



Welcome



# Agenda

- Introduction of your presenters
- Case: WTC Amsterdam building network
- Why MikroTik?
- Migration path from Cisco to MikroTik
- Lessons learned

A black and white portrait of a man with short, dark, curly hair, smiling. He is wearing a light-colored collared shirt under a patterned blazer. The portrait is partially obscured by a large white diagonal shape that serves as a background for the text.

**PROPER<sup>ICT</sup>**

# Alex van der Baan

- Service and Project management Lead at NDI (2006-2015)
- MTCNA & MTCRE
- Working with the MikroTik platform since 2007
- Responsible for the redesign and rollout of the current MikroTik backbone
- Started Proper ICT beginning of 2016
- To assist owners of commercial real estate with the challenges of integrated networking
- To educate and assist managed service providers to move core network and CPE management to MikroTik
- MikroTik distributor since May 2016

# Glen Christensen

- Network Lead at NDI
- Working with the MikroTik platform since 2015...love at first sight
- Attended MUM Europe 2016 in Ljubljana
- NDI provides a broad range of ICT services, such as server and desktop support; VOIP and internet connectivity; Remote Office; online backup...
- Directing role in 17 multi-tenant commercial office buildings in the Randstand area
- 3 corporate offices (Amsterdam, Den Haag, Rotterdam), 75 employees servicing 500+ clients





# MuM in the Netherlands

“As ambassadors of MikroTik we want to grow awareness and market share in NL”

Traditional vendors versus MikroTik’



# Our Case



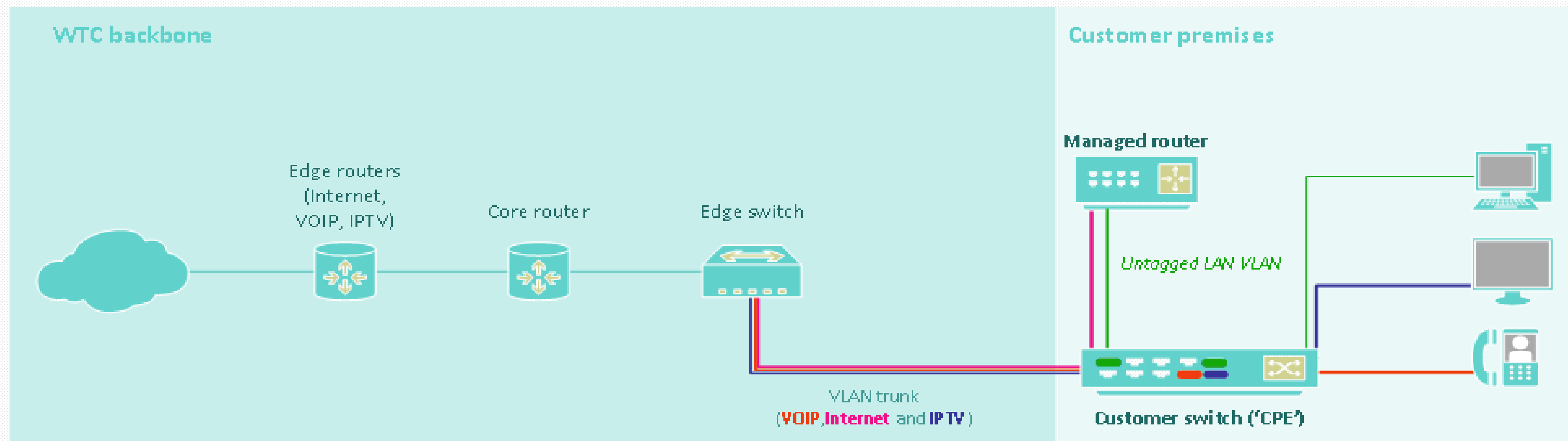
MikroTik plays nice in corporate environments

World Trade Center Amsterdam (NDI ICT Solutions)

- 500+ clients
- International clients
- 1 network with internet, telephony & IP-TV



# Legacy Backbone



# Design Goals

- Demarcation > provide a clear boundary between responsibilities client and provider
- Monitoring
  - bandwidth consumption on CPE
  - bandwidth consumption on individual client devices behind CPE
- Efficient allocation of IP addresses by using /32 addressing; flexibility in allocating non-sequential IP addresses
- Hassle-free and rapid deployment/provisioning of services, bandwidth, extra IP addresses
- Flexible traffic shaping to accommodate client-specific needs

DEMARCATIION

MONITORING

BANDWIDTH

ALLOCATION

HASSLE-FREE

FLEXIBLE TRAFFIC

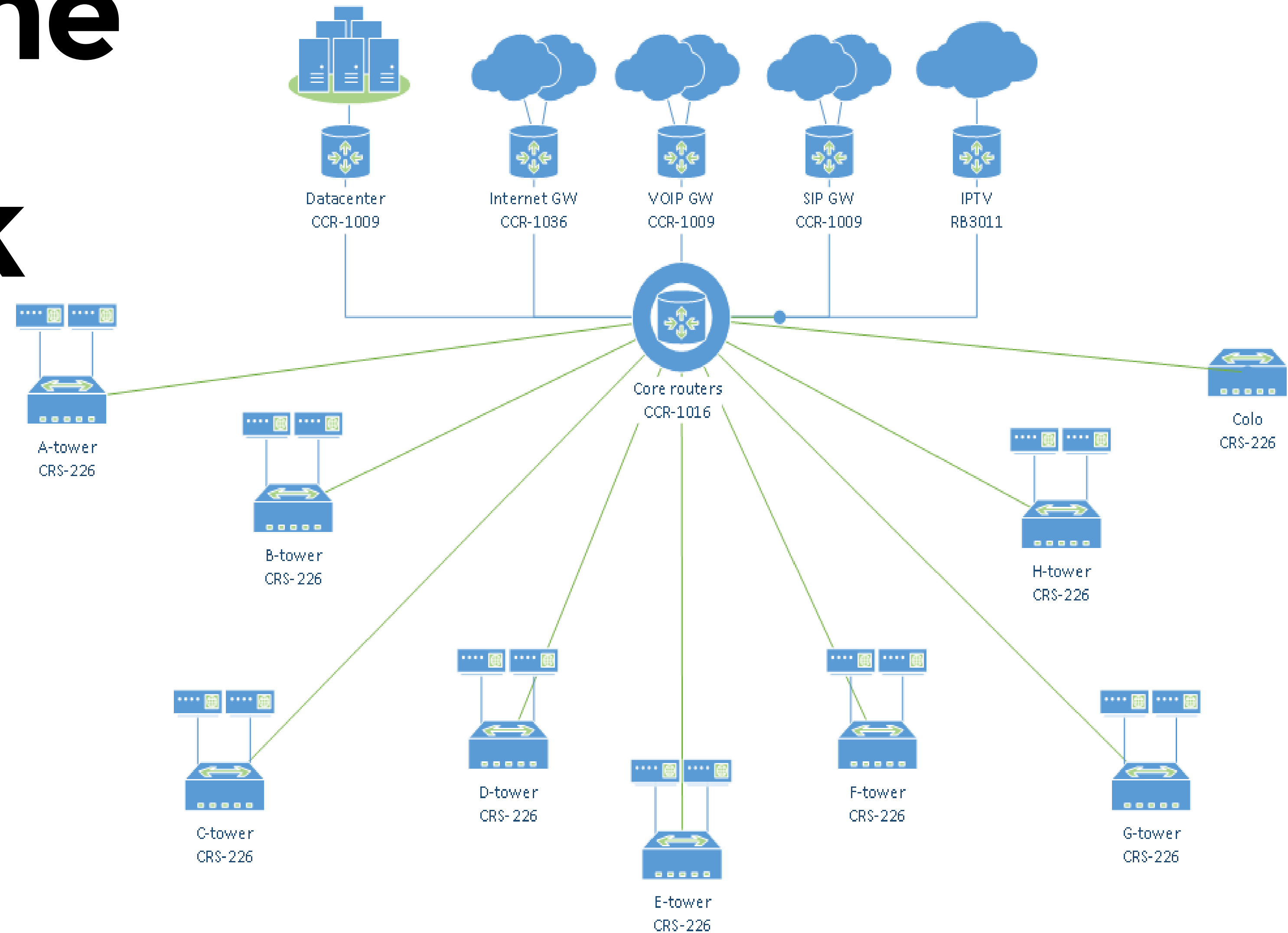


# Feature criteria

- Rich VLAN and routing feature set > RouterOS
- Turn-key monitoring and troubleshooting: Torch, graphing, statistics and overall insight to what's going on in a device > WinBox
- Single vendor device range, from core to CPE > RB, CCR, CRS hardware
- bandwidth consumption on individual client devices behind CPE
- Manageability >RoMon & WinBox
- Thus: Mikrotik!

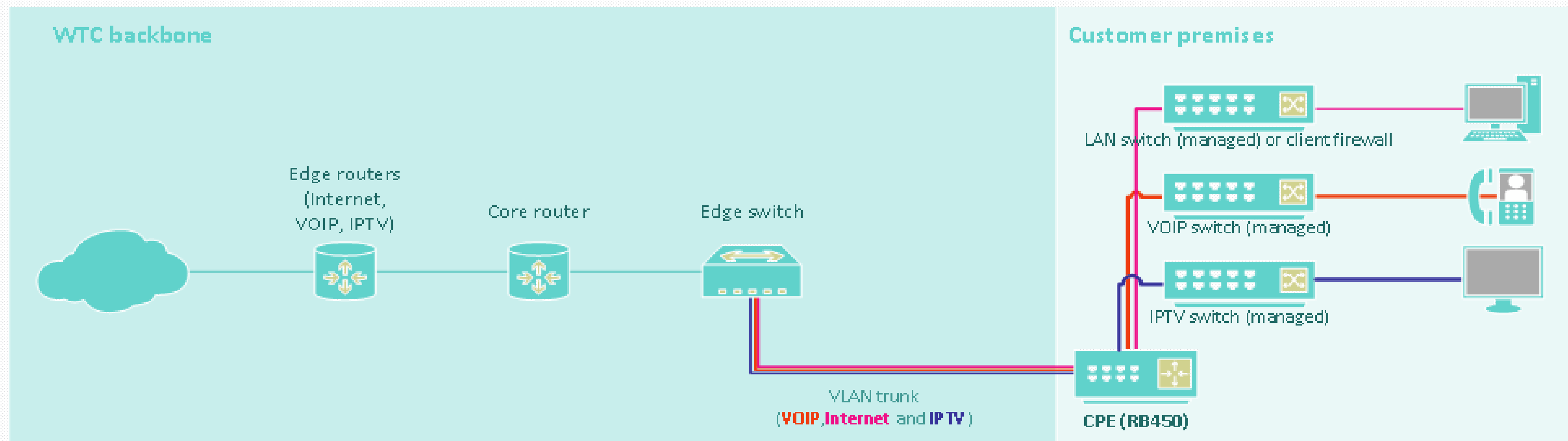


# Backbone 2.0 core network





# Backbone 2.0 client network



# Migration Playbook

## Two flavors

Managed & Bridge mode, always demarcation at MikroTik client device

- NAT/DHCP/ firewall/ VPN/ tailor-made traffic shaping etc.
- Bridge is BYOD

## Backbone Deployment

- We decided to migrate managed clients first due to us having full control of the entire process
- Bridge clients easier in config however more difficult to migrate (external engineers, time difference)



# Migration Playbook

Interface List									
	Interface	Ethernet	EoIP Tunnel	IP Tunnel	GRE Tunnel	VLAN	VRRP	Bonding	LTE
<div style="text-align: right;">Find</div>									
Name	Type	L2 MTU	Tx	Rx	Tx Pa...	Rx P...	Comment		
X config_changelog	Bridge		0 bps	0 bps	0	0			
X _config_locatie	Bridge		0 bps	0 bps	0	0	H16		
X _config_typeconfig	Bridge		0 bps	0 bps	0	0	Default-NAT		
X _config_versie	Bridge		0 bps	0 bps	0	0	1.0		
R bridge-vl-PPPOE	Bridge	1516	87.4 kbps	9.8 kbps	14	6			
X bridge3-vl-VOIP	Bridge		0 bps	0 bps	0	0			
X bridge4-vl-IPTV	Bridge		0 bps	0 bps	0	0			
R ether1-ts-TRUNK	Ethernet	1520	91.9 kbps	10.7 kbps	17	6			
X ether1-interface-vlan-IPTV	VLAN		0 bps	0 bps	0	0			
R ether1-interface-vlan-MGMT	VLAN	1516	0 bps	0 bps	0	0			
RS ether1-interface-vlan-PPOE30	VLAN	1516	87.4 kbps	9.8 kbps	14	6			
X ether1-interface-vlan-VOIP	VLAN		0 bps	0 bps	0	0			
R ether2-LAN	Ethernet	1520	7.8 kbps	5.1 kbps	2	7			
X ether3-VOIP	Ethernet	1520	0 bps	0 bps	0	0			
X ether4-IPTV	Ethernet	1520	0 bps	0 bps	0	0			
X ether5-MGMT	Ethernet	1520	0 bps	0 bps	0	0			
R pppoe-out 1	PPPoE Client		84.9 kbps	9.4 kbps	14	6			

17 items (1 selected)

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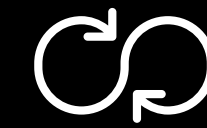
Log

Freeze

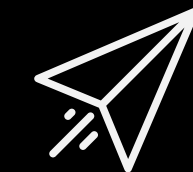
Changelog

Nov/10/2016 23:17:33	Changelog	script, warning	Disabled IPTV service per client's request
Nov/10/2016 23:19:19	Changelog	script, warning	Extended DHCP pool from 192.168.88.100 to 192.168.88.200

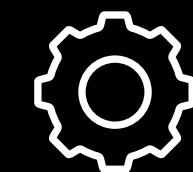
# Migration stats



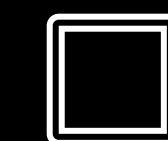
**Migration from January  
2015 until December 2016**



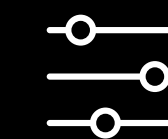
**250 clients migrated**



**>300 RB450 CPE's installed**



**20 CRS226**



**10 CCR devices**



# Challenges

- IP migration (technical & project management) 2 yrs 3x /24 subnet
- Coordinating external IT departments
- Site Surveying
- Parallel environment for 2 years
- Building new core while migrating away
- Bridge and engineers mode without PTP compatibility (overlapping /30 in cpe while /32 in pppoe)
- CPE config evolving during project

# Current improvements

- Darkfiber connectivity to DC
- From Torch-based (ad-hoc) to PRTG monitoring (proactive/historical)
- Mass updating CPE script
- RoMoN management over separate VLAN (layer 2)
- Separate management VLAN (Layer 3)



# Wishlist

## Software

- switch limitations/STP/IGMP snooping

## Hardware

- PoE(+) switch
- 48 ports switch
- CCR with 16+ SFP cages

# References

**Update script**

[http://wiki.mikrotik.com/wiki/Semi-Automating\\_CPE\\_ROS/Firmware/script\\_updates\\_and\\_setting\\_changes](http://wiki.mikrotik.com/wiki/Semi-Automating_CPE_ROS/Firmware/script_updates_and_setting_changes)



# Thank You!

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# Questions?

