

Mapping New Zealand Internet Topology

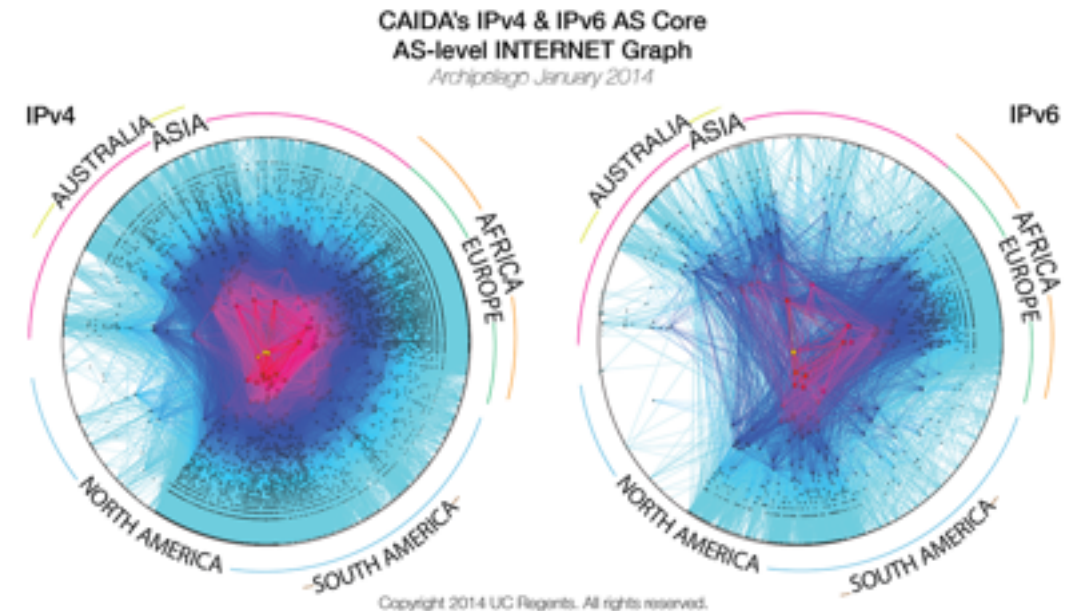
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Agenda

- Motivation
- BGP Map
- BGP Map Demo
- IP Map introduction

Motivation

- Internet mapping efforts are not new!
- BGP maps for New Zealand are not new!
 - ISP Map <http://www.ispmap.co.nz/>
 - IXP View <http://nzix.net/peers.html>
- But condensed and updated network structure visualisations are useful for
 - Informed technical discussions
 - Informed policy discussions
 - Provide a wider view and challenge partial views.

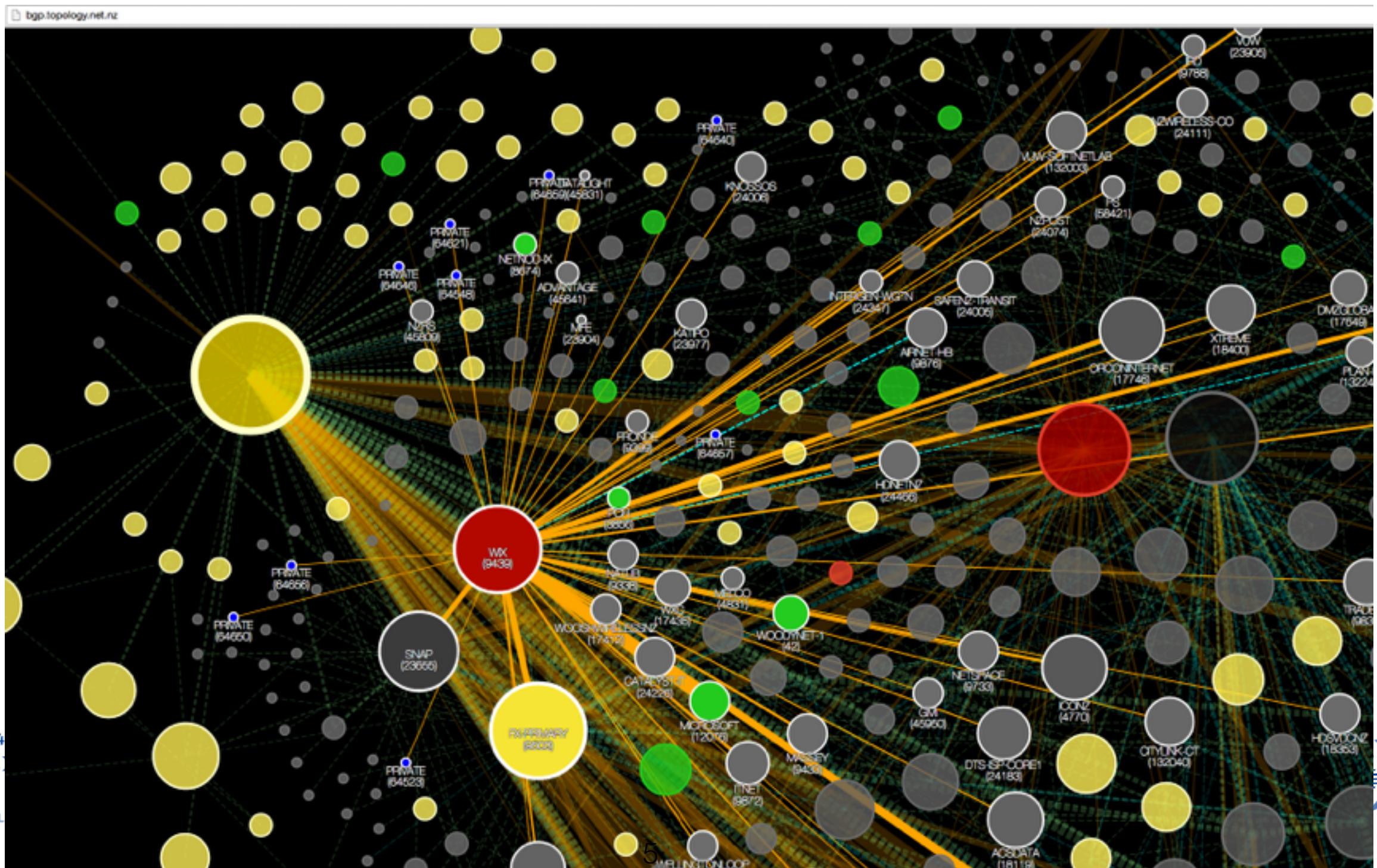


BGP Map

- RouteViews BGP dumps (Palo Alto, Portland, Atlanta, Ashburn, Nairobi, London, Sao Paulo, Sydney, Tokyo)
 - MRT converted to text using libbgpdump (RIPE)
- New Zealand IXs (APE, WIX, CHIX, PNIX, HIX)
 - Web scrape
- APNIC AS and IPv4 delegations
 - Available publicly via FTP, parseable text file
- CAIDA's inferred AS relationships.
 - Available at their website, parseable text file



BGP Map Snapshot



p: (+64) (4)
f: (+64) (4)
P.O. Box
NEW ZEAL

BGP Map

- Each node represents an Autonomous System
 - Color represents category: NZ, AU, IX, Private, Other
 - Size represents number of peers (degree)
- Each edge represents a peering session
 - Color/style represent the type of relationship: client to provider, peer to peer, sibling to sibling, undetermined
 - Thickness represents “importance” as number of IPv4 /24 exchanged as part of the session.



BGP Map demo

<http://bgp.topology.net.nz>

BGP Map

- Deficiencies
 - It doesn't work with Internet Explorer
 - BGP view is all about policy
 - It doesn't include preference for a certain route.
 - Data is public and from limited vantage points
 - Some bilateral relationships are not visible: Vodafone - Spark
 - No cover for IPv6 topology

IP Topology Map

- Work in progress, no visualisation yet
- Active probing
 - Using the RIPE Atlas nodes (<http://atlas.ripe.net>) in NZ (40+), trace route among each other and to desired destinations
- Map addresses to ASes
 - More complete AS graph
 - It will even show internal routing inside an ISP



IP Topology Map

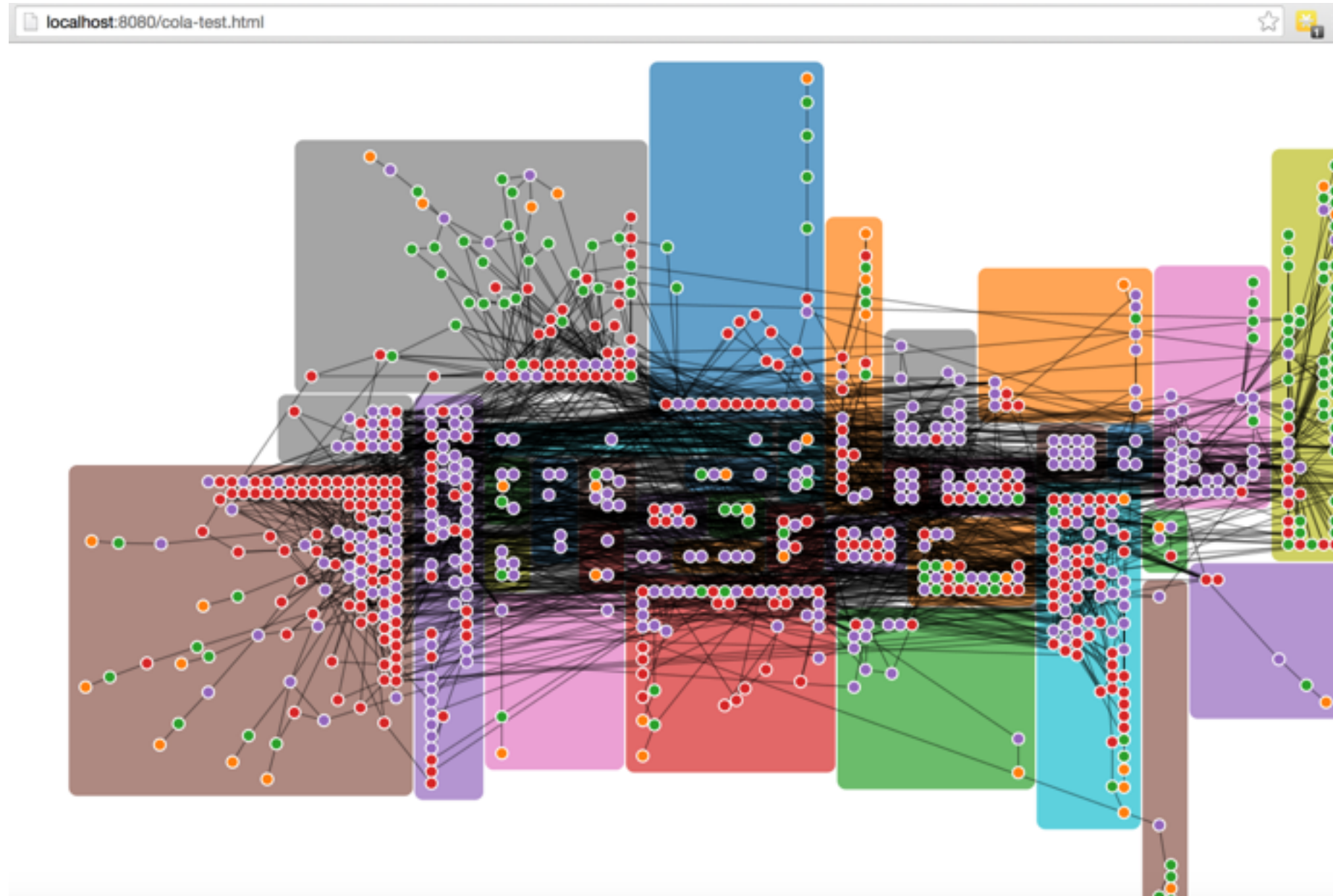
- Challenges
 - NAT everywhere!
 - Use of private addresses within an ISP or local network
 - “Star nodes”

IP Topology Map

| | |
|----------------|---------|
| Probe 3703 | AS23655 |
| Private 3703-1 | Priv |
| Hop 3703-2 | Priv |
| Private 3703-3 | Priv |
| 202.124.98.61 | AS23655 |
| 111.69.53.80 | AS23655 |
| 111.69.53.81 | AS23655 |
| 123.255.40.191 | AS23655 |



IP Topology Map



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Questions?

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