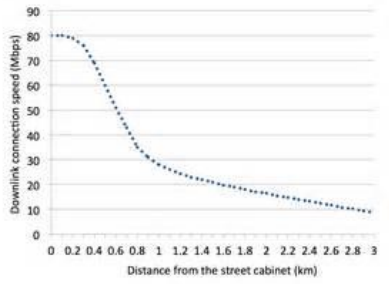
The Otel Journey

1. Otel was providing wholesale voice access to WISPs nationally
2. Realised that quality of access was key to the success of VoIP
3. Experimented with ADSL, Bonded ADSL, Diginet, licensed wireless, then fibre (metro Ethernet)
4. Evolved a **Big Brother** role – fighting layers of corporate resistance for the cause of each individual customer
5. One or two long-standing WAPA wish-list items could be fulfilled at the same time (WISP peering, aggregation power)

Journeyofhealth.org

Solutions – A History: **ADSL**



Increasebroadband.co.uk

- Relatively easy to set up
- Affordability has improved over time
- A good short-term or redundancy solution
- A tribute to the innovative spirit in the WISP community

BUT

- Fundamentally an access technology, not backhaul
- Many rural and urban exchanges are congested
- Slow uplink (where was VDSL in 2010?)
- Limited IP allocation options

Bonded ADSL enabled Otel to offer faster solutions, but was *way* tougher to implement than envisaged

Solutions – A History: **Diginet**

- Leased lines were the original building blocks of the emerging Internet and mobile operator infrastructure
- Relatively straightforward connection between 2 points
- Affordability also improved over time
- New ‘lease’ of life when Telkom promoted the reseller channel
- Generally stable

BUT

- Relegated to access, rather than backhaul
- It was never ‘cheap’ (beyond mobile operator COFL rates)
- Became obsolete with 3G
- Beyond outdated technology – Telkom only maintaining due to delays in commercialising a replacement
- Some links suffer downtime and intractable performance issues

Solutions – A History: **Licensed Links**

- Microwave (licensed) is deployed by larger carriers to expedite access
- Any WISP can deploy licensed links and more should be – many are reluctant to complete the application and pay annual fees
- Usually microwave spurs off fibre links.
  - Operators require major commitments to justify these spurs
  - Otel expedites spur investments based on overall relationshipshown demand in new areas

Solutions – A History: **License Exempt**

- Wireless backhaul links of up to 100's of Km's have been deployed by WISPs (real pieces of technical art – Da Vinci's and Picasso's)
- These work brilliantly in areas of low interference
- Certain hotspots (such as the rooftop at Isando) have intolerable interference (resulting in use of 17Ghz or licensed links for the final hop).
- A problem is that one link failure (interference, lightning) takes out an entire network segment depending on multiple hops
- Needs revised EIRP legislation

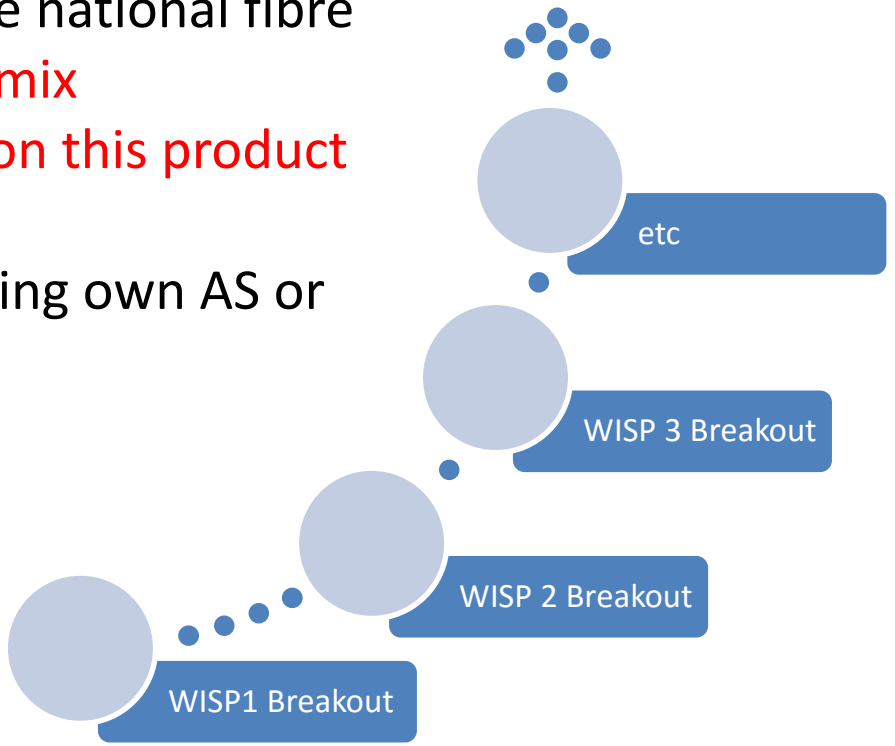
Teraco roof antenna
Source: HTXT

SAIX Breakout

- Successful wholesale product by Telkom to enable ISPs to offer multiple national POPs
- Now a useful breakout, offering ISPs backhaul access at competitive prices
- Offers 25% of bandwidth international. That works for many
- Takes advantage of Telkom's extensive national fibre
- Price revisions yesterday change the mix
- Otel has some excellent promotions on this product

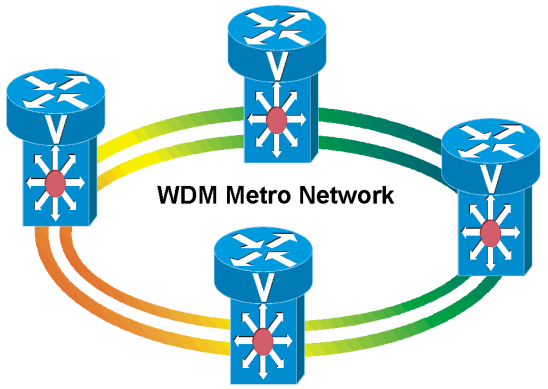
BUT

- Less suitable for the mature ISP wanting own AS or higher levels of international

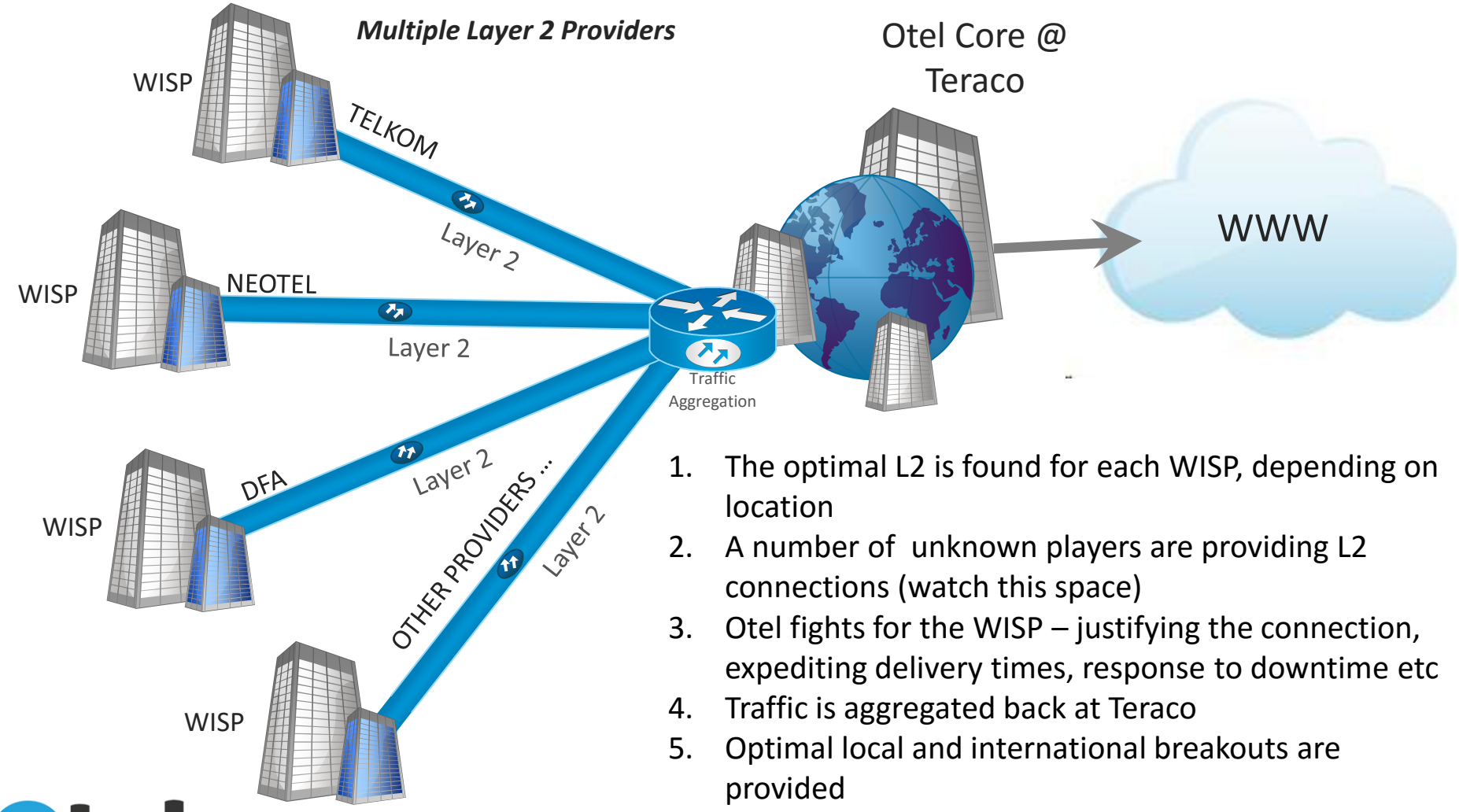


Metro Ethernet

- Fibre is the ***end-game*** technology of fast, reliable, fibre.
- Bandwidth is virtually unlimited
- Offered by multiple players, with Telkom and Neotel enjoying wide coverage
- Pricing is reasonable, especially within metro's
- Fibre backhaul with wireless spurs optimises reliable backbone with rapid, cost-effective extensions



The Layer 2 Breakout Model



1. The optimal L2 is found for each WISP, depending on location
2. A number of unknown players are providing L2 connections (watch this space)
3. Otel fights for the WISP – justifying the connection, expediting delivery times, response to downtime etc
4. Traffic is aggregated back at Teraco
5. Optimal local and international breakouts are provided
6. WISPs can use own IP numbers or their own AS
7. Traffic between WISPs can be peered directly
8. Otel has negotiated very compelling rates

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AS/IP Strategy Affects Backhaul Choices

Rented IPs

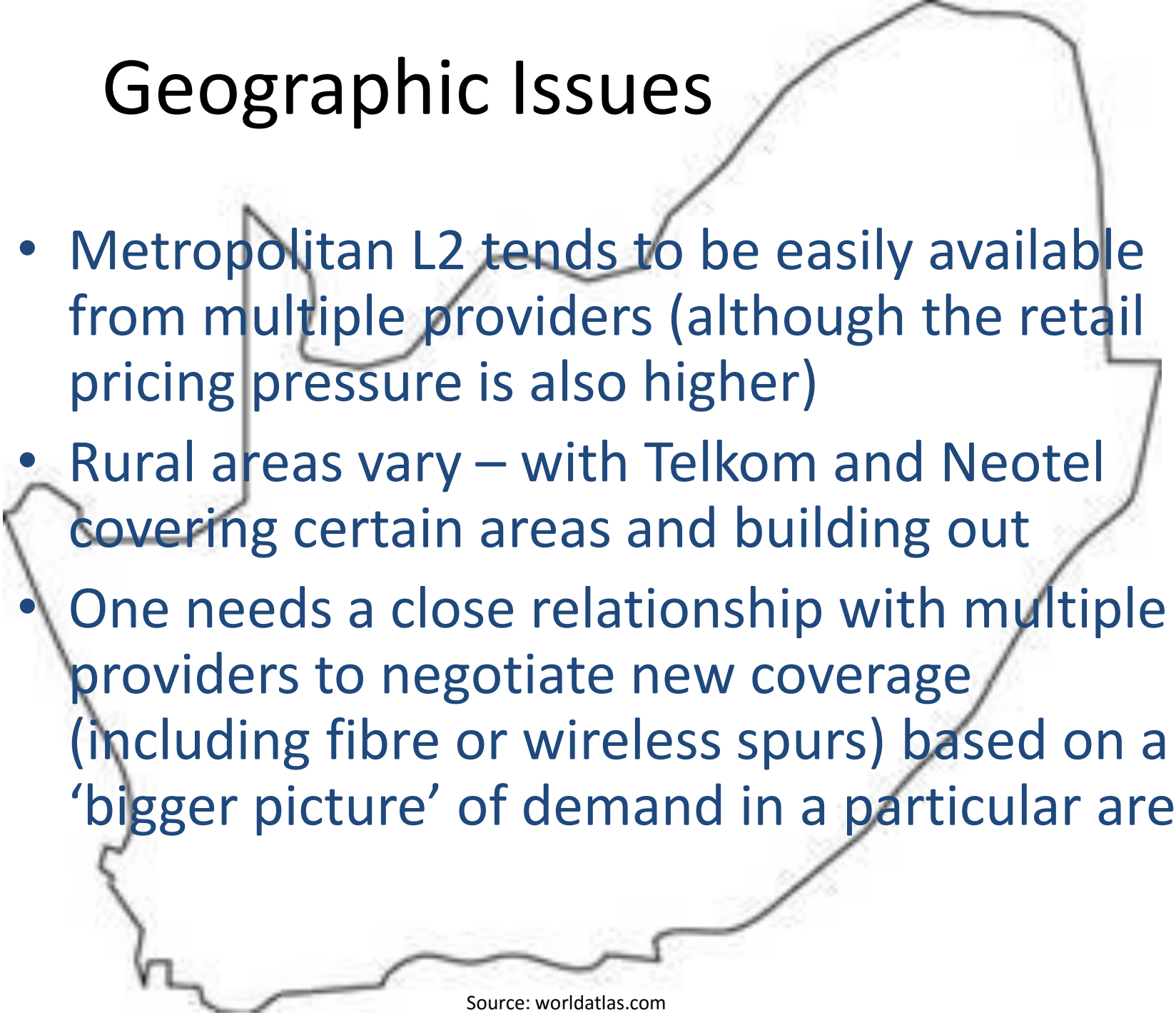
- Save time and effort in procuring and maintaining own IPs
- Changing providers can take a weekend for a mid-size WISP (to switch over IP's), depending on private/public IP strategy on network

Own AS (Autonomous System) and IP Address Range

- Initial AS and IP's can take 9m with Afrinic. Outlay is from $5000 and $400pa
- Offers more autonomy in a longer term strategy
- Can save a % of bandwidth by peering at NAP Africa or INX (offset against routing equipment and hosting costs)

Geographic Issues

- Metropolitan L2 tends to be easily available from multiple providers (although the retail pricing pressure is also higher)
- Rural areas vary – with Telkom and Neotel covering certain areas and building out
- One needs a close relationship with multiple providers to negotiate new coverage (including fibre or wireless spurs) based on a ‘bigger picture’ of demand in a particular area



Source: worldatlas.com

Redundancy

- Full redundancy requires ring structures, with dual redundancy links and full spare capacity
- Experienced WISPs add a level of redundancy by creating rings where feasible
- An ideal ISP procures full redundant capacity, but in practice this seldom occurs (due to cost or simple non-availability)
- Most redundancy arrangements observed tend to be based on maintaining legacy access arrangements after upgrading to a new providers. The legacy systems are usually well under-spec'd because the WISP has long outgrown the original source
- Otel offers a satellite-based redundancy solution for critical clients

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Current Trends

WISPs have adopted a range of strategies:

- Multiple smaller WISPs (many non-WAPA members) build business around ADSL (this is often not necessary – Otel is seeing WISPs move to fibre at 20mbps points).
- Many have tapped into fibre as it becomes available within their area, (procuring from 40 – 400 Mbps or more)
- Redundancy planning is not mature (largerly due to cost constraints). Many maintain a previous access service as a (very slow) backup
- A few WISPs have joined forces to leverage scale, as consortia or one buying from another.
- Many buy from aggregators such as Otel for price advantage, to have someone fight for them at the provider's head office or as an integrated service together with a full voice offering.
- A range of approaches are taken regarding IP's. More are taking out their own ranges, particularly the larger WISPs

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This is a fast moving arena
Watch this space …