

Bandwidth management with



GLC webinar, 26 january 2017

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GLC Networks, Indonesia

Agenda

- Introduction
- Bandwidth management
- Mikrotik simple queue
- Demo
- Q & A

What is GLC?

- Garda Lintas Cakrawala (www.glcnetworks.com)
- An Indonesian company
- Located in Bandung
- Areas: Training, IT Consulting
- Mikrotik Certified Training Partner
- Mikrotik Certified Consultant
- Mikrotik distributor

About GLC webinar?

- First webinar: january 1, 2010 (title: tahun baru bersama solaris - new year with solaris OS)
- As a sharing event with various topics: linux, networking, wireless, database, programming, etc
- Regular schedule: every 2 weeks
- Irregular schedule: as needed
- Checking schedule:
<http://www.glcnetworks.com/main/schedule>
- You are invited to be a presenter
 - No need to be an expert
 - This is a forum for sharing: knowledge, experiences, information

----- Forwarded message -----

From: **achmad mardiansyah** <a.mard...@gmail.com>

Date: 2009/12/30

Subject: [OSUG-ID] undangan: webinar "tahun baru bersama solaris"

To: OSUG-Indonesia <OSUG-In...@googlegroups.com>

hallo semua,

mau ngasih tau, GLC

(<http://www.facebook.com/group.php?gid=255388515405>) mau ngadain webinar di tahun 2010.

webinar ini fleksible, jadi tidak perlu keluar rumah jika ingin ikutan. berikut ini detilnya:

webinar ini ditujukan bagi para pemula yang ingin berkenalan dengan UNIX terutama solaris.

topik webinar:

- introduction to solaris
- open mind tentang GLC Learning Center

tanggal: 1 januari 2010

waktu: 10:00 - 11:00 Waktu Jakarta (GMT+7)

lokasi: Internet

Pembicara: Achmad Mardiansyah

(<http://au.linkedin.com/pub/achmad-mardiansyah/7/a44/a72>)

biaya: free (gratis)

cara pendaftaran:

- isi data anda melalui form berikut:

<http://spreadsheets.google.com/viewform?formkey=dEFleGRCZHFRVICY0>

Trainer Introduction



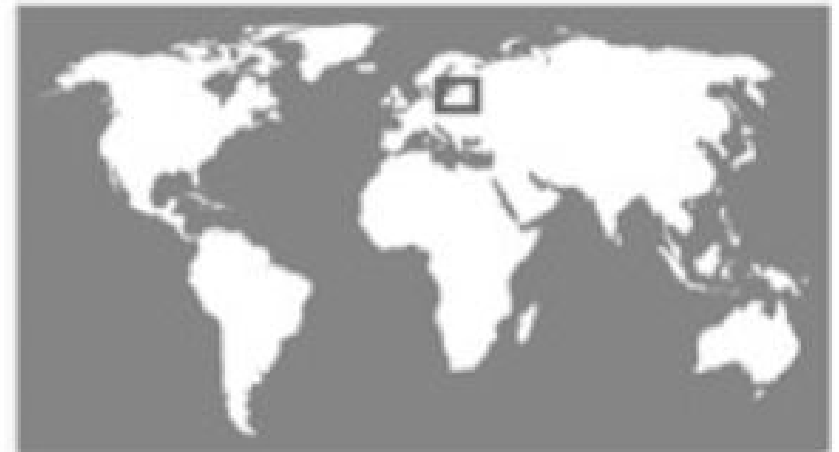
- Name: Achmad Mardiansyah
- Base: bandung, Indonesia
- Linux user since 1999
- Mikrotik user since 2007
- Certified Trainer (MTCNA/RE/WE/UME/INE/TCE)
- Mikrotik Certified Consultant
- Work: Telco engineer, Sysadmin, PHP programmer, and Lecturer
- Personal website: <http://achmadjournal.com>
- More info: <http://au.linkedin.com/in/achmadmardiansyah>

Please introduce yourself

- Your name
- Your company/university?
- Your networking experience?
- Your mikrotik experience?
- Your expectation from this course?

What is Mikrotik?

- Name of a company
- A brand
- A program (e.g. mikrotik academy)
- Headquarter: Riga, Latvia

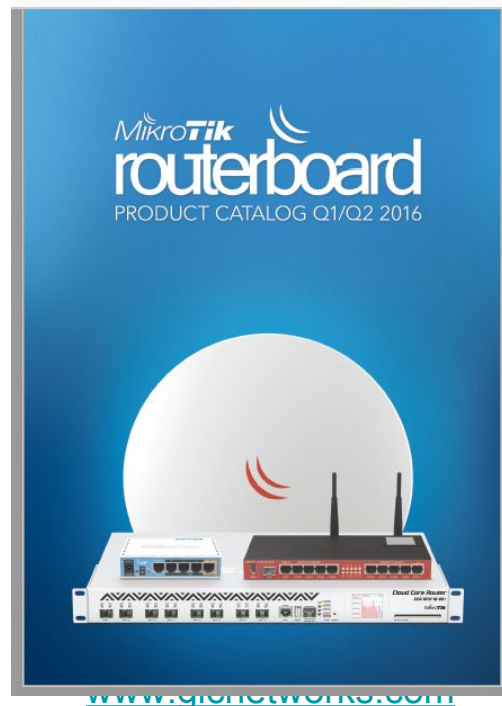
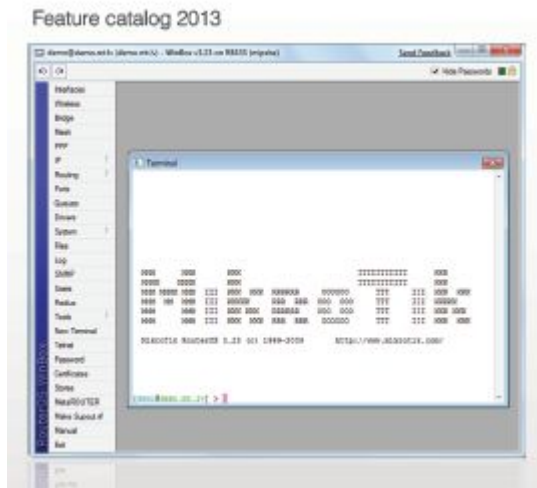


What are mikrotik products?

- Router OS
 - The OS. Specialized for networking
 - Website: www.mikrotik.com/download
- RouterBoard
 - The hardware
 - RouterOS installed
 - Website: www.routerboard.com

What Router OS can do?

- Go to www.mikrotik.com
 - Download: what_is_routeros.pdf
 - Download: product catalog
 - Download: newsletter



MikroTik
NEWSLETTER, ISSUE #71 - MARCH 2016

- LHG 5
- hAP AC
- Metal S2 ac
- 911 LHG5 ac
- Upcoming MUMs

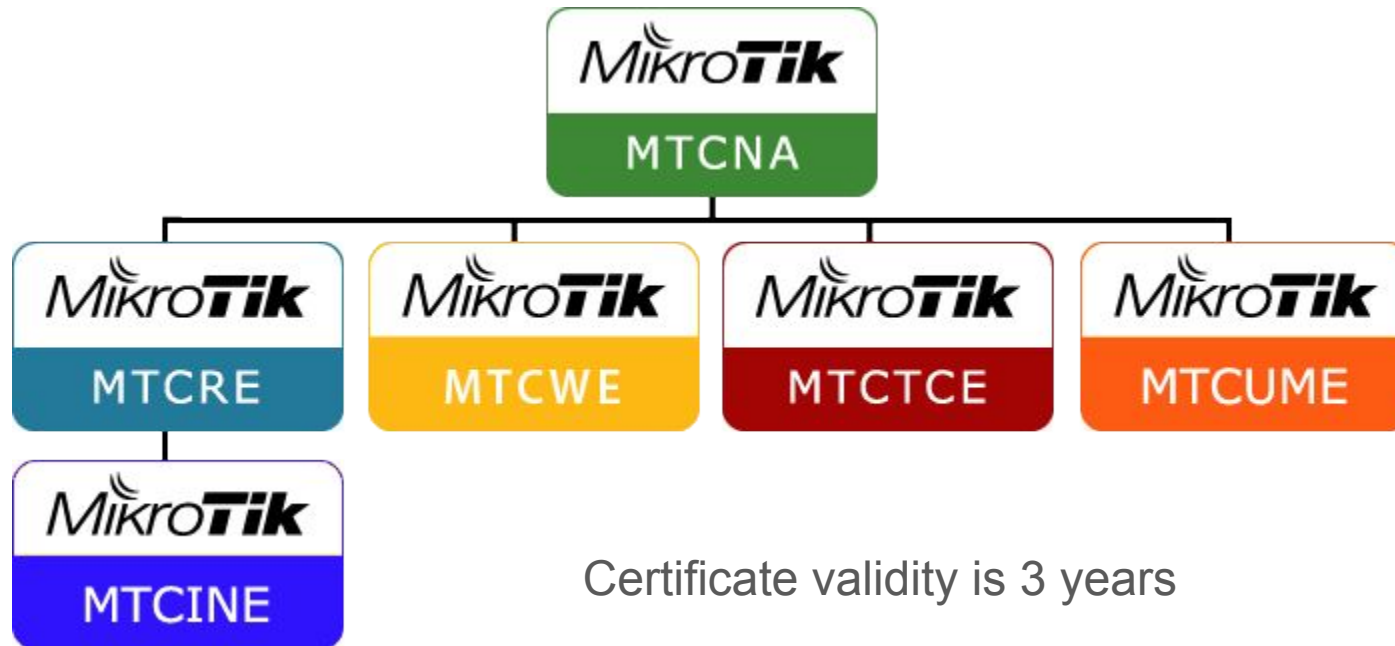
New low-cost 5GHz 24.5dBi CPE/backbone LHG 5

The Light Head Grid (LHG) is a compact and light wireless device with an integrated 24.5 dBi grid antenna at a revolutionary price. It is perfect for point to point links or for use as a CPE at longer distances. We are already shipping to distributors. Contact your favorite **Distributor** to obtain your LHG 5 now!

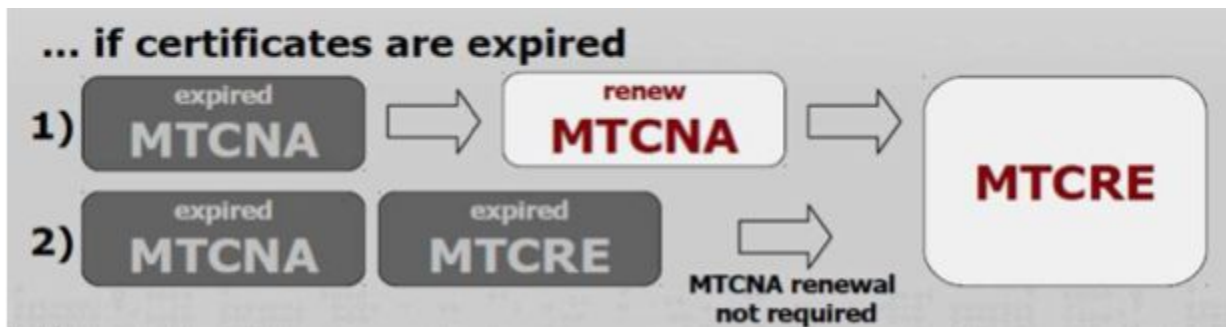
\$59

The grid design ensures protection against wind, and the fact that the antenna element is built into the wireless unit means no loss on cables.

What are Mikrotik training & certifications?



Certificate validity is 3 years



Bandwidth management

What is (digital) Bandwidth?

- **The amount of data that is transmitted over a media for a fixed amount of time**
- Unit: bit per second (bps)
- Unit multiplication: bps, kbps, mbps, gbps
- Is what people sell, buy, get -> commodity
- Bandwidth is a must-have for application

Is your bandwidth enough?

Yes and no, various answer. Usually, bandwidth is depends on...

- The rate (bps)
- The applications people using
- The time
- Load, etc... etc...

Therefore, managing bandwidth...

- is a kind of art, no fixed rules here
- Can be flexible or rigid
- Need a clear definition of what is “enough”

If you can't manage the bandwidth...

- Your bandwidth will never be enough for users
- There will be one user dominating the whole pipe -> Others will complain a lot
- Need a fair share to other user
- Headache... ??

Considerations/criteria to apply bandwidth management

- Applications: browsing, email, ftp, ssh, voip, etc, etc
- Address: single address, network address
- Rate: low/medium/high bit per second
- Amount of traffic: e.g. X GB per month
- Duration: valid for X days
- **Committed Information Rate (CIR)** -> guaranteed bandwidth
- **Maximum Information Rate (MIR)** -> what ISP usually sell (e.g. package Z is up to X mbps)

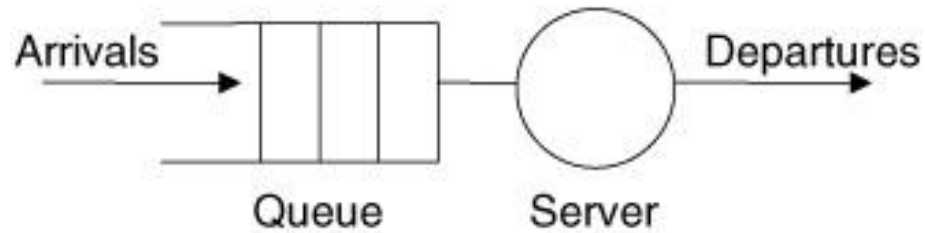
What is bandwidth management?

- Bandwidth management is the process of measuring and controlling a traffic on a network link
- Measured in bit per second (bps)
- Aka. traffic shaper, bandwidth limiter, qos (quality of service)

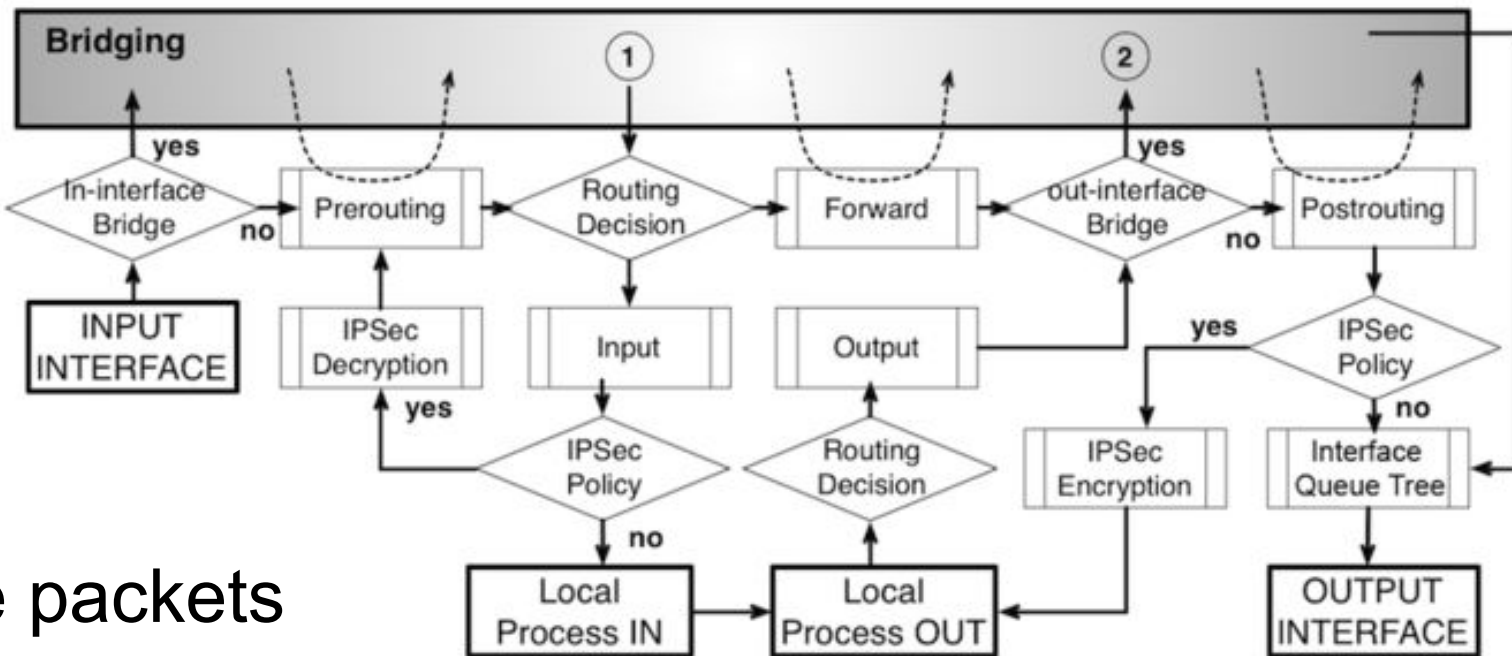
What we expect after implementing bandwidth management:

- Avoid the link is full (congested)
- Manage fair share of bandwidth for customers. There is no user that dominating bandwidth
- Applying priority on traffic (queue)

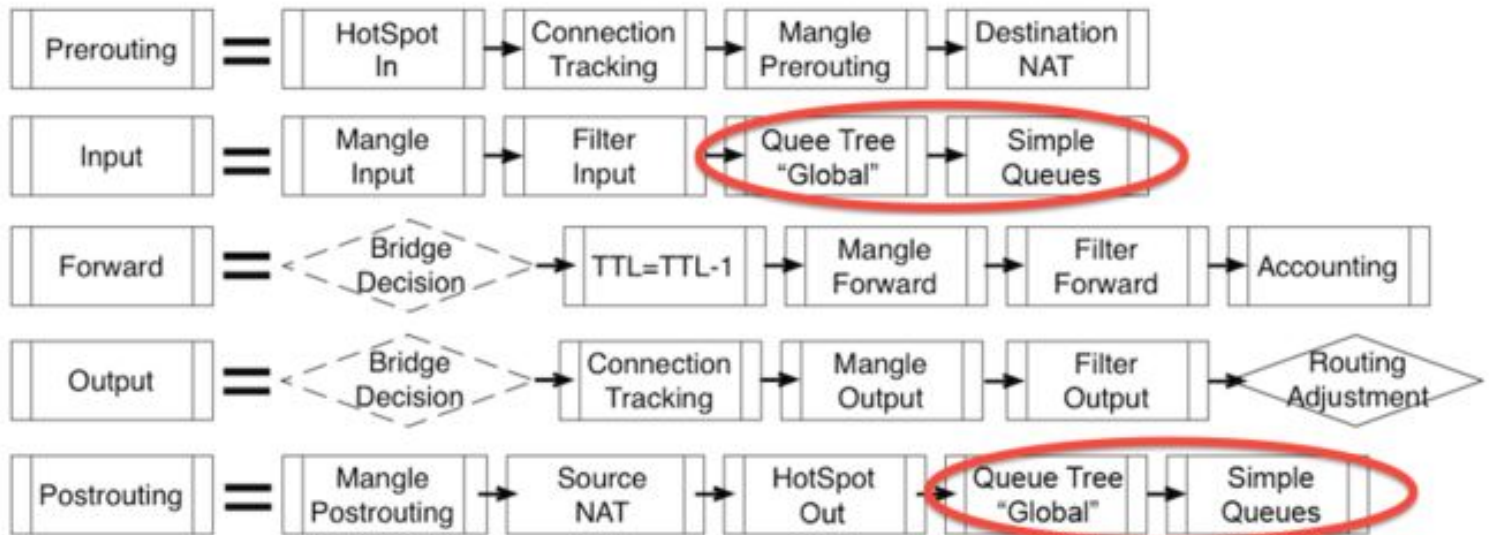
Implementation (simple model)



Mikrotik Simple queue



Where the packets are queued?



Bandwidth management mechanism

Mikrotik uses Hierarchical Token Bucket (HTB) algorithm for managing the **queue**:
to define of datarate of clients

Scheduling algorithm:

- FIFO (first in first out)
- RED (Random Early Detection)
- SFQ (Stochastic Fair-share Queue)
- PCQ (Per-Connection Queue)

Queue size: discard vs delay (limiting vs equalizing)

	Rate limiting	Rate equalizing
Mechanism	discard packets that exceed a limit	delay packets that exceed a limit if possible
Queue size (buffer)	0	> 0

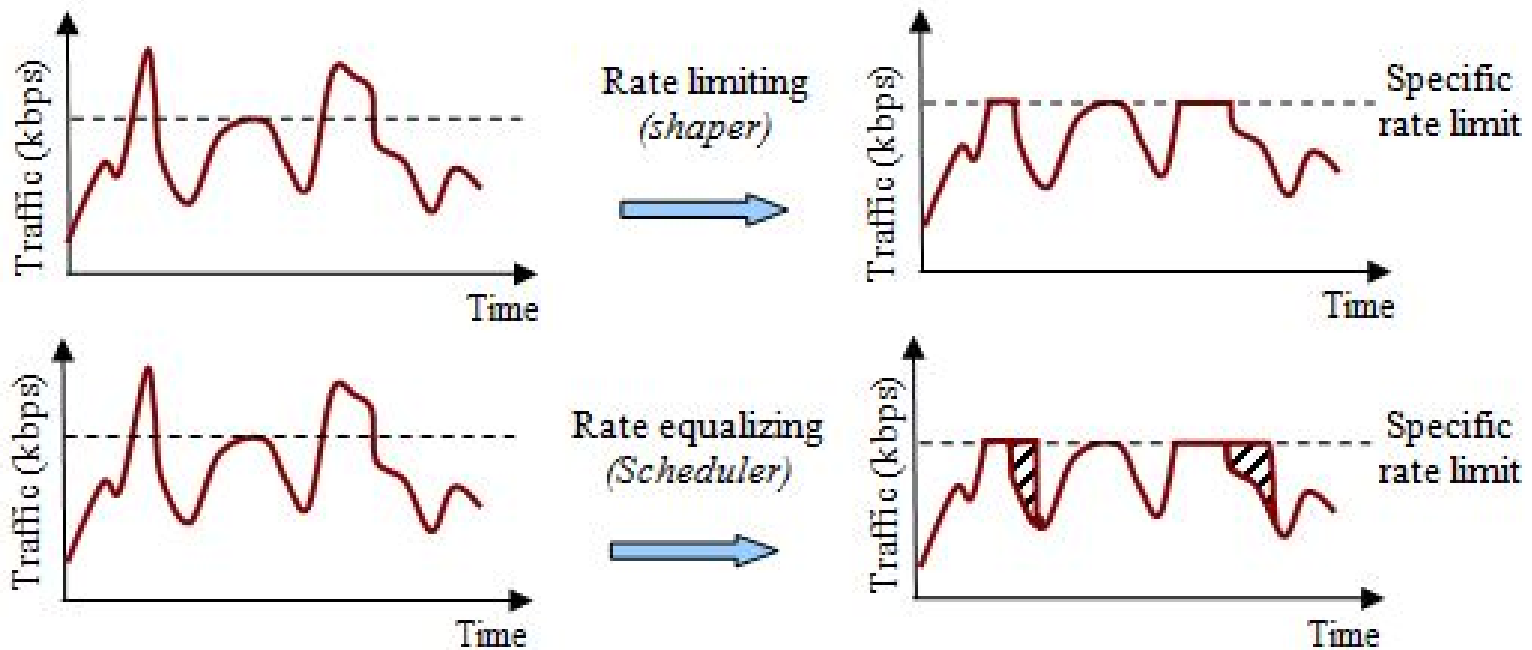


Figure 8.1. Principles of rate limiting and equalizing

Queue type

The screenshot shows the 'Queue List' window with the 'Queue Types' tab selected. A 'New Queue Type' dialog box is open, allowing the user to create a new queue type. The dialog box has the following fields and options:

- Type Name:** queue1
- Kind:** pfifo (selected from a dropdown menu)
- Queue Size:** (empty)

The 'New Queue Type' dialog box also includes buttons for OK, Cancel, Apply, Copy, and Remove.

Type Name	Kind
default	pfifo
default-small	pfifo
ethernet-default	pfifo
hotspot-default	sfq
multi-queue-ethernet-default	mq pfifo
only-hardware-queue	none
pcq-download-default	pcq
pcq-downstream-8m	pcq
pcq-upload-default	pcq
pcq-upstream	pcq
synchronous-default	red
wireless-default	sfq

12 items

Simple queue (general tab)

Simple Queue <192.168.31.0/24>

General | Advanced | Statistics | Traffic | Total | Total Statistics

Name: 192.168.31.0/24

Target: 192.168.31.0/24

Dst.:

Target Upload | Target Download

Max Limit: unlimited | 10M bits/s

Burst

Burst Limit: unlimited | unlimited bits/s

Burst Threshold: unlimited | unlimited bits/s

Burst Time: 0 | 0 s

Time

enabled

OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counters
Torch

Simple queue (advanced tab)

Simple Queue <192.168.31.0/24>

General Advanced **Statistics** Traffic Total Total Statistics

Packet Marks:

	Target Upload	Target Download
Limit At:	<input type="text" value="128k"/> <input type="button" value="v"/>	<input type="text" value="128k"/> <input type="button" value="v"/> bits/s
Priority:	<input type="text" value="8"/>	<input type="text" value="8"/>
Bucket Size:	<input type="text" value="0.100"/>	<input type="text" value="0.100"/> ratio
Queue Type:	<input type="text" value="default-small"/> <input type="button" value="v"/>	<input type="text" value="pcq-downstream-8m"/> <input type="button" value="v"/>
Parent:	<input type="text" value="none"/> <input type="button" value="v"/>	

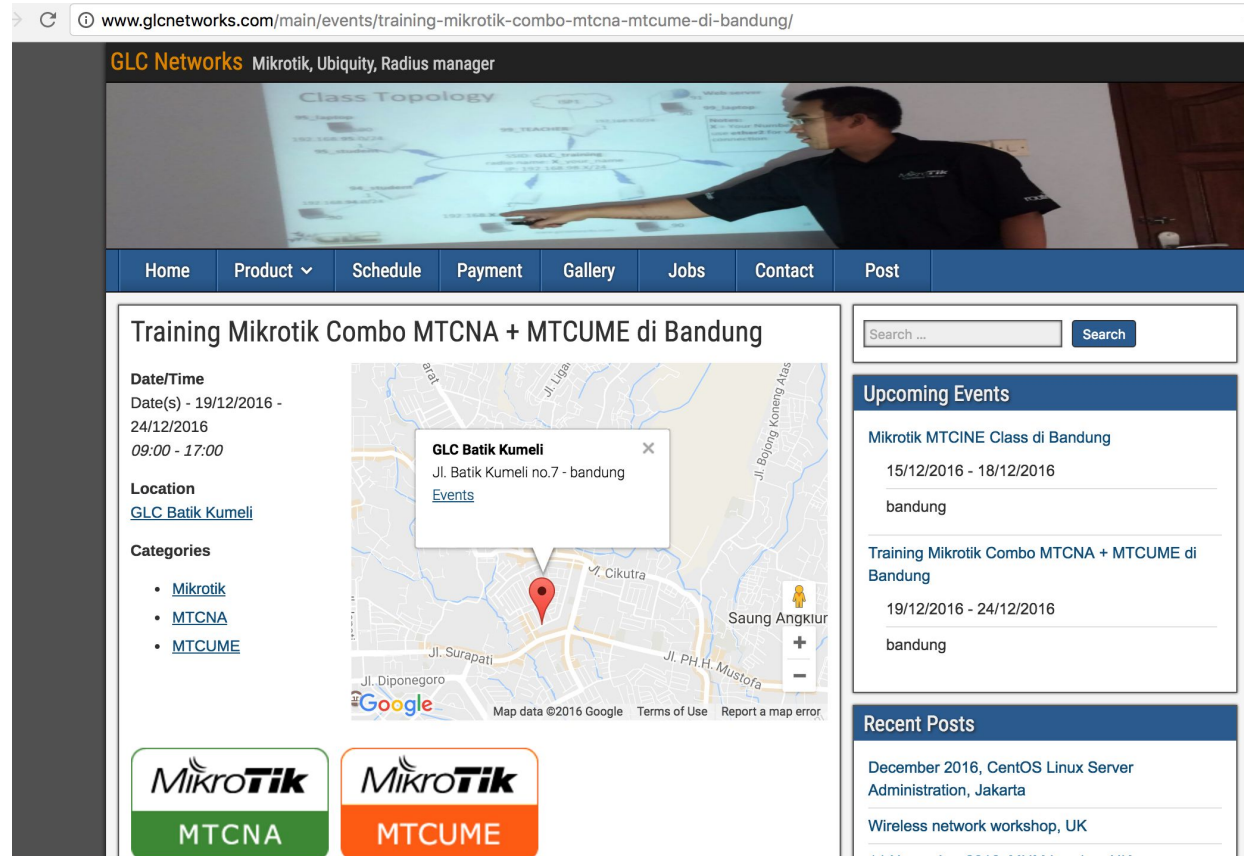
enabled

OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counters
Torch

Interested? Just come to our training...

Special price for webinar
attendees...

<http://www.glcnetworks.com/main/schedule>



The screenshot shows a web browser displaying the GLC Networks website. The page title is "Training Mikrotik Combo MTCNA + MTCUME di Bandung". The main content area includes a date/time section (19/12/2016 - 24/12/2016, 09:00 - 17:00), a location section (GLC Batik Kumeli), and a categories section listing Mikrotik, MTCNA, and MTCUME. A map of Bandung shows the location of GLC Batik Kumeli at Jl. Batik Kumeli no.7. The page also features a navigation menu, a search bar, and sections for "Upcoming Events" and "Recent Posts".

GLC Networks Mikrotik, Ubiquity, Radius manager

Class Topology

Home Product Schedule Payment Gallery Jobs Contact Post

Training Mikrotik Combo MTCNA + MTCUME di Bandung

Date/Time
Date(s) - 19/12/2016 - 24/12/2016
09:00 - 17:00

Location
[GLC Batik Kumeli](#)

Categories

- [Mikrotik](#)
- [MTCNA](#)
- [MTCUME](#)

Upcoming Events

- Mikrotik MTCINE Class di Bandung
15/12/2016 - 18/12/2016
bandung
- Training Mikrotik Combo MTCNA + MTCUME di Bandung
19/12/2016 - 24/12/2016
bandung

Recent Posts

- December 2016, CentOS Linux Server Administration, Jakarta
- Wireless network workshop, UK

MikroTik MTCNA **MikroTik MTCUME**

End of slides

- Thank you for your attention
- Please submit your feedback: <http://bit.ly/glcfeedback>
- Like our facebook page: “GLC networks”
- Slide: <http://www.slideshare.net/r41nbuw>
- Recording: https://www.youtube.com/channel/UCI611_IIkQC0rsLWIFIx_yg
- Stay tune with our schedule