



**Afrinic**

The Internet Numbers Registry for Africa

## The Internet & adoption of change V6 the African perspective

Badru Ntege

## The implementation challenge

Level 9 Global issues & African Issues	Management awareness and Understanding
Level 8	Financial justification
Level 7	Enabled applications
Level 6	Operationalisation
Level 5	Implementation
Level 4	Planning
Level 3	Training
Level 2	Technical awareness
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## Level 9 from the Global perspective

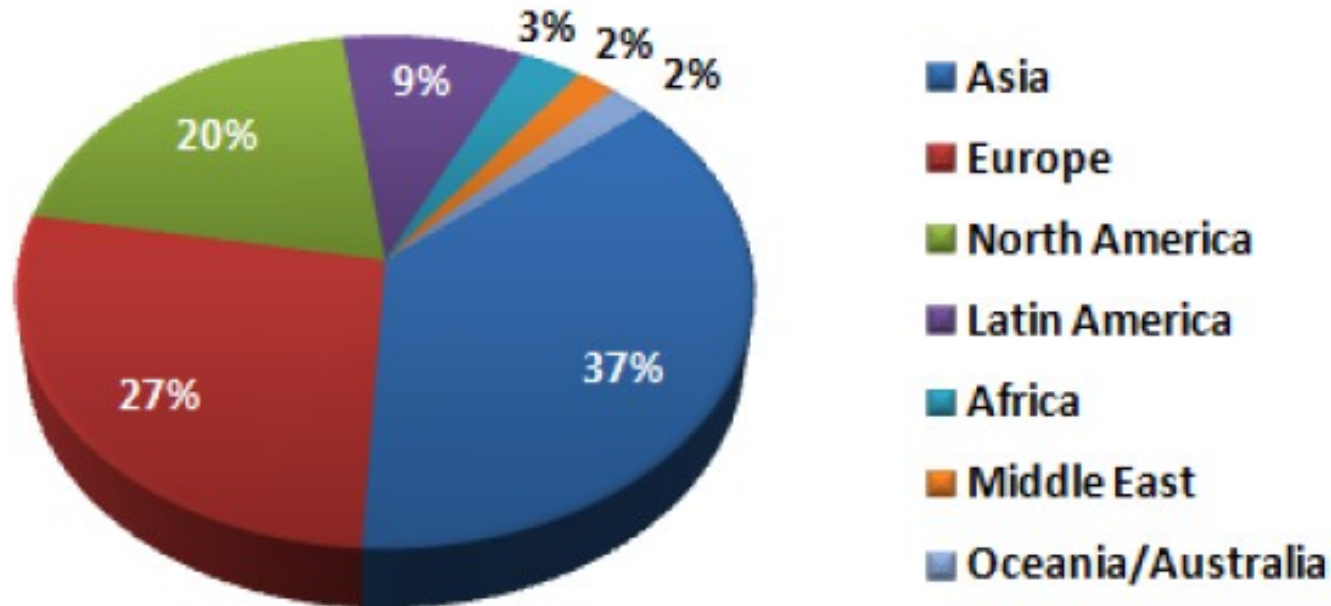
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A few realities:

- The internet is an echo system that we in Africa are part of whether we like it or not.
  - Africa as usual came to the table last in the v4 world.
  - The assumption is that we are equal players in the global bottom up community that governs the internet when it comes to resources
    - Are we really equal ?
    - Do we really need to be equal ?
-

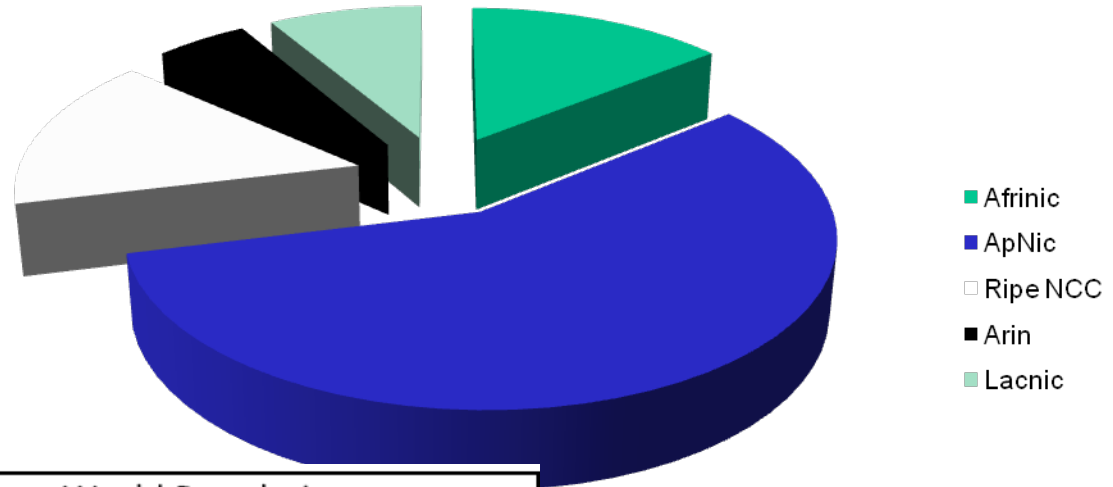
# Are we really equal ?

## World Internet Users



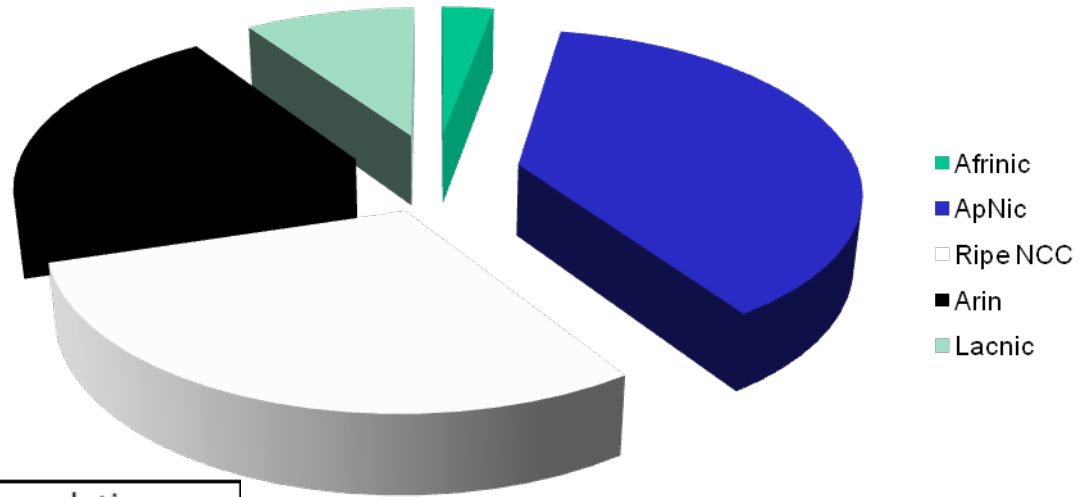
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# Population by Region



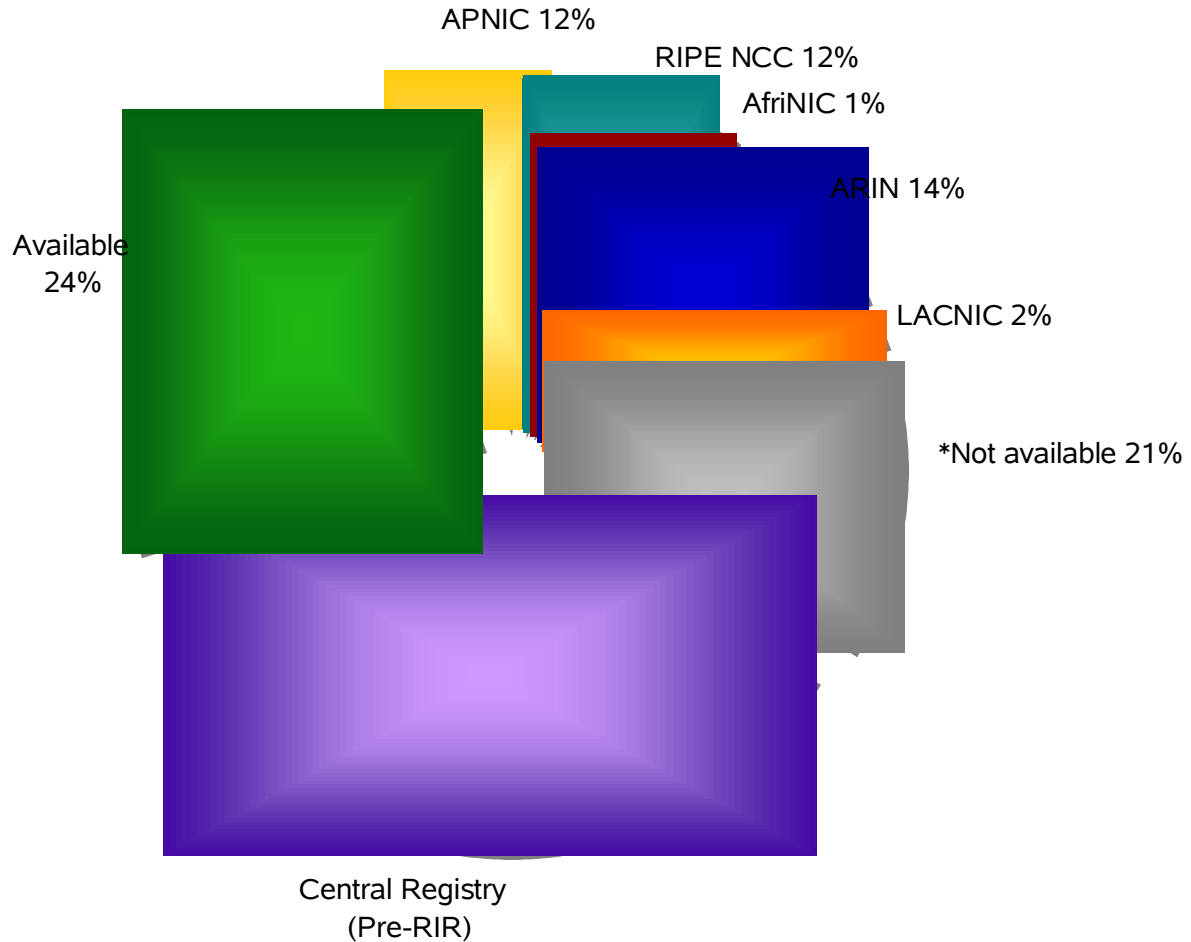
Region	World Population	
	Numbers	% of world population
Afrinic	933,448,292	14%
ApNic	3,746,996,067	57%
Ripe NCC	1,002,077,413	15%
Arin	334,538,018	5%
Lacnic	556,606,627	8%
<b>Total</b>	<b>6,573,666,417</b>	<b>100%</b>

# Internet penetration



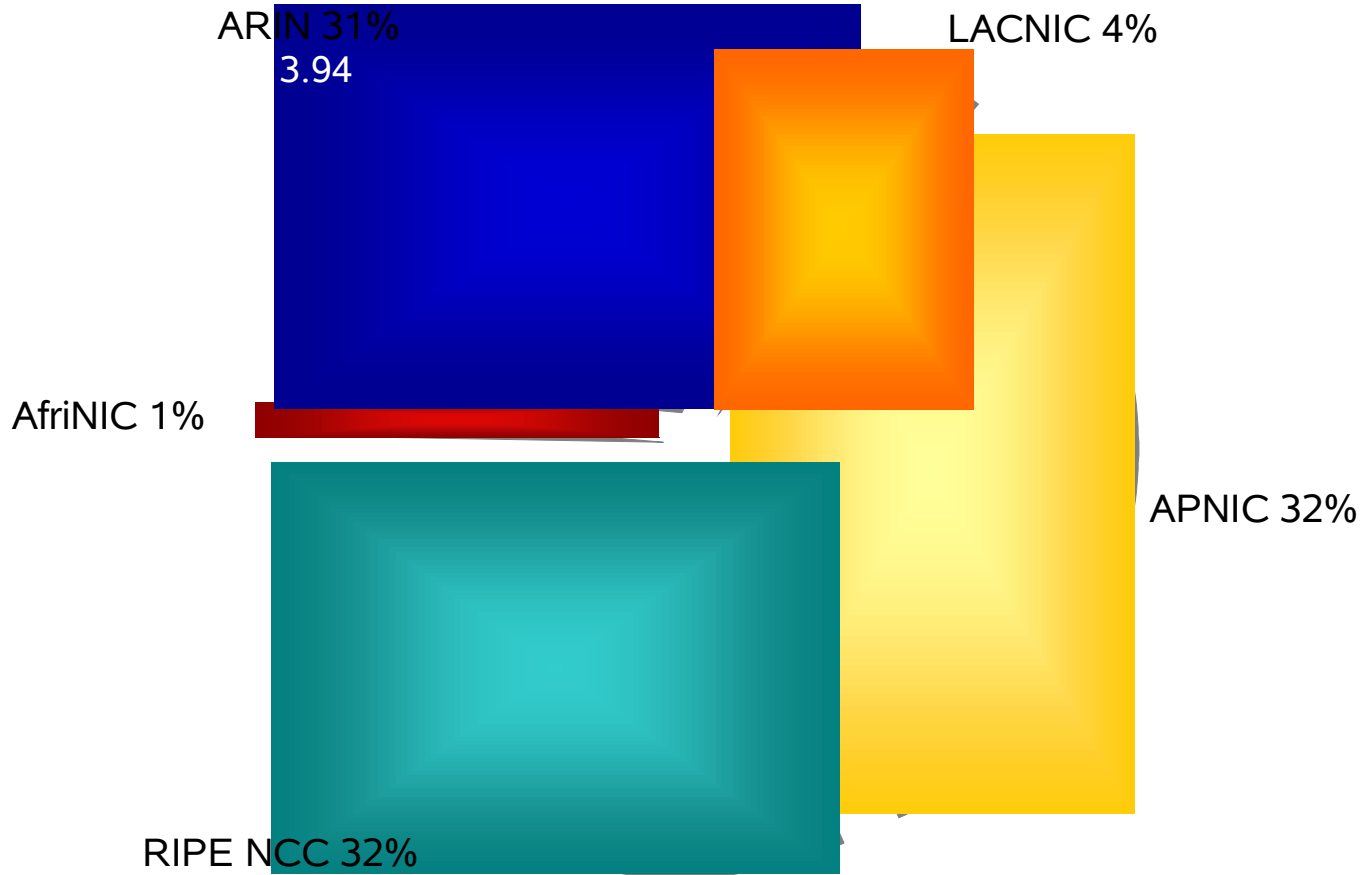
	Internet User population	
	Actual users	% of world users
Afrinic	33,545,600	3%
ApNic	436,758,162	38%
Ripe NCC	341,392,777	30%
Arin	232,655,287	20%
Lacnic	109,961,609	10%
	<b>1,154,313,435</b>	<b>100%</b>

# Status of IPv4 address space

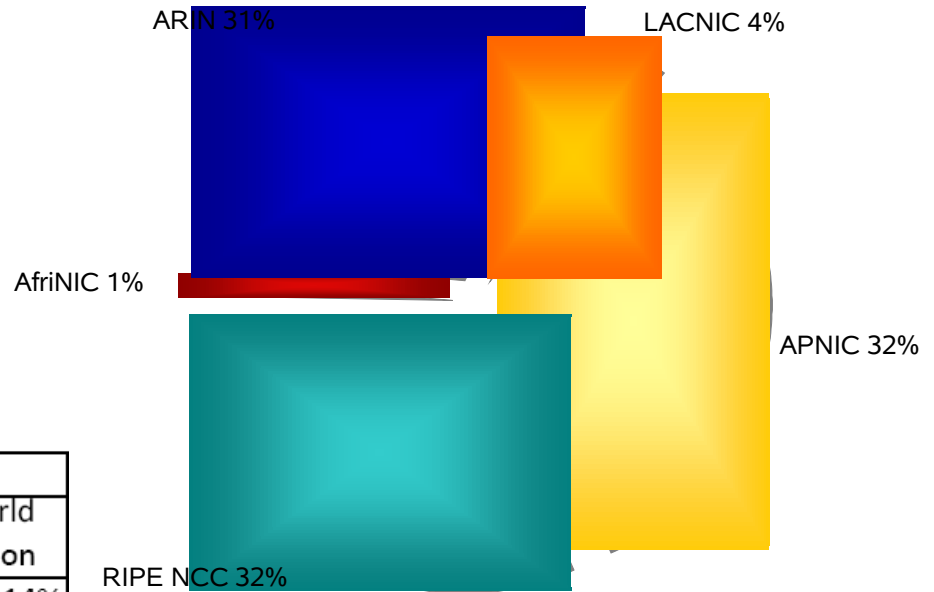




# IPv4 Allocations from RIRs to LIRs / ISPs (/8s)



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# Are we really equal?

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- The Answer is NO.... But the Jury is still out on how this should be translated.
  - Do we really want to get equality ????
    - Again here my answer is NO... the discussion on the remaining /8's is a diversion.
    - As a region we have very little to benefit from what will become a legacy technology
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## Do we really want to get equality ????

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- One could translate a quote from Malcom X

*“We have been invited to the dinner table but our plates are empty.”*

- In other words the debate for equality on how we share the last V4 resources will never end in our favor.
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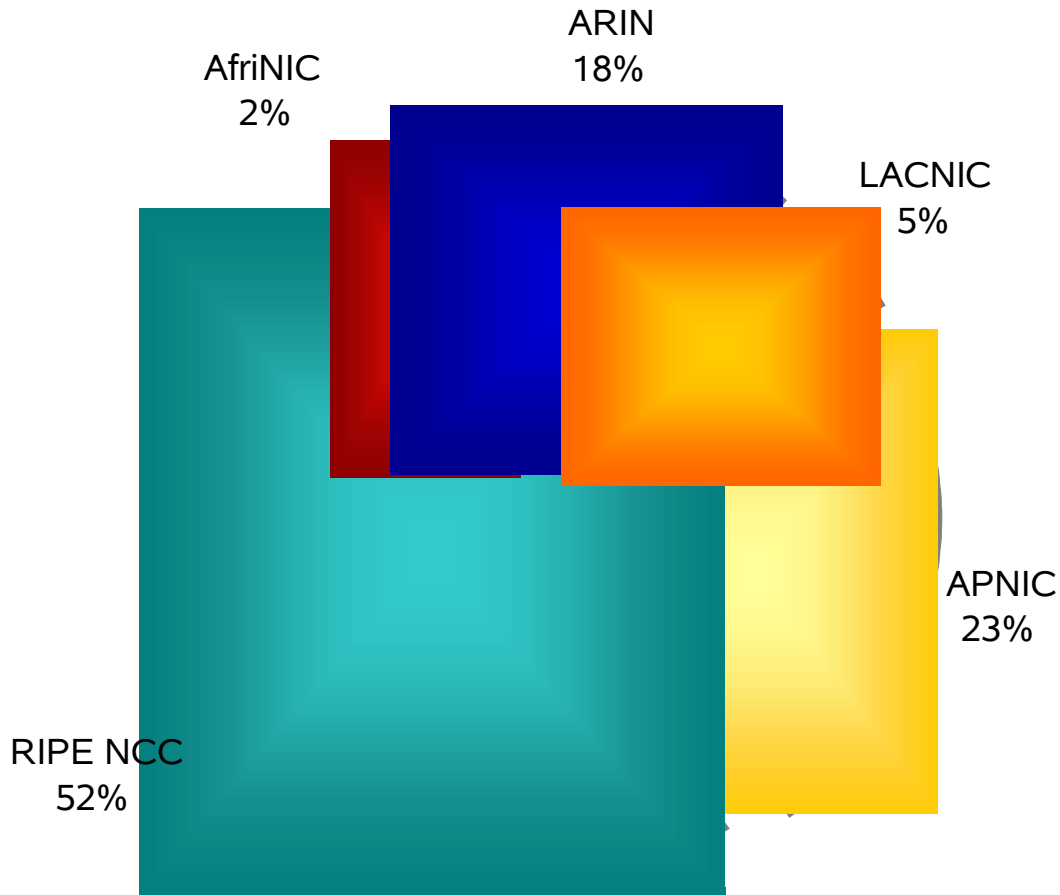
# Do we really need to be equal

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- My Answer is NO..
  - We now need to understand that moving forward the world will be a v6 world
  - There will be years of dual stack operation and Africa has to give itself a deadline when all ISP's will have dual allocations with a higher preference being v6 with a minimum /24 to allow for dual operation
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# IPv6 Allocations from RIRs to LIRs / ISPs



## Level 9 & Level 8 issues

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- Currently
  - Existing IPv4 users will migrate to IPv6 for one of three possible reasons:
    - New functionality not found in IPv4
    - Reduced costs by using Ipv6
    - To gain connectivity to otherwise unreachable IPv6 hosts

J curran rfc 1669 (1994)

- Post Depletion the above choices wont exist
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## Level 9 & Level 8 Criteria

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*In order to meet the requirement for "viability in the marketplace', IPng needs to deliver clearly improved functionality over IPv4 while offering some form transparent access between the IPv4 and IPng communities once IPv4 address depletion has occurred.*

J curran rfc 1669

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## the transition to classless IP addressing

- in the mid-nineties a major transition in address management happened
  - driven by **routing table growth**
  - the Class A/B/C distinction was dropped and routing aggregation introduced
  - providers were encouraged to upgrade to new allocation methods & BGP4
  - users werent supposed to notice any change
- this was a substantial operational investment **with no immediate upside for providers**
  
- speed picked up when **route filtering** was introduced – the unconverted providers were cut off from connectivity by some backbones, leading to massive customer complaints
- the driver: a sudden change in economics

# what brings about change ?

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- change happens if the underlying economics are right
    - technical merit rarely counts as an adoption driver
    - do regional initiatives change the economics sufficiently? (Yes they can)
  - Metcalfe's law applies: coverage wins over good intent any day
    - users walk away if there is choice and better solutions elsewhere
  - Forced change has to be guided. (dual stack deadlines)
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## summary

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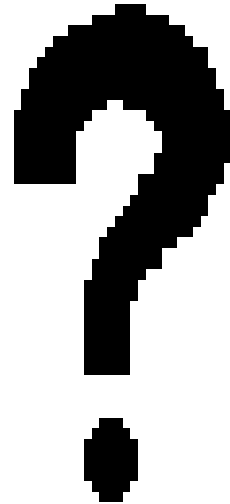
- djihad initiatives have limited impact - the economics needs to change
    - make sure you have a rational motive for spending hard earned money
  - availability of both Hardware and skill is a precondition for adoption
    - AfriNIC needs to get it right on IPv6 supply (1 v4 /24 plus v6 allocation)
    - Industry and government need to focus and plan the way in concert
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## RIR-Boards discussion

- “we have to drastically shorten the theoretical period between "IPv4 central pool depletion" and "an IPv6-only consumer can access all internet services". this means finding a way to make all ISPs in all countries deploy IPv6 in dual-stack mode even while IPv4-only is still economically viable. THAT would be a social good”.....(*Paul vixie*)

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**Thank You  
Comments**





# Extra slides

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## The implementation challenge

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# IPv6 adoption user level –Debate

(Michael Haberler, Internet Foundation Austria ,July 2004)

- there are good reasons for ipv6
  - end-to-end reachability without NAT breaking media streams is IMO the strongest one
  - **address depletion is not the „killer app“**
- Q1: whose PC **today** has a **publically reachable** IP address in his office ?
  - if not: is the reason for that IPv4 address shortage?
  - if addresses were not scarce, would you give your PC a public address?
  - what will your firewall manager say about this?
- Q2: which broadband application is **impossible** with IPv4?
- Q3: what will be the impact of e.g. large-scale use of IPv6 in Africa, in mobile networks, or for each power plug?
  - if applications assume end-to-end, IPv4 interworking is required
  - which takes the pressure of IPv4-only operators
  - which means IPv6 will remain VPN's for a long time
- the **cost** is in **running** dual stack networks
- the **benefit** is mostly with specific applications and equipment manufacturers