

# IPv6 experience in NITC

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# Agenda

- NITC
- IPv6 task force
- IPv6 address allocation
- IPv6 address advertisement
- IPv6 address management
- IPv6 services
- summary

# NITC

- National information Technology Center is a government organization which has the following roles:
  - ISP for all government entities
  - The registry and registrar for domain names under .jo – both at the first level and second level.
  - Providing hosting services for the government.
  - The government arm regarding any ICT issue.

# IPv6 Task Force

- In 2008 a task force had been held by NITC, MOICT and TRC as a stone to manage and coordinate all IPv6 issues.
- We also established an internal committee for running IPv6 and executing IPv6 task force regulations and recommendations.

# IPv6 Task Force Cont.

- IPv6 task force draws a roadmap for deploying IPv6 in NITC with the following main milestones:
  - IPv6 address allocation(Done)
  - IPv6 address advertisement(Done)
  - Running IPv6 in the core network(Done)
  - Running the services at IPv6(Partially done)
  - Provisioning customers with IPv6(pending)

# IPv6 address allocation

- In 2008 NITC IPv6 committee contacted RIPE for IPv6 address allocation and by Feb. 2009 we got the following IPv6 address block:  
2a02:9c0::/32 ,ASN 8934



# IPv6 address advertisement

- By December 2009 we advertised our IPv6 prefix to the world so we're the first ISP in Jordan that is connected to IPv6 world

Less than 80% of the GRH participants saw this route.

Less than 50% of the GRH participants saw this route.

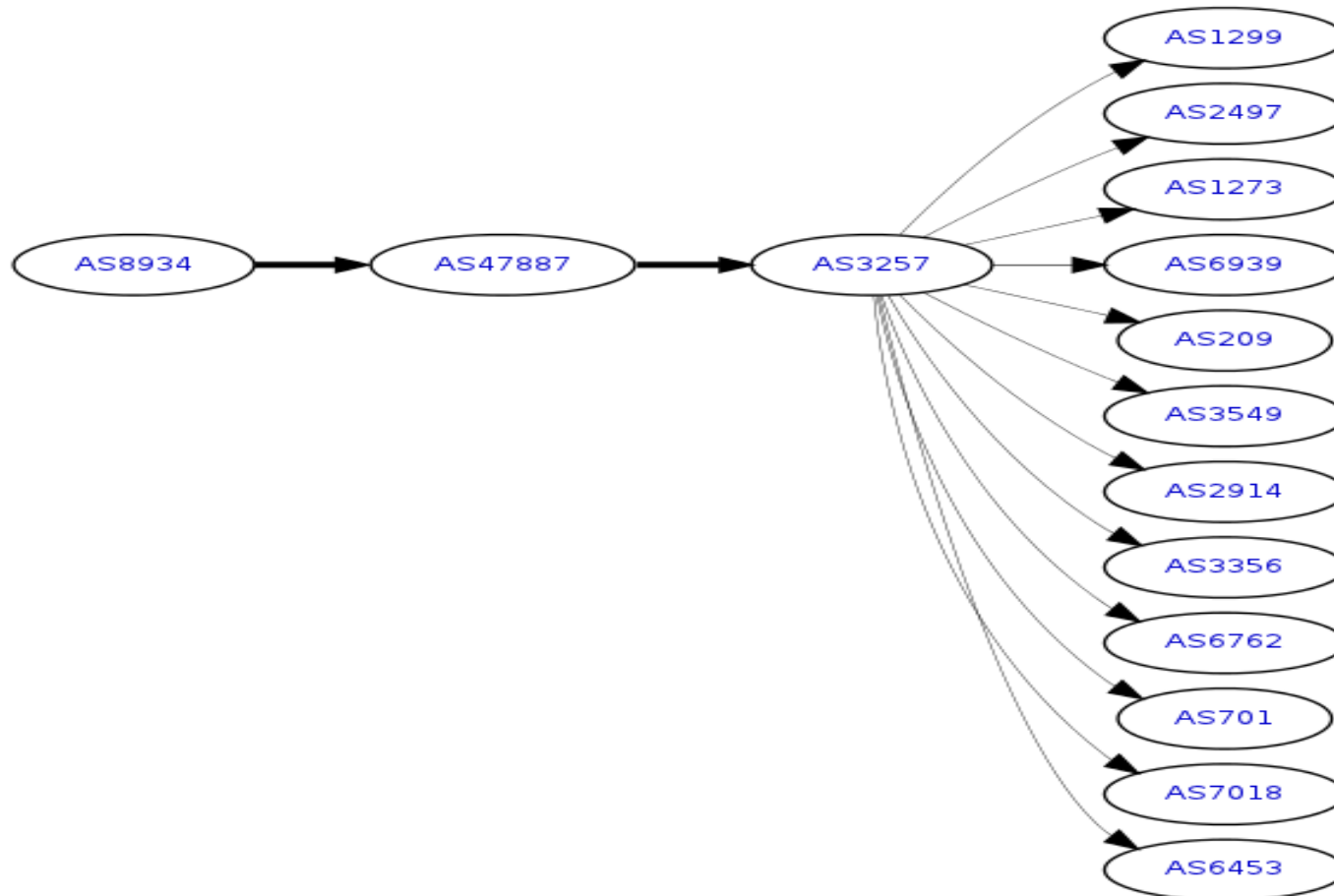
Less than 30% of the GRH participants saw this route.

LG	Prefix	tld	NetName	Owner	AS	S	Allocated	First seen	Seen by	Last seen (*)
LG	2a02:9b8::/32		CZ-LOSAN-20090204	LOSAN internet s.r.o.	41824	A	2009-02-04	2009-03-26 10:47:27	99%	2009-12-25 12:02:35
LG	2a02:9c0::/32		JO-NIC-20090204	National Information Cent...		A	2009-02-04	2009-12-24 13:02:36	99%	2009-12-25 12:02:35

- <http://www.sixxs.net/tools/grh/dfp/>

# IPv6 address advertisement...Cont

## AS8934 IPv6 Route Propagation





# IPv6 address advertisement..Cont

AS8934 IPv4 Peer Count (90 Days)



AS8934 IPv6 Peer Count (90 Days)



AS8934 IPv4 Prefixes Announced (90 Days)



AS8934 IPv6 Prefixes Announced (90 Days)



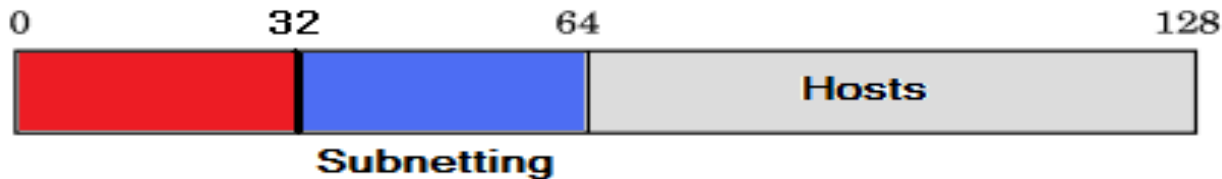
AS8934 IPv4 Prefixes Originated (90 Days)



AS8934 IPv6 Prefixes Originated (90 Days)



# IPv6 customers address allocation



- NITC can create  $2^{32}$  network
- Every network can use  $2^{64}$  host.

# Seven Options

Option #	Customer subnet bits	NITC's subnets bits	Number of networks / customer	Number of networks (NITC(
1	16	16 (/48)	65536	65536
2	12	20 (/52)	4096	1048576
3	10	22 (/54)	1024	4194304
4	9	23 (/55)	512	8388608
5	8	24 (/56)	256	16777216
6	7	25 (/57)	128	33554432
7	6	26 (/58)	64	67108864

# Utilization

Option#	NITC's Subnets	1000 Customer	2000 Customer	3000 Customer	4000 Customer	5000 Customer
1- 16/16 (/ 48)	65536	0.015	0.03	0.045	0.061	0.076
2- 12/20 (/ 52)	1048576	0.0009	0.0019	0.0028	0.0038	0.0047
5- 8/24 (/ 56)	16777216	0.000059	0.000119	0.000178	0.000238	0.000298

# So How we plan addressing?!

- Infrastructure (P.P & loopbacks) :
  - we use /48 subnet for infrastructure such that a /64 out of this /48 used for loopbacks and another /64 used for P.P with a /127 prefix.
  - We use /48 subnet for each customer
  - We use a /48 subnet for customer's links per POP such that each customer link has /64 subnet.

# IPv6 services

- NITC has different services which run on IPv6:
  - DNS servers running both IPv6 & IPv4
  - Web servers running both IPv6 & IPv4

# IPv6 Obstacles

- Our providers were not ready for IPv6 so we wait a time till some of them tunnel us temporarily through it to some IPv6 gateway.
- Some of our devices has an OS which does not support IPv6 so we upgrade them.
- OS bugs with IPv6 till now.
- Customer awareness and interest in IPv6

# Summary

- Till now no one of our customers make an application for IPv6
- We've a problem in some security devices that breaches IPv6 services connectivity.
- We're working with vendors to fix the bugs



# Questions

- Thank you 😊