Wireless and IPv6

Marcelo Manta
December 5, 2001

Agenda

- **Wireless Paradigm**

- **To NAT or not to NAT**

- **IPv6?**

- **What to expect**

NØRTEL
NETWORKS

Wireless Paradigm
Fast Introduction to Wireless Generations

- **1G – Analog Mobile Communication**
  - AMPS

- **2G – Digital Mobile Communication**
  - CDMA, TDMA, GSM

- **2.5G – Data-optimized 2G Mobile Communication**
  - GPRS, 1xRTT

- **3G – Data-centric Mobile Communication**
  - UMTS, 3xRTT

Wireless Paradigm

- **Billions of mobile devices**
  - — Phones, Wireless enabled MP3 players, Internet radios, Videophones, In car entertainment systems, etc

- **Always on**

- **Peer to Peer Applications**
  - — V²oIP, File Sharing and distribution, Distributed Computing, Active Networking

NORTEL
NETWORKS

Mobiles are not only phones anymore

- **New wireless terminals have:**
  - cHTML
  - Video
    - MPEG4
    - H.323 or SIP
  - Bluetooth
  - Java
  - MP3

To NAT or not to NAT

- **NAPT could solve the address shortage for client nodes**
  - How to deal with server nodes?

- **Peer to Peer applications impacted**

- **How about VoIP?**
  - A middle box should connect the RTP streams

NORTEL NETWORKS

NAT

Transparency gone

Impossible to deploy new protocols globally

Layer new applications over old ones (SOAP)

- **More complex solutions**
  — Applications should be aware of network
  — How to implement QoS?
  — How to handle end to end security

- **More complex management**

NORTEL NETWORKS

IPv6

- "A guy that designed Boeing's* large internal network said that he would deploy IPv6 for only 3 reasons:
  - — They ran out of global addresses.
  - — There were functions in v6 that can't be retrofitted to v4.
  - — His boss told him to."

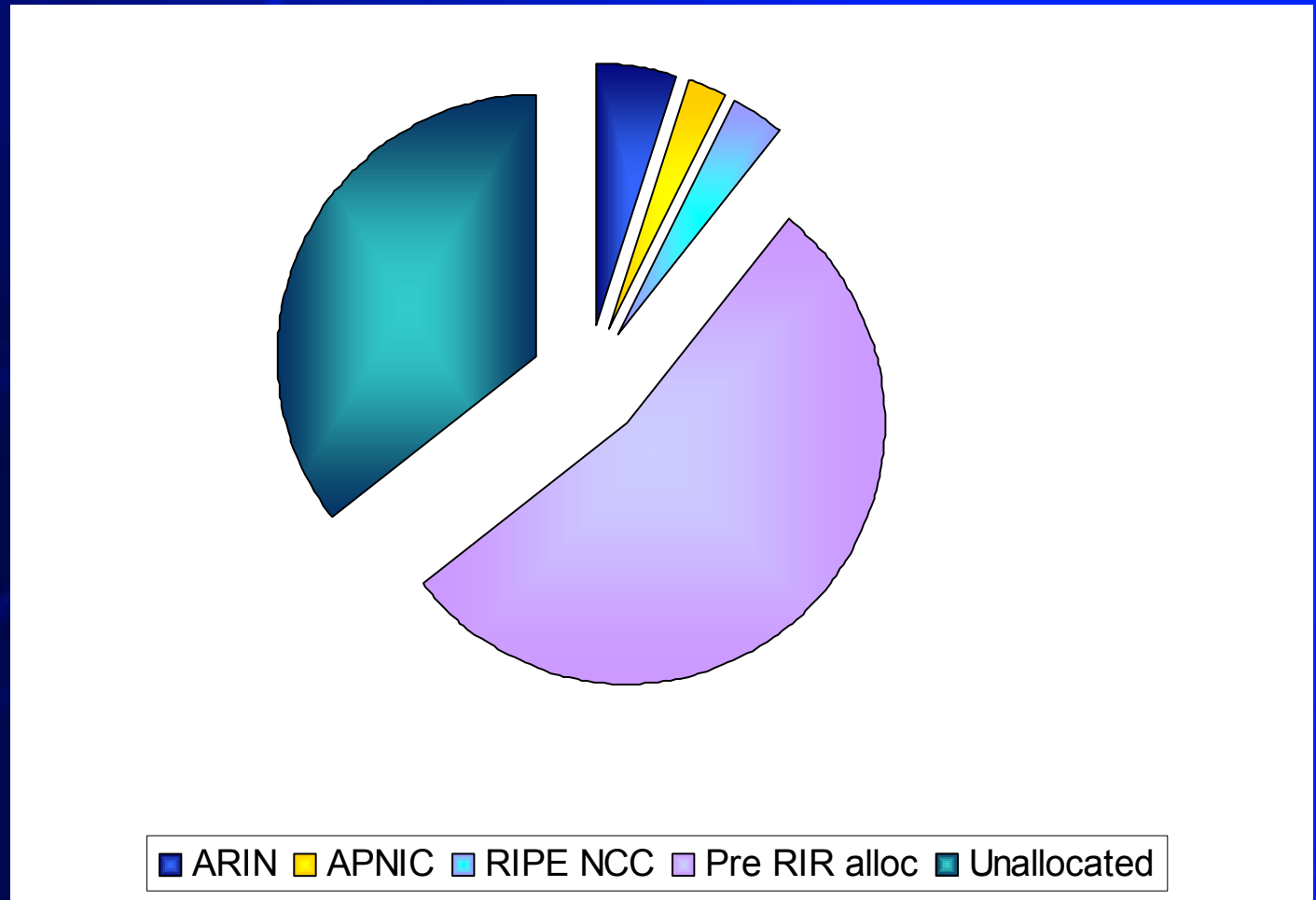 — quote from ipv6-strategy mailing list

*Boeing has a /8

NØRTEL NETWORKS

What we want from IPv6

- **More addresses**

- **More addresses**

- **More addresses**

- **Less NAT**

- **Simpler configuration**

- **Mobility**

IPv6
Are addresses really finishing?

We took 18 years to spend 64% of the address space

But now new users need IP addresses (ADSL, Cable, Mobile, sensor networks)

Estimatives for IPv4 space depletion varies from 5 to 10 years

Legend: ■ ARIN ■ APNIC ■ RIPE NCC ■ Pre RIR alloc ■ Unallocated

IPv6 Forum

NORTEL NETWORKS

IPv6
Why Mobility

Currently GPRS networks uses IPv4 + NAT*

# of phones (millions)	2005	2010
Mobile Phones	1500	3000
Data enabled phones	500	1000
Roaming data phones	5	10

IPv6 Forum

*Ok for WAP browsing

IPv6 on the Wireless World

- **3GPP – Europe 3G**

  — UMTS mandates IPv6 on Release 5 (~2005)

- **Japan & Korea 3G**

  — Government mandates IPv6 by 2005

- **3GPP2 – US 3G**

  — Mandates IPv6 and MIPv6 (~2010)

Possible Outcomes

	Scenario 1	Scenario 2	Scenario 3
IPv6	Successful migration	Failure	Partial
Address Transparency	E2E restored	NAT to exhaustion	Partial (as today)
IPsec	works	Who knows?	Partial (as today)
Issues	Internet as today	Generalized NAT (NAT between even ISPs)	IPv4 to IPv6 transition situation

What should we do?

- **Become part of 6Bone**

- **Support IPv6 DNS on the root servers**

- **Get an IPv6 allocation**

- **Enable IPv6 on the NAP**

NORTEL NETWORKS

Questions

?

NØRTEL
NETWORKS

Backup

NORTEL
NETWORKS

Sample callout

- **Reduce font for pages with a lot of text**
  - Second level bullet is 22 pt. plain
    - Third level bullet is 20 pt.

- **Sample text**
  - Second level bullet is 22 pt. plain
    - Third level bullet is 20 pt.

- **Sample text**
  - Second level bullet is 22 pt. plain
    - Third level bullet is 20 pt.

NORTEL NETWORKS

Sample callout

- **Reduce font for pages with a lot of text**
  - Second level bullet is 22 pt. plain
    - Third level bullet is 20 pt.

- **Sample text**
  - Second level bullet is 22 pt. plain
    - Third level bullet is 20 pt.

- **Sample text**

- **Sample text**

Sample emphasis text

NORTEL NETWORKS

Sample callout - different color

- **Reduce font for pages with a lot of text**
  - Second level bullet is 22 pt. plain
    - Third level bullet is 20 pt.

- **Sample text**
  - Second level bullet is 22 pt. plain
    - Third level bullet is 20 pt.

- **Sample text**

- **Sample text**

Sample emphasis text

NORTEL NETWORKS

Sample 2 Column

- **Sample bullet**
  - Sample 1st Tab
    - Sample 2nd Tab

**NORTEL
NETWORKS**

Corporate color palette

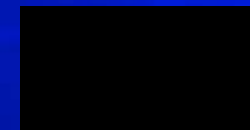| Blue	Yellow	Purple	Gray	Red

Additional colors

The orange and green additional colors are **only available for color-coding and content graphics** and are used on charts, graphs and maps **only after all other colors of the corporate palette** have been utilized.
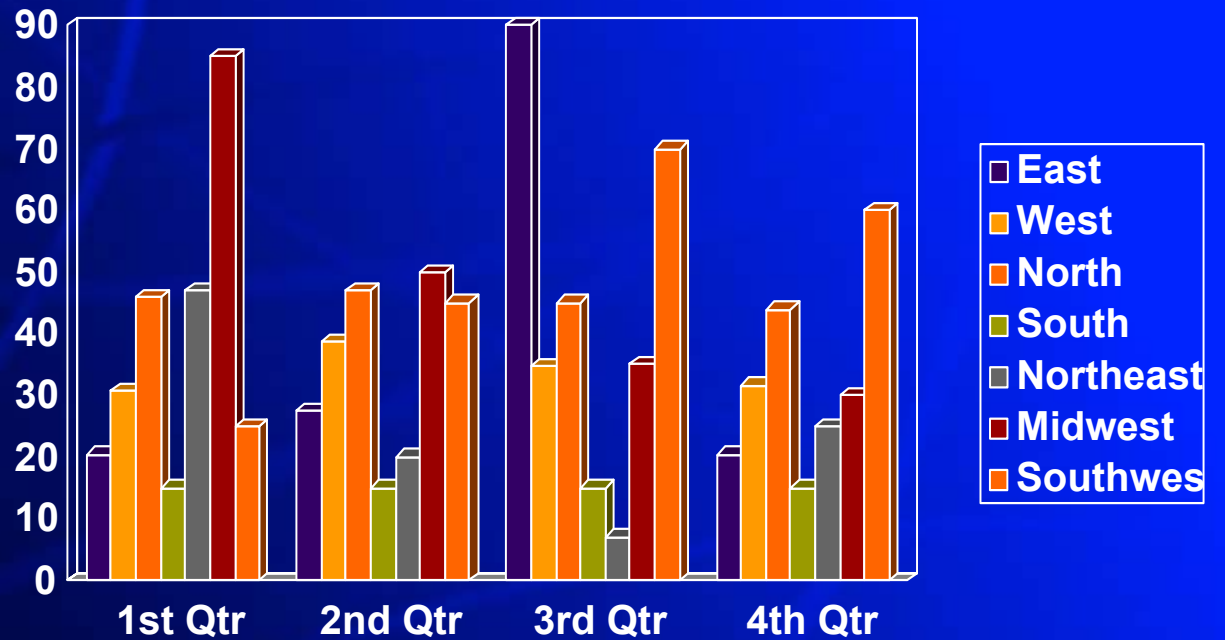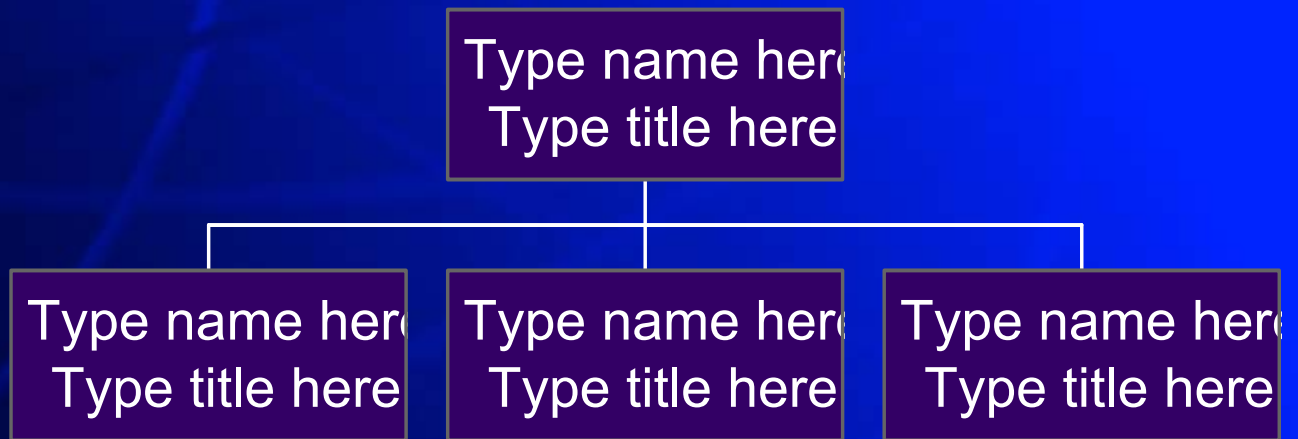
Green	Orange	Black (Text)

NORTEL
NETWORKS

Sample chart

Sample org chart

```
                    ┌─────────────────┐
                    │ Type name here  │
                    │ Type title here │
                    └────────┬────────┘
          ┌──────────────────┼──────────────────┐
┌─────────────────┐ ┌─────────────────┐ ┌─────────────────┐
│ Type name here  │ │ Type name here  │ │ Type name here  │
│ Type title here │ │ Type title here │ │ Type title here │
└─────────────────┘ └─────────────────┘ └─────────────────┘
```

NORTEL NETWORKS

Sample table

Title1	Title2	Title3	Title4
text	text	text	text
text	text	text	text
text	text	text	text

Please Note: Nortel Networks colors are not available in Microsoft Word Table. Please add color using PowerPoint's AutoShapes only as shown in the example above.

NORTEL NETWORKS