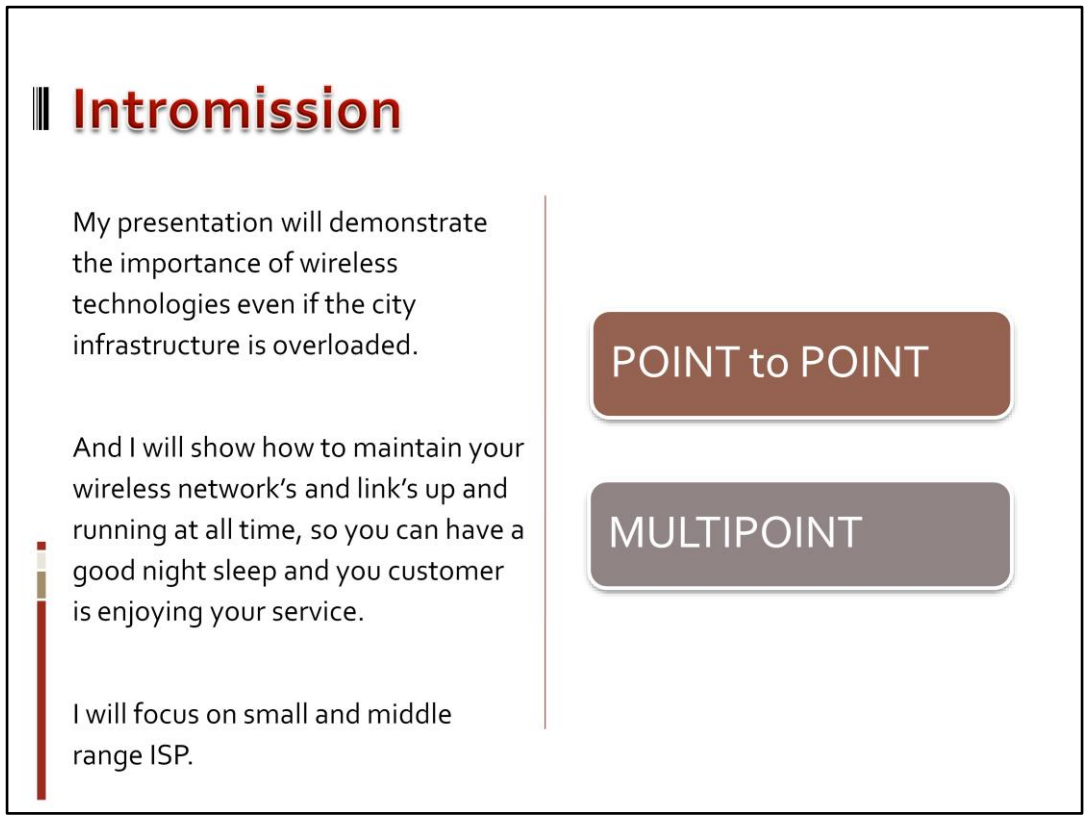
Introduction >

Hello and good afternoon,
Let me introduce myself, my name is Martin Krug, certified Mikrotik Trainer.

and My goal and the theme for today will be to show and explain on the examples from Laboratory and on-site installations the possible problems with Wireless technology in general in the city area and to introduce quite new technologies witch I did tested for you and prepared short overview.



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Because of technology witch they are using mainly MikroTik routers and Wireless AP's.

In generally I will divide my presentation into two parts

Into Point to Multipoint part and Point to Point part because in the technology and usage is huge difference, but they are bounded together.
Only with the cooperation o all technology part's will by your network run without problems.

POINT to POINT

ISM free bands still used

- mostly 5 GHz
- 10 GHz in Czech republic
- 24 GHz !!
- 60 GHz – GigaWave

Licensed bands mostly used

- 18 GHz
- 23 GHz
- 26 GHz

In our countries is mostly used a 5GHz in a small ISP area where Mikrotik is a fair and stable solution. in Czech republic in last one year is the 10GHz segment in Point to Point often used for main UPLINK for distribution sites. And from a local producer of a Licensed band I would like to mention Alcoma CZ witch we tested and compared for you.

UP-link technologies

Need for a SPEED

Bonding

and

Dual Nstreeme Technology – 5GHz

Bonding - Incredible speed

Why I decided to test this technology because few weeks before I was doing some configuration's for the ALCOMA and it is a nice combination with the MikroTik RB1000

Imagine 4 pcs ALCOMA F links

and 2pcs RBxxxx

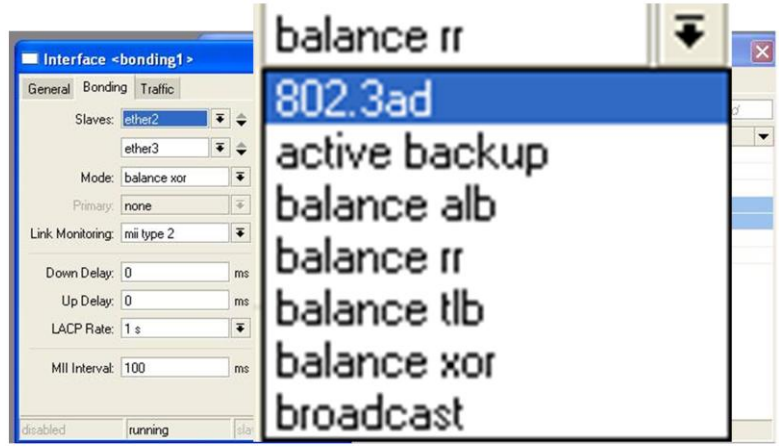
And speed **1200** Mbps

Just so easy

Excellent speed – affordable price

Bonding - point of proof

Mode balance rr – is round robin mechanism and when one link will fail it will use other's slave so it is enough if only one link is working and you still have working setup.



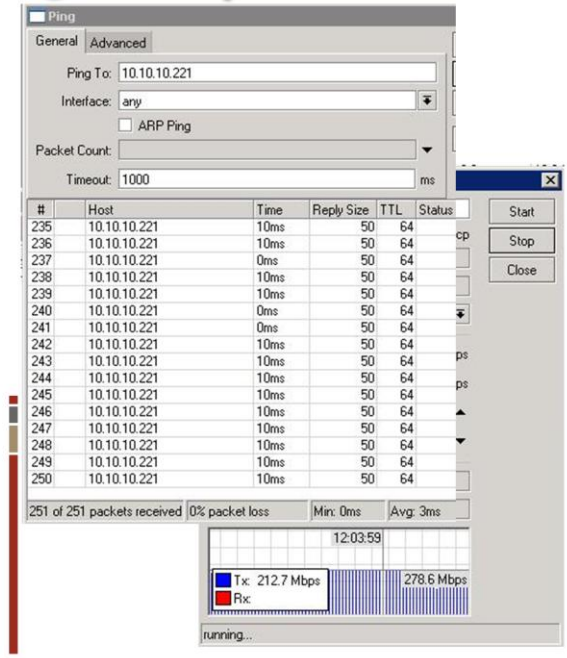
Bonding - Alcoma technologies

The Alcoma ALxxF link can even work in free ISM band 24GHz and in Czech republic 10GHz with speed's up to 311mbps per outdoor unit and indoor unit can supply two outdoor unit's at the same time

With the usage of RB600 or RB1000

You can have 600 or 900 Mbps

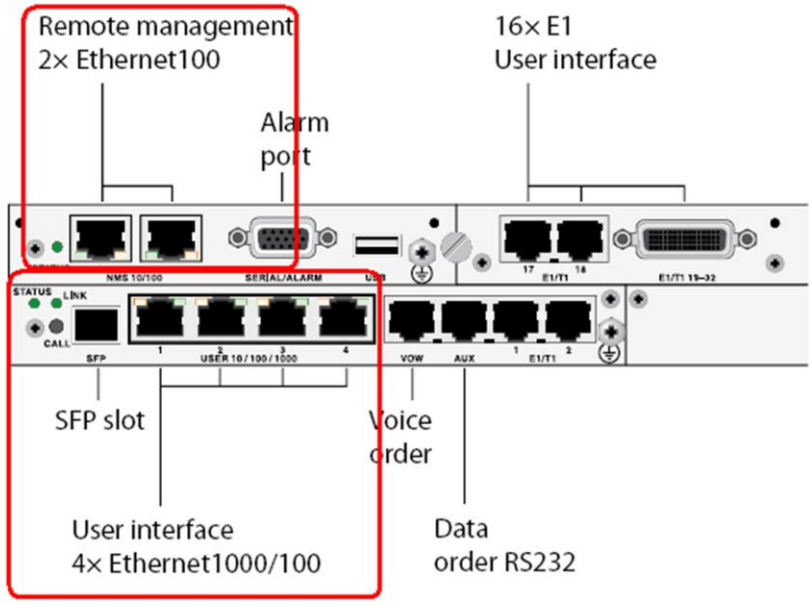
300Mbps test



As you can see yes it is possible to have on one link 300Mbps

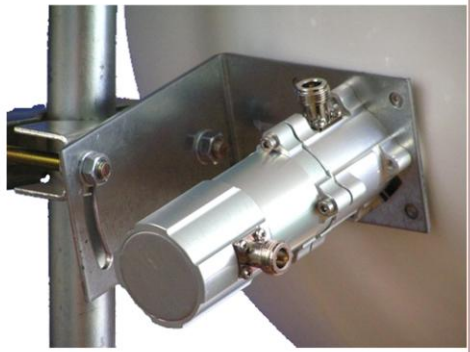
And still have a nice ping about 10ms

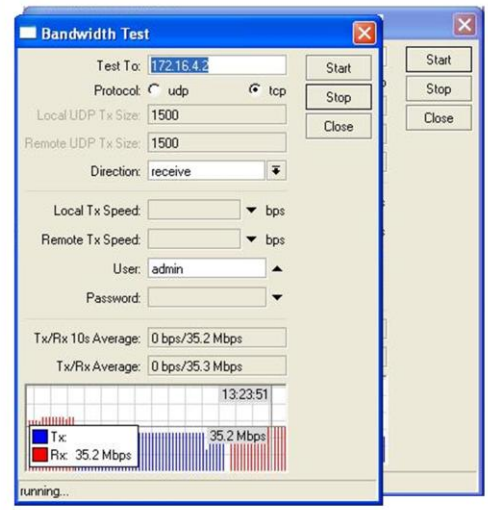
MORE PARAMETERS



Dual Nstreeme on one antenna

First you have to test all wireless system equipment for a 100% output and input stability.





I hope that probably every one in this room experienced with this technology but got various problems and I would like to help you to solve your problems.

For example when I made this testing I was using a brand new equipment –because it is quite difficult to find a problem When it is already installed on site.

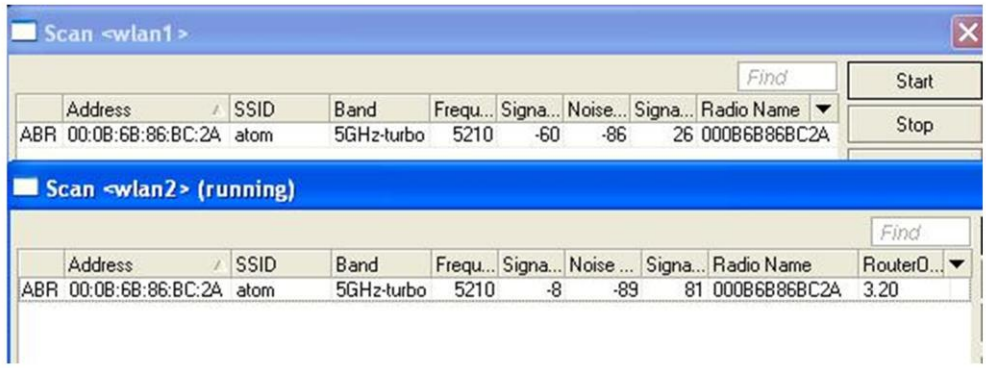
first in the laboratory I figured out that I have a problem on one side with receiving signal so I exchanged a pigtail so I got all connection parameters to equalize for a booth links. Then I started to test throughput on each side and on each link separately And I got some strange problem as you can see on the slides, So I exchanged a wireless MiniPCI card and got all parameters equal.

I do all testing with TCP protocol to get all results more accurate to compare with real traffic.

Then I installed the testing setup on the real site to test performance and throughput for a Uplink distance 1,3km we decided to use only 24dbi dual antenna so I will not over the regulated power output

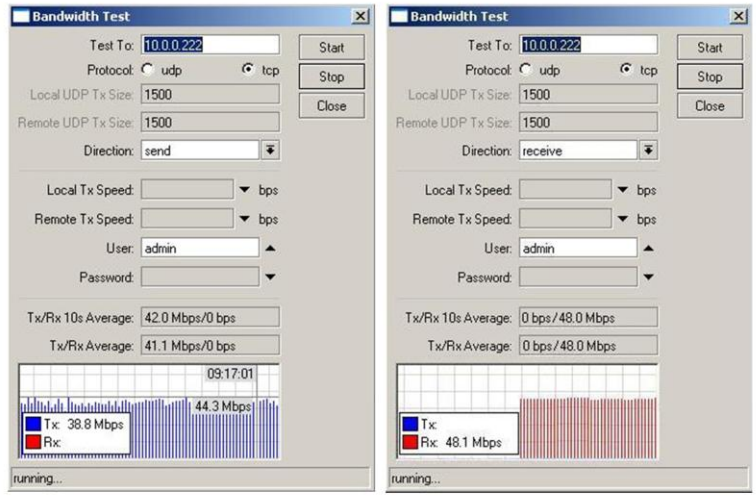
Dual Nstreeme on one antenna

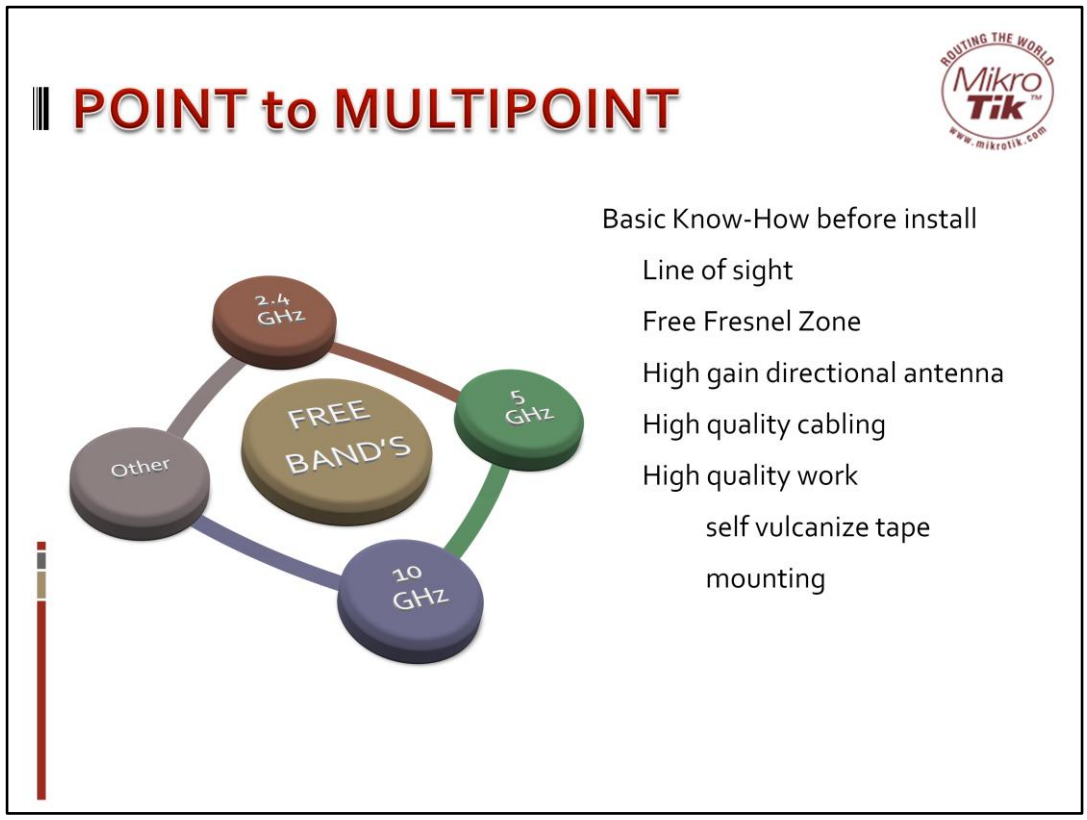
After installing it on real site I got a pphenomenal noise distance between channels = 52 db



Dual Nstreeme on one antenna

And a quite fair bandwidth up to 48 Mbps





First I will introduce some technologies witch are commonly used in our countries

We can divide into FREE Bands and Licensed Bands

I will do right to the problematic, because I think that we all are at least very familiar with the basic's
Breaking the basics rules causing most of the problem's.

I will focus on the basic's free band frequencies 2.4 and 5 GHz
2.4GHz is like old-timer and it is still in-use and you can revitalize your 2.4GHz networks as I will show later.

Free ISM 2.4 and 5GHz

MikroTik Full support for wireless cards :

- Prism II
- Atheros AR5000 – AR5006

Problems:

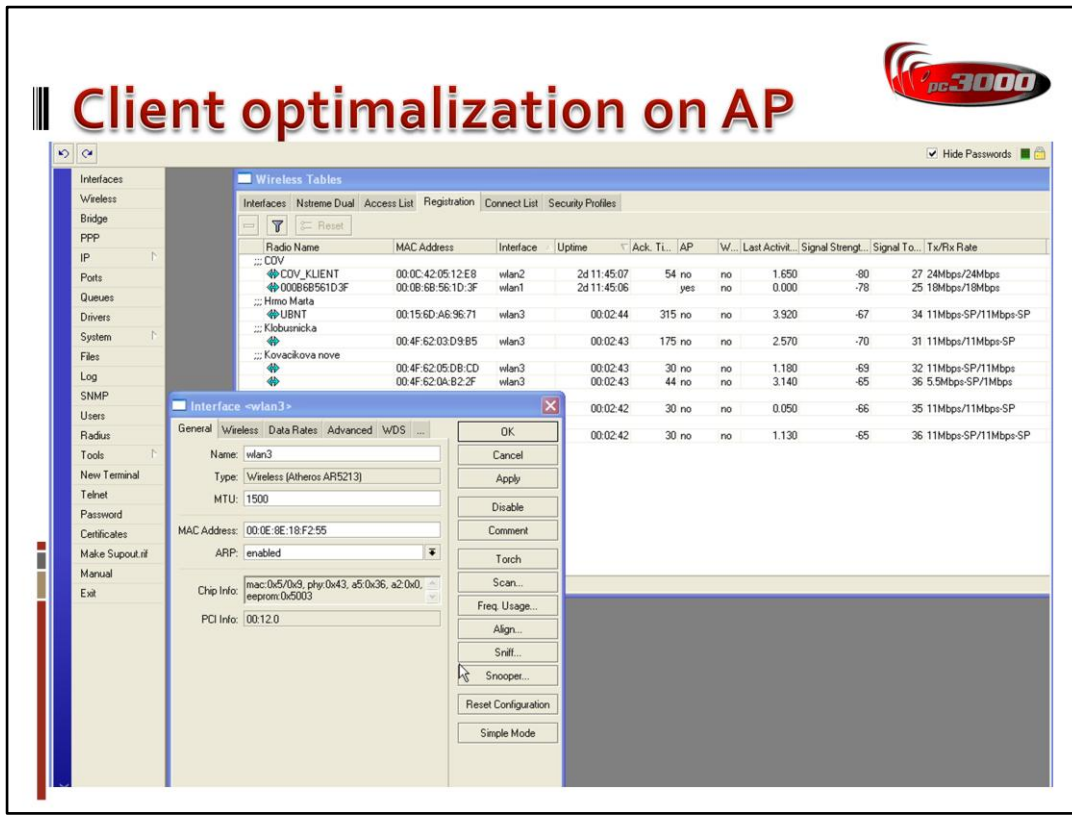
- interference
- SNR
- ACK

So many producers and thus cards are Different Even from piece to piece even they have the same chipset.
The on site experience is the best way how to test different parameters of each product.

Specially I foccused on the new R52H cards.

In the few minutes I will show differences of cards in the other –dual nstreeme test.

Client optimalization on AP



As a first testing I did done some real 2.4 GHz access point site to try optimize client connection.

After going trough interfaces and settings I found that the Wi-Fi Ethernet card has in Advanced Mode changed TX power to manual and it is set to 30dbm and ad you can see it is quite easy

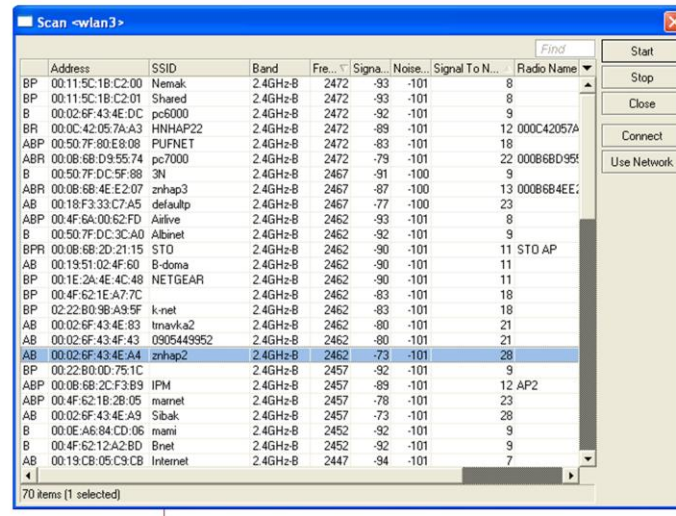
Client optimalization on AP

As you can see the interference on that AP

Is really incredible.

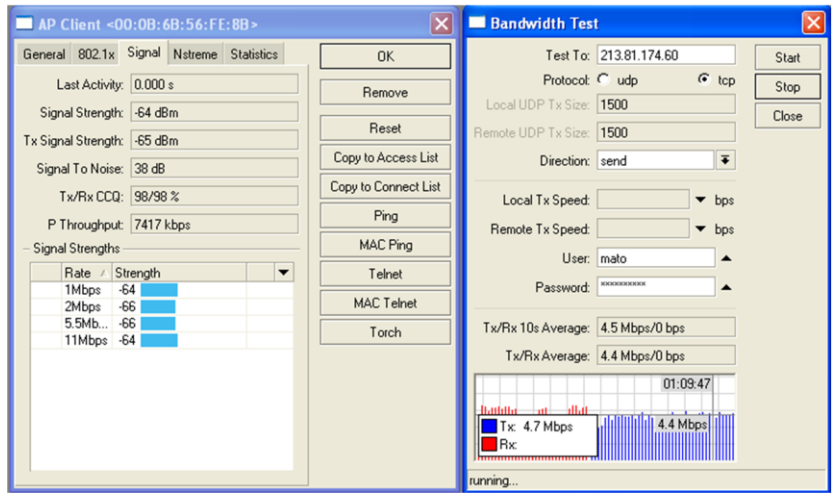
The AP is seeing up to 70 others AP's

And still you will be able to get a god and stable AP



I will try to publish all picture's and video's witch will be relevant to Mine testing.

Client optimalization on AP



And still even in so hard environment you can get about a 5 Mbps so it means usually about 2.5 Mbps per client

So it is usually acceptable by the client

Client optimalization on AP

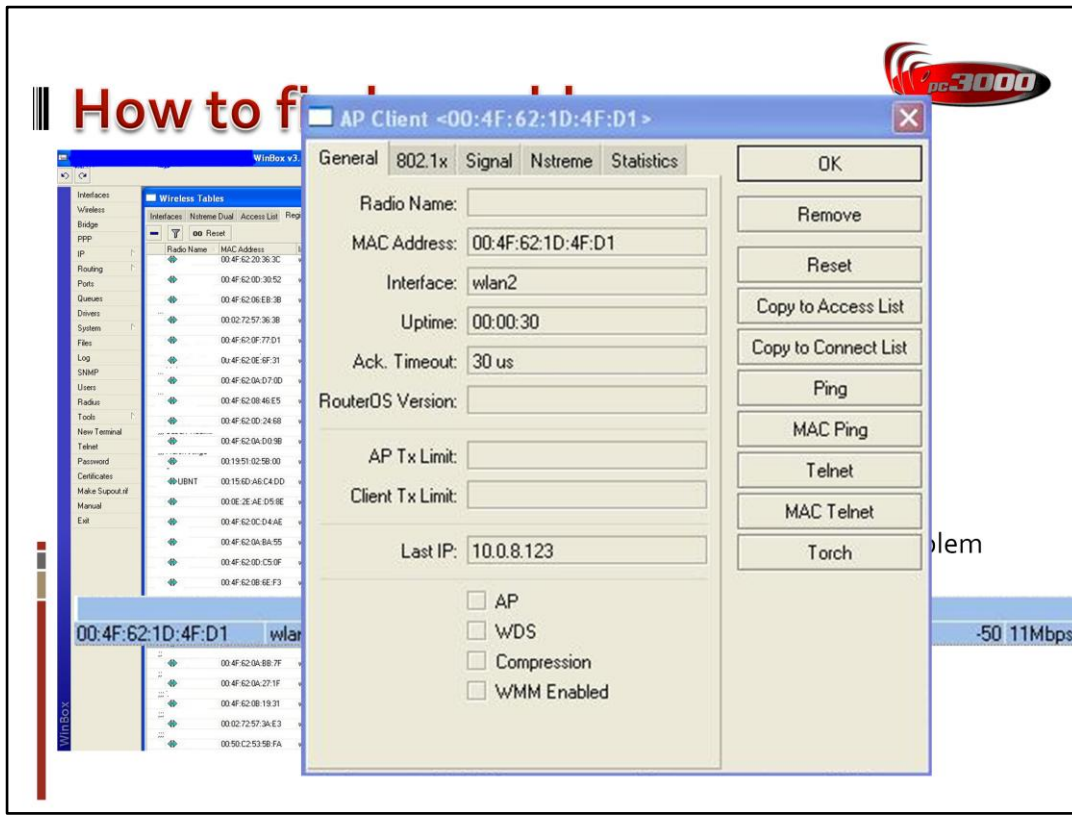
The Question is, the value of Acknowledge timeout for receiving ACK packet ?

Answer is quite complicated.

Automatic settings is required in Wi-Fi technology.

In 2.4 GHz not so dramatic – about 30 µs

5GHz it have to be precise – f.e. 5km about 54 µs



As a second optimalization I had another access point where client had complained that he have problem to get pages from time to time.

When I went trough a list of connected client's first I inspected a wireless interfaces on one is connected in one time about
13 clients and on the other about 11 that looks like the maximum what I can suggest.

Then I went trough list of client's and we got lucky because in Mikrotik version 3.X you can enable to see all kind of parameter's
And in this and in all other cases you will need to see SNR and ACK parameters.

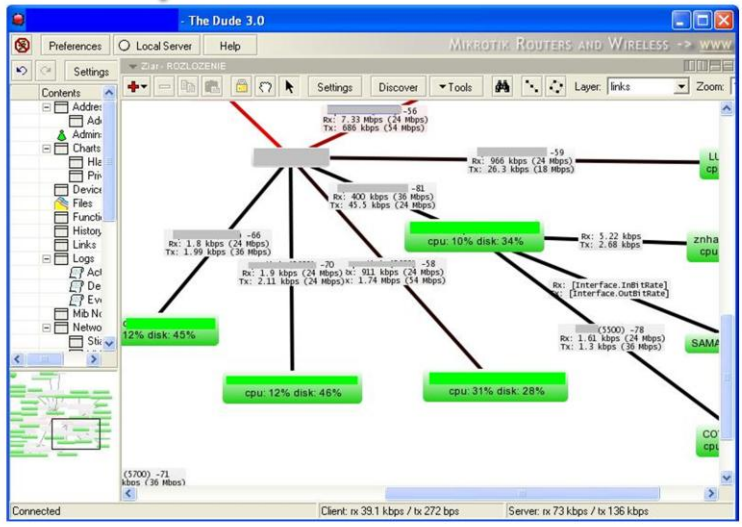
Practically all client's had a good signal quality and ACK jus right about 30
nd I found our problematic client.

As you can see he has a nice signal -50dbm butt the ACK is too high and it will affect all other clients as well.

He had some experience with this problem and after visiting this customer we found that In this case the problem is the one basic rule – cabling.

The Installer was not using a

Client optimalization on AP



Nice tool to keep track of customers even they do not have a Mikrotik devices

Is SNMP management the Dude, you should use it to watch when the problem started and it will help to determine area of the problem.

It is a quite usable for all devices with SNMP support, Mikrotik Dude has preloaded MIBs (Management Information Base) so you are able to use it practically on anything.

From the beginning of this whole test I needed some equipment.
And I got a big support from the following companies

for borrowing all necessary equipment for the test sites on the real environment

WORKSHOP

I would love to invite you at the discussion table

THANK you.