





October 2017 Fires, Napa, California





Lte TM **5G**



market

Prevalent

Commodity

Fast!

Lte 5G



market

challenges

Prevalent

Growth

Commodity

Pricing

Fast!

Competition



challenges

opportunities

Growth

ARPU

Pricing

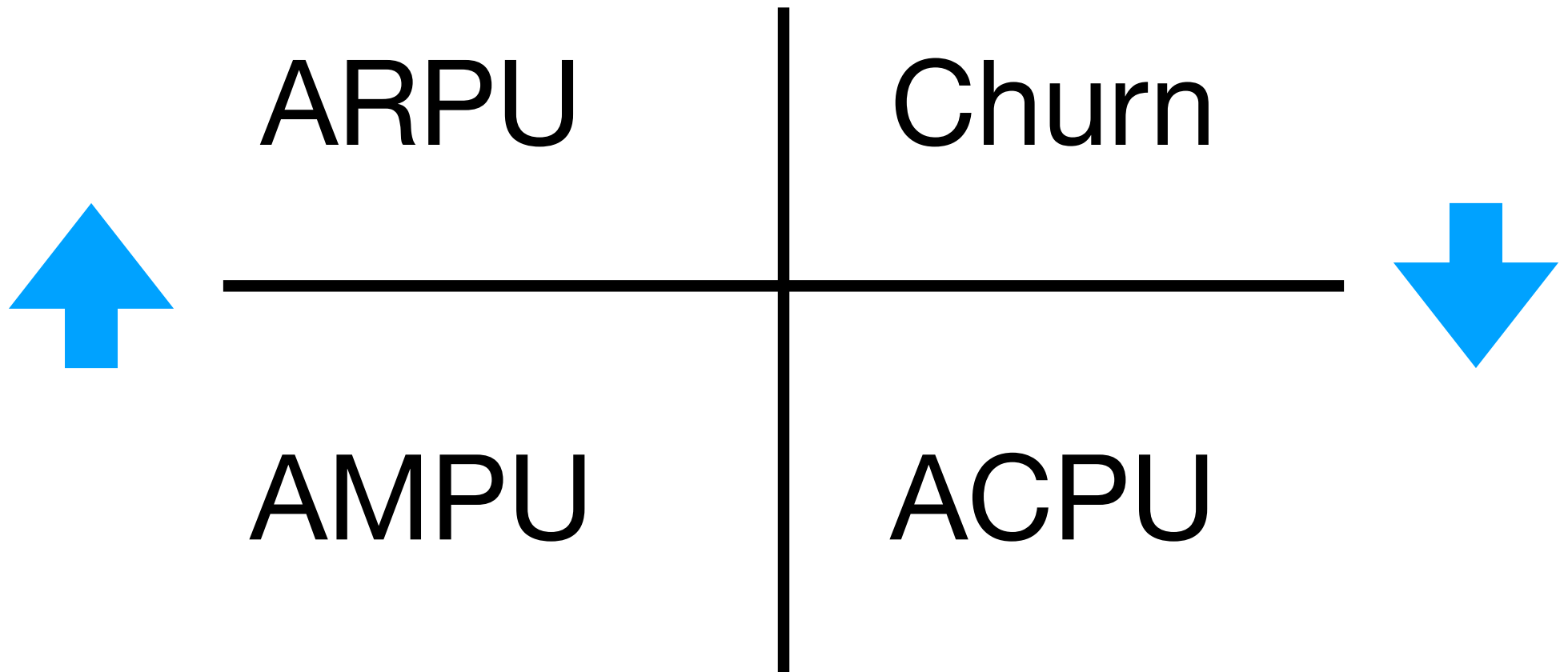
AMPU

Competition

Churn



opportunities strategy



$$\text{ARPU} - \text{ACPU} \\ = \text{AMPU}$$



ACPU	Base	2015 Cost	2017 Cost
Network	\$10.4 / mbit +noc	10.40 US\$	10.40 US\$
Tech Support	\$30 / hour	5.26 US\$	3.51 US\$
Truck Rolls	\$450 / roll	20.03 US\$	13.50 US\$
Upgrades	\$600 / 3 yr	16.60 US\$	16.60 US\$
Churn	1.50%	1.00 US\$	1.00 US\$
ARPU	ACPU	53.29 US\$	45.01 US\$
93.50 US\$	AMPU	40.21 US\$	48.49 US\$



AMPU → \$8.28 → \$250k

48.49



40.21 →



smart.adaptor deployment

- Mandatory
- WAN bridge or Gateway
- 750r2 to CCR
- DHCP Plug-n-Play
- L2 separation
- Remote troubleshooting



smart.adaptor use



Intelligence

BTest

Bandwidth Test (Running)

Test To: 23.103.67.43

Protocol: ☐ udp ☒ tcp

Local UDP Tx Size: 1500

Remote UDP Tx Size: 1500

Direction: both

TCP Connection Count: 20

Local Tx Speed: bps

Remote Tx Speed: bps

☒ Random Data

User: admin

Password: *****

Lost Packets: 0

Tx/Rx Current: 19.0 Mbps/8.9 Mbps

Tx/Rx 10s Average: 17.7 Mbps/8.9 Mbps

Tx/Rx Total Average: 17.9 Mbps/8.5 Mbps

running...

Ping

Ping

General Advanced

Ping To: 8.8.8.8

Interface:

☐ ARP Ping

Packet Count:

Timeout: 1000 ms

Seq #	Host	Time	Reply...	TTL	Status
8	8.8.8.8	9ms	50	54	
9	8.8.8.8	10ms	50	54	
10	8.8.8.8	10ms	50	54	
11	8.8.8.8	9ms	50	54	
12	8.8.8.8	9ms	50	54	
13	8.8.8.8	13ms	50	54	
14	8.8.8.8	10ms	50	54	
15	8.8.8.8	10ms	50	54	
16	8.8.8.8	9ms	50	54	
17	8.8.8.8	9ms	50	54	

19 i... 19 of 19 ... 0% pac... Min: ... Avg:... Max: ...

Interface

Interface <ether3>

Overall Stats Rx Stats Tx Stats Status Traffic ...

Tx Broadcast: 580

Tx Pause: 0

Tx Multicast: 5

Tx Underrun: 0

Tx Collision: 0

Tx Excessive Collision: 0

Tx Multiple Collision: 0

Tx Single Collision: 0

Tx Excessive Deferred: 0

Tx Deferred: 0

Tx Late Collision: 0

Negoti.

Interface <ether3>

Overall Stats Rx Stats Tx Stats Status Traffic ...

Last Link Down Time: May/13/2018 23:56:01

Last Link Up Time: May/13/2018 23:56:03

Link Downs: 1

Auto Negotiation: done

Rate: 1Gbps

☒ Full Duplex

Cable Test

Cable Test (Running)

Status: link ok

Cable Pairs:

Start

Stop

Close

Sniffer

Packet Sniffer Settings

General Streaming Filter

Memory Limit: 10000 kb

☐ Only Headers

☒ Memory Scroll

File Name: dns-log

File Limit: 1000 kb

OK

Cancel

Apply

Start

Stop

Packets

Log

probably a loop

probably a loop

probably a loop

probably a loop



RouterBoard per customer
An ~~Apple~~ a Day keeps
the ~~Doctor~~ away
truckrolls



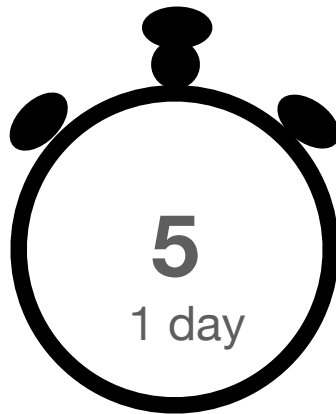
smart.adaptor effect

Tech Support

(avg. duration in min)



Before



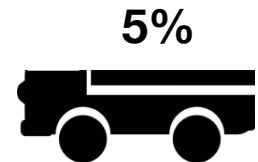
After

Truck Rolls

(false positives)



Before



After



Isn't the CPE enough?

- Antenna is the physical link
- BTest will kill it
- Unreliable
- No Mikrotik?
- Ubiquiti tests are UDP
- Limited troubleshooting tools
- Unless on cli, defeats the purpose



support case examples

	Case 19632 May 15th, 2018 3rd party IT	Case 19062 April 30th, 2018 GTT	Case 18715 April 19th, 2018 Henry
Reported	Router down	connectivity issues, packet loss, high latency	Low speeds on LAN
smart.function	end to end testing L1 verification	Interface vitals	BTest, LAN ICMP
Issue Was	managed firewall shaping	cust router negotiations set manual (gig upgrade)	Old 802.11n APs insufficient coverage
Avoided	Trunk roll	Churn	Chronic Support Call Churn
\$ saved (earned)	\$450	\$4320/year	\$804/upgrade \$1728/year



In their words...



Joe, GM

“smart adaptors have severely decreased truck rolls, it’s been so long now, I think we forgot “the good ol’ days”



Ben, Tier 1-2

“It’s a 90% decrease in time spent on slow speed calls. The frequency of them decreases and the time spent on each call decreases because there are fewer variables”





what if we could
prevent the support
call from happening
in the first place?



Winbox is too intelligent

(for the average customer)



Session Settings Dashboard

Safe Mode Session:

RouterOS WinBox

Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
IPv6
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rtf
Manual
New WinBox
Exit

Torch (Running)

Basic

Interface: LAN

Entry Timeout: 00:00:03 s

Collect

☒ Src. Address ☒ Src. Address6
☒ Dst. Address ☒ Dst. Address6
☐ MAC Protocol ☐ Port
☐ Protocol ☐ VLAN Id
☐ DSCP

Filters

Src. Address: 0.0.0.0/0
Dst. Address: 0.0.0.0/0
Src. Address6: ::/0
Dst. Address6: ::/0
MAC Protocol: all
Protocol: any
Port: any
VLAN Id: any
DSCP: any

Start
Stop
Close
New Window

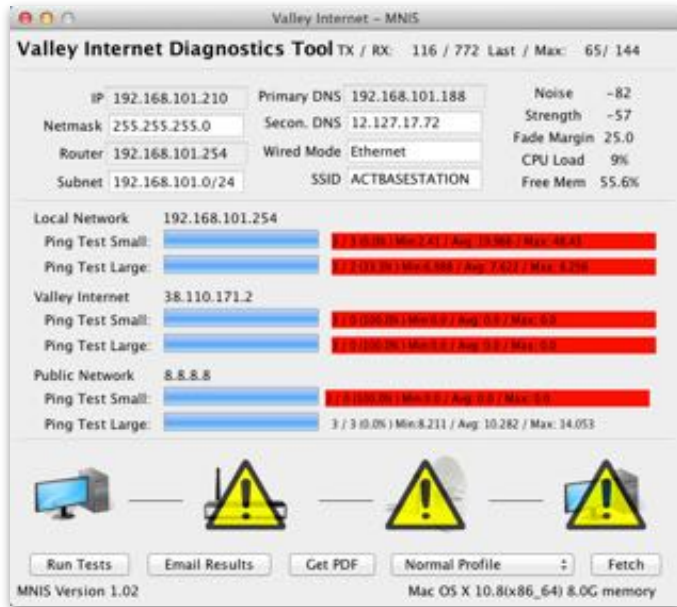
Eth. Protocol	Pro...	Src.	Dst.	Tx Rate	Rx Rate	Tx Pack...	R
800 (ip)		192.168.18.175	63.203.87.38	56.4 kbps	2.5 Mbps	107	
800 (ip)		192.168.18.108	45.57.58.201	20.2 Mbps	850.9 kbps	1675	
800 (ip)		192.168.18.114	96.90.230.26	0 bps	344 bps	0	
800 (ip)		192.168.18.111	63.203.87.34	0 bps	0 bps	0	
800 (ip)		192.168.18.116	63.203.87.34	0 bps	0 bps	0	
800 (ip)		192.168.18.4	192.111.144.114	0 bps	0 bps	0	

6 Items Total Tx: 20.3 Mbps Total Rx: 3.4 Mbps Total Tx Packet: 1 782 Total Rx Packet: 1 745

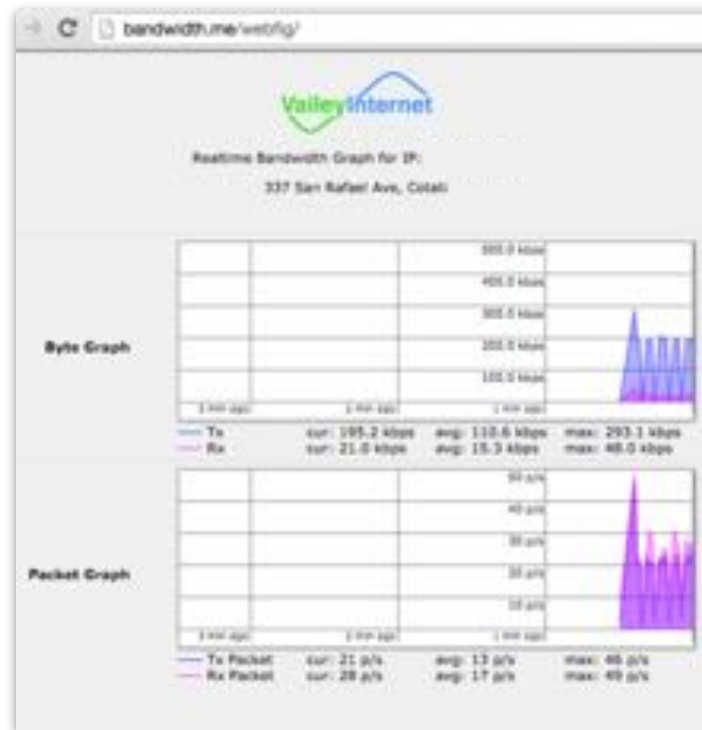


simple is very difficult

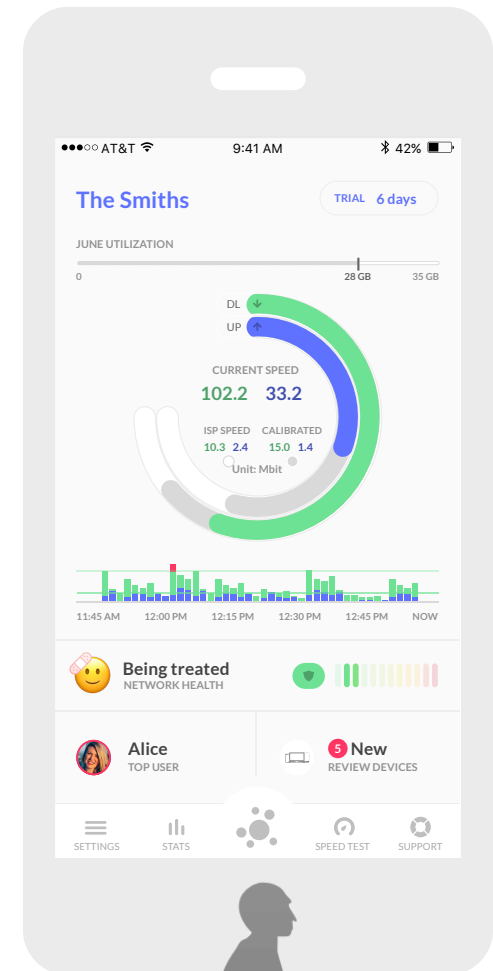
MNIS java tool



bandwidth.me



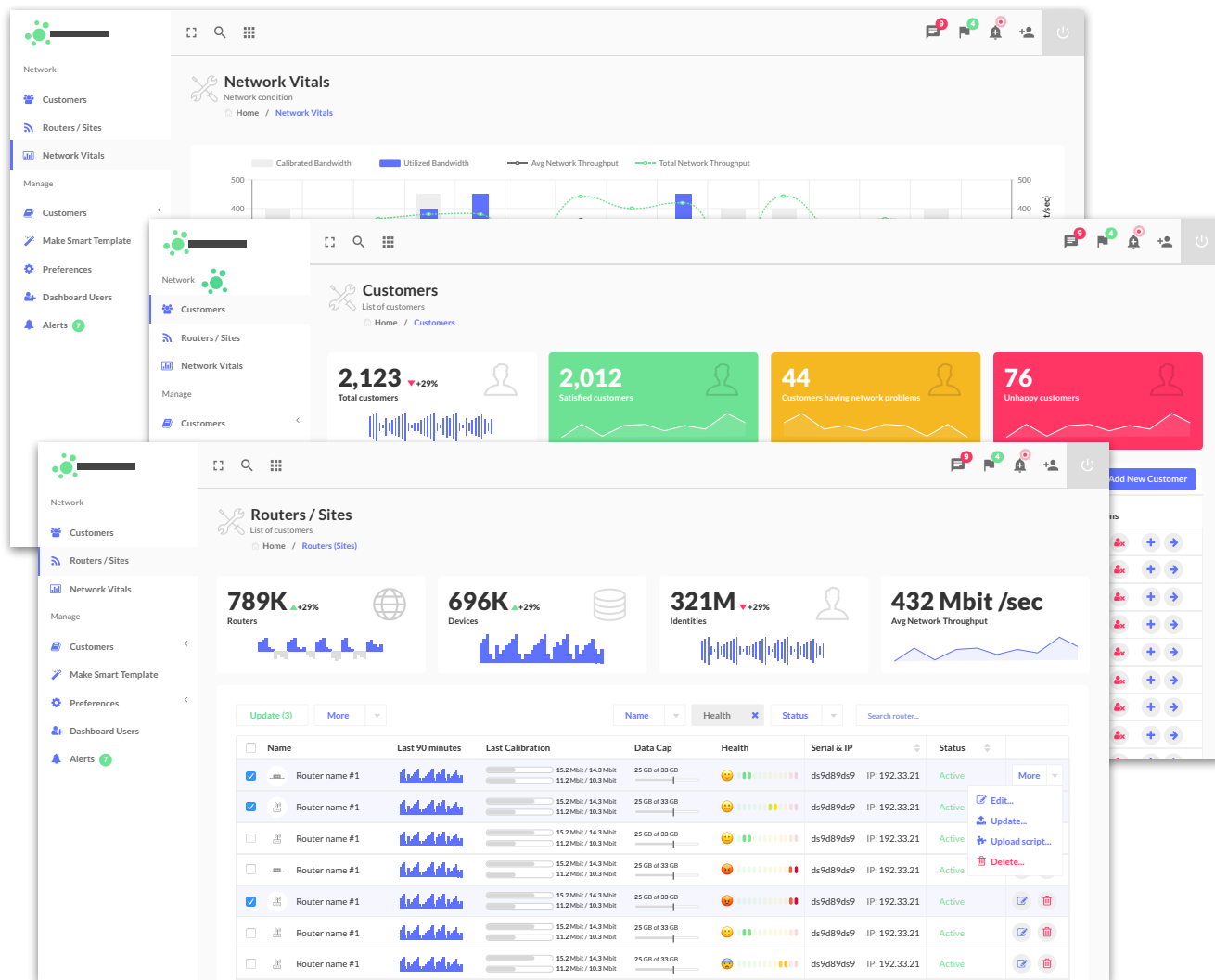
smart.network



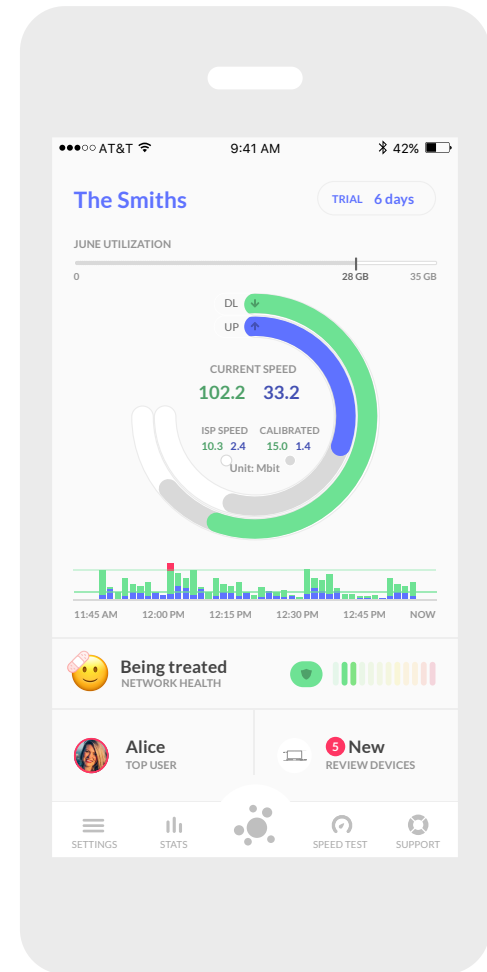
smart.network

powered by
MikroTik

smart.board



smart.app





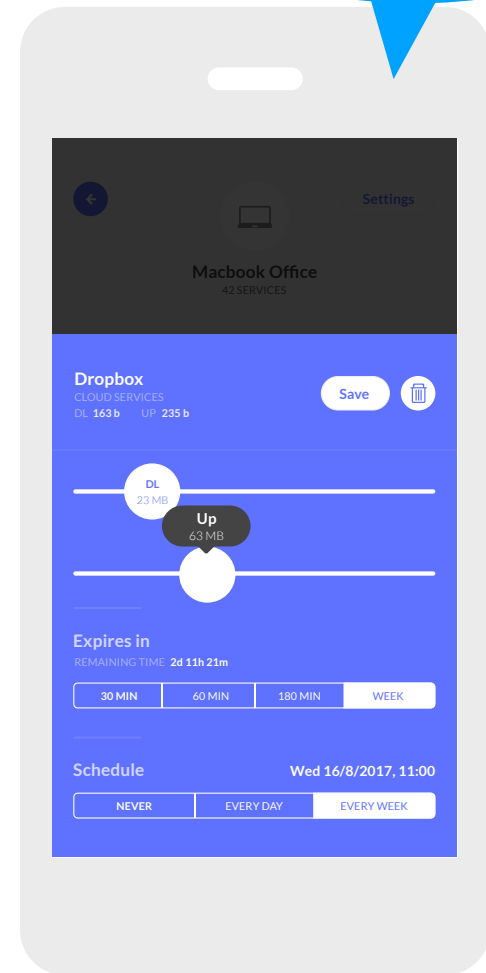
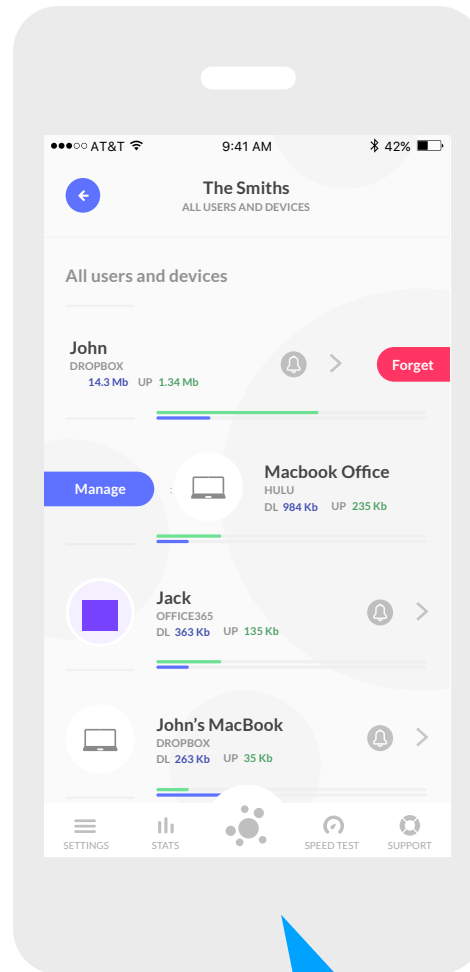
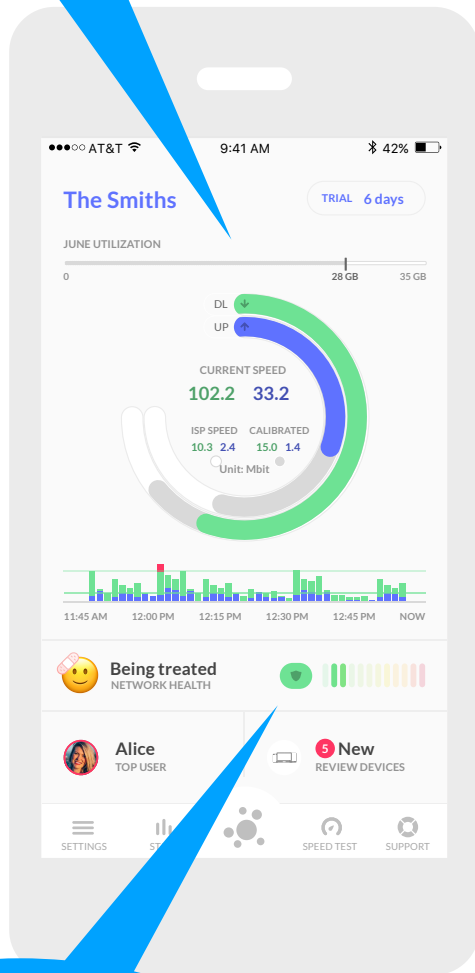
winbox for the home user



interface > print
stats

RouterOS under the hood

queue simple
system scheduler



ping address=

tool > torch

and then some...



ROI

(Gain - Cost) / Cost

(250k - 154k) / 154k

= 62%

