13th Global Symposium for Regulators (Warsaw, 2013)

4th-Generation Regulation: driving digital communications ahead

Presentations

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The role of standards in a digital economy

Rudi Bekkers, Eindhoven University of Technology

13th Global Symposium for Regulators
"4th Generation regulation: driving digital communications ahead"
Warsaw, Poland, 3-5 July 2013

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1. Standards and the (digital) economy

- Standards are being recognized as pivotal for economic and social growth in our increasingly 'digital' world.
- But standards have been around for a long, long time. Why this sudden interest?
- Already understood since long that standards have an impact on markets in a variety of ways.

- From the perspective of the user, developer or implementer (micro):
  - Lower prices, more suppliers, less lock-in, more complementary goods
- From the societal / economic perspective (macro):
  - (+) Standards encourage technical change, innovation and competition, facilitate international trade.
  - (-) Standards can convey special power to owner, may obstruct market access, and can hamper competition and innovation

- Regulators adopted positive attitude, but do employ safeguards

1. Standards and the (digital) economy

- Markets and the economy as a whole are becoming more and more dependent on compatibility standards.
- … traditionally found in Telecommunications, IT and CE domains
- … but now more and more in other important societal sectors
  - E.g. smart grids, e-health, public transport, road safety, and intelligent transport systems, internet of things, M2M

- Standards developed in variety of ways:
  - Proprietary
  - Fora and consortia
  - Open standard setting organizations (ITU, IEC, IEEE, ETSI)

2. Challenging relationship patents and standards

- Standards and patents both aim to promote innovation and boost the economy.
- But do so in different, sometimes conflicting ways
  - open access vs. monopoly rights
  - -> leads to tension

- Special category: Standard Essential Patents (SEPs)
- Including SEPs in standards can be a good thing… But also a quite bad thing….

- SEPs are not an incidental phenomenon anymore
  - Recent open database OEIDD records over 17,000 USPTO or EPO patents among 13 major standard setting bodies
  - Standards with > 500 SEPs (families): 2G, 3G, 4G, WiFi, MPEG-2 and AVC
  - Smartphone estimate > 6,000 SEP (families)

➢ Companies pay billions to acquire SEP patent portfolio's

3. Concerns about patents in standards

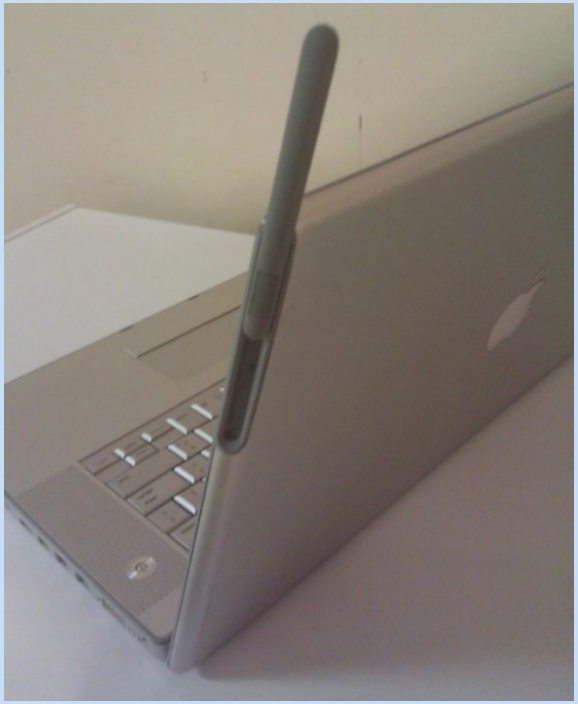
- The actual or prospective implementer of the standard simply has no choice but to use the technology covered by essential patents, and seek a license.
- This gives the patent owner extraordinary power, leading to concerns:
  1. Non-availability of licenses
  2. Ex post patent holdup
  3. Royalty stacking
  4. Undue discrimination
  5. Over-inclusion
- Of course, one needs to balance these concerns against the benefits of patents in standards, including long-term incentives for parties to invest in R&D.

3. Concerns about patents in standards

3. C

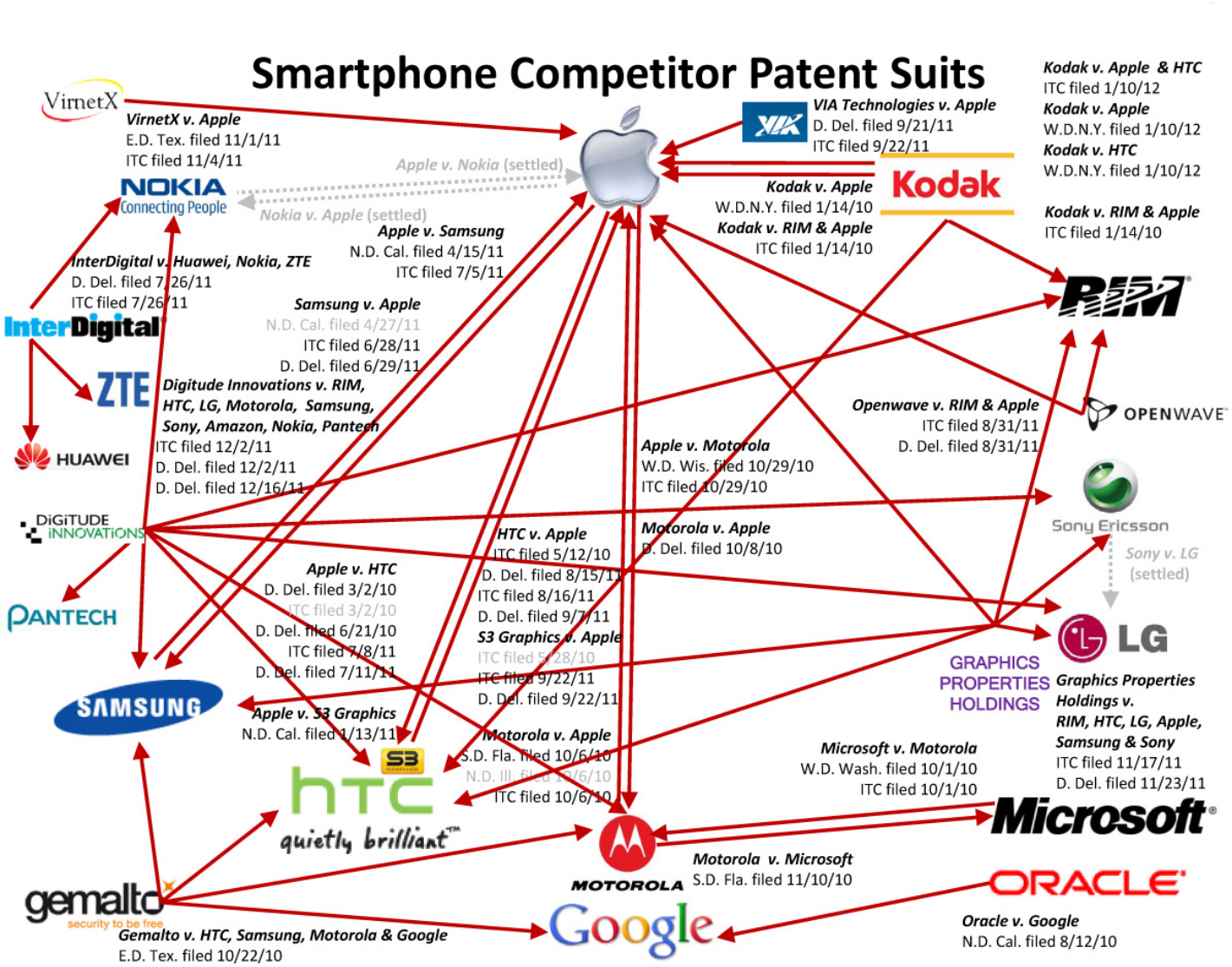
How

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Prototype of Apple Macbook Pro with a 3G antenna, 3G hardware and SIM card slot built in, offered for sale on eBay, origin ~2007



Graph source: Smartphone Patent Wars Explained, January 19, 2012

3. Concerns about patents in standards

Why is tension increasing?

1. Standards are becoming more relevant and successful
   - Key to business models, convergence, smart everything
2. Essential patents are extremely valuable business assets
   - Worth 2G/3G technology licensing market estimated US$ 10-23 billion annually
   - Revenues, bargaining chips, defensive use, ….
3. Increasing number of SEPs
   - Rising continuously, opportunistic behavior in standard setting bodies
4. SEPs are more often litigated than other patents
   - In fact, 5.5 times more often. More aggressive IP strategies everywhere (trolls, privateering)
5. Standards-based markets have been subject to considerable dynamics
   - Entry, exit, rise and falls, bankruptcy, …
6. Increasing ownership transfer of SEPs
   - Both sellers and buyers keen to transfer. Concern: splitting portfolios to NPE's/trolls

4. The way forward – proposals for change

Current views diverge significantly

- Some argue that incidental conflicts are business as usual and demonstrate the system is working.
- Others consider current conflicts as evidence that the F/RAND system is broken

▪Variety of perceived problems and suggested solutions, summarized in background document

▪Priorities:

•Critical review of inclusion processes

•Re-consider blanket disclosures

•Completeness and accuracy of IPR databases

•Better rules on patent transfer

•Clarification of principles of FRAND

Concerns or potential problems	*Suggested solutions*
P1. Implementers have insufficient protection against hold-up and ambush.	S1. Rules stating under which circumstances patent owners are allowed to seek (preliminary) injunctive relief (or exclusion orders) for SEPs, or principles for when these are appropriate remedies. S2. Develop principles on royalty rate and royalty base, among other things, that help parties (including third parties like judges and arbitrators) to assess whether offers are F/RAND. S3. Mandatory dispute resolution mechanisms or arbitration (e.g. in SSOs) before parties can turn to courts. Should or could address F/RAND rate, validity, essentiality, and infringement. S4. More transparency on actual SEP ownership (update requirements for SEP disclosures, limiting use of blanket disclosures, stricter disclosure regime, notification of transfer, collaboration between SSOs and patent offices), allowing the construction of benchmarks. S5. Patent landscaping. S6. Rules that licensors are required to provide a cash-only option in certain circumstances (e.g. an actual dispute). S7. Anonymous database of royalty rates for benchmarking purposes.
P2. Implementer being disadvantaged in licensing negotiations due to information asymmetry on the extent and value of licensors' SEP portfolio.	As S4.
P3. Forum shopping, where IPR owners select specific litigation/legal venues that are favorable from their own perspective (including the bifurcated German court system and the U.S. International Trade Commission ITC).	S8. Introduction and use of European Community Patent.
P4. Risk of incidental or categorical discrimination, e.g. against parties that own no SEPs.	As S6.
P5. Risk that access to SEP is made conditional for licensing out non-SEPs.	As S6. S9. Clarify reciprocity element of F/RAND.
P6. Transaction costs when dealing with numerous SEP owners.	S10. Promote patent pools.
P7. Risk that after SEP transfer, the new owner does not consider itself bound to earlier licensing commitments (including situations with cascading transfers and blanket disclosures).	S11. Stronger SSO rules that bind future owners of SEPs to existing commitments. S12. Use of License-of-Rights (e.g. in new Community patent). S13. Promote use and harmonization of other law theories. S14. Rules on notification of transfer of encumbered patents.
P8. Risk that SEP commitments fall apart after owner becomes bankrupt.	(S15.) Strongly dependent on national law; few solutions accept attempts to harmonize national laws.
P9. Over-inclusion of patented technologies in standards because participants have incentives to include them (and allow others to include them).	S16. Review standardization procedure & practices; more guidance and/or rules on whether or not including a patent technology is appropriate. As S5.
P10. Problems with access to licenses for patents deemed necessary in the marketplace but are technically speaking not SEPs.	S17. Widening scope of F/RAND commitment/rules on reciprocity.

4. The way forward – proposals for change

Several actors are moving:

- **Policy makers** are increasingly asking themselves whether the current FRAND system of self-governance is sufficient to protect the interests of society
- **Competition authorities** have become increasingly vocal
- **Courts** have been handling quite a few cases
- **Standard setting bodies** expressed concerns (et least, some…)
- **Patent offices** have started to collaborate with SSOs

- So, are we there? Are we sufficiently addressing the (potential) issues?
  - … Probably not. Each of these actors can only offer partial solutions
    - 'Tip of the iceberg'? Or 'rotten apples'?

- Need for multiple actors to act. Particularly SSOs, and their members, which need to overcome short term vs. long term interest dilemma. This way they can prevent self-governance is take over by interventions.
- Make standardization a successful and vibrant mechanism for generations to come. For all legitimate stakeholders, not least the end-user.

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Discussion paper: TV White Spaces – Managing the spaces or better managing inefficiencies?

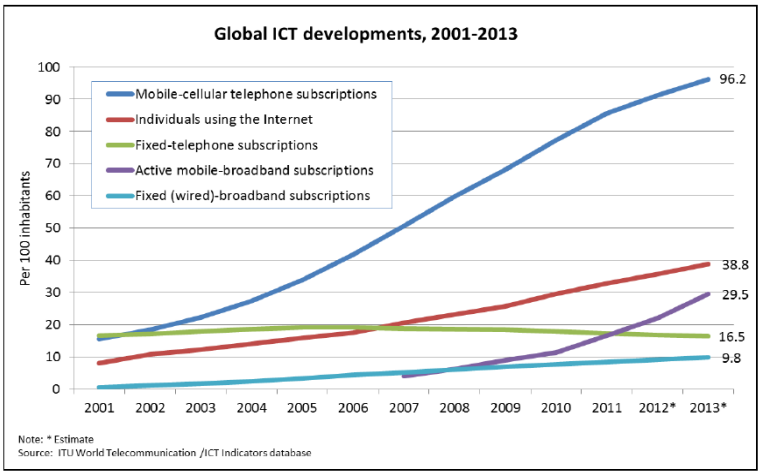
Cristian Gomez
Radiocommunication Bureau, ITU

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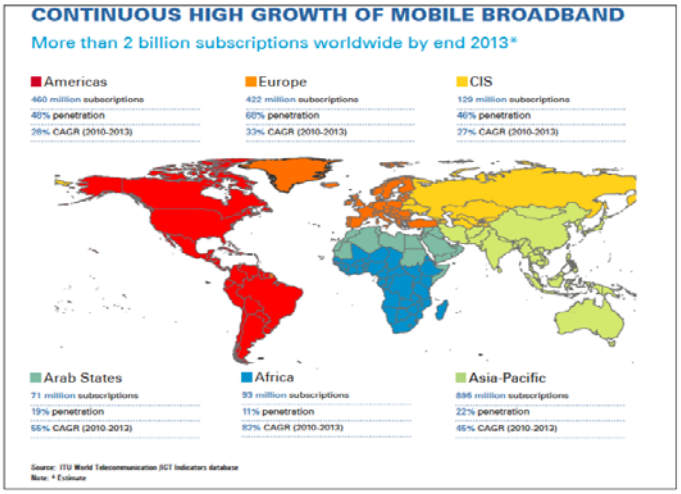
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Why looking for more efficient spectrum use?



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Why looking for more efficient spectrum use?



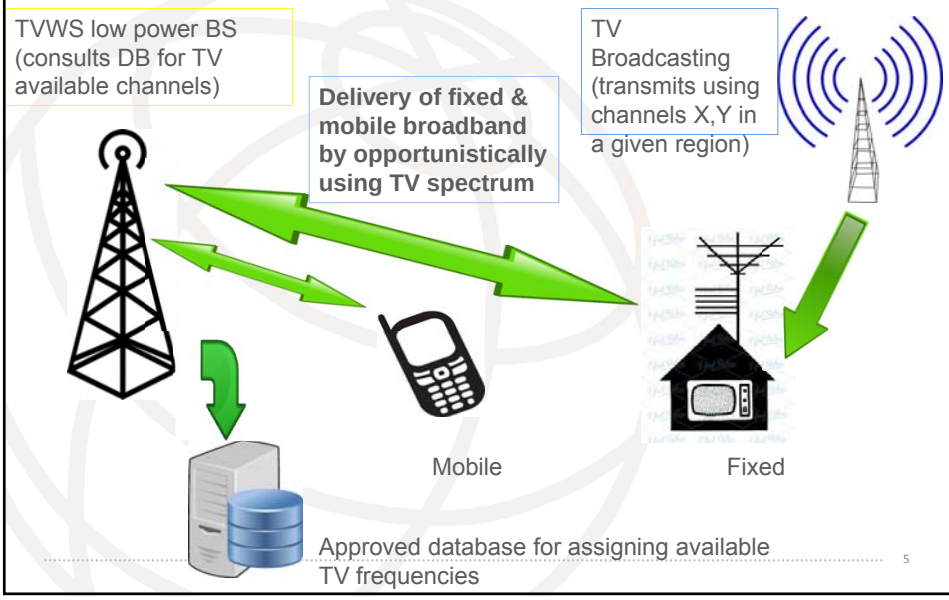
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TV White Spaces: what are they and how they are being used?

- In TV frequency bands, currently idle frequency channels: “white spaces” used in an opportunistic manner & low power
- UHF spectrum is highly valued limited resource: more coverage, cost effective (the “sweet spot of spectrum”)
- Useful for wireless technologies other than broadcasting: opportunity for wireless broadband
- Currently, there are on-going trials and some commercial deployments are emerging.
- Proposed as a *license-exempt* application: low power non-interference/non protected basis (like Wi-Fi). Must not interfere with the primary service (broadcasting)

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TV White Spaces: what are they and how they are being used?



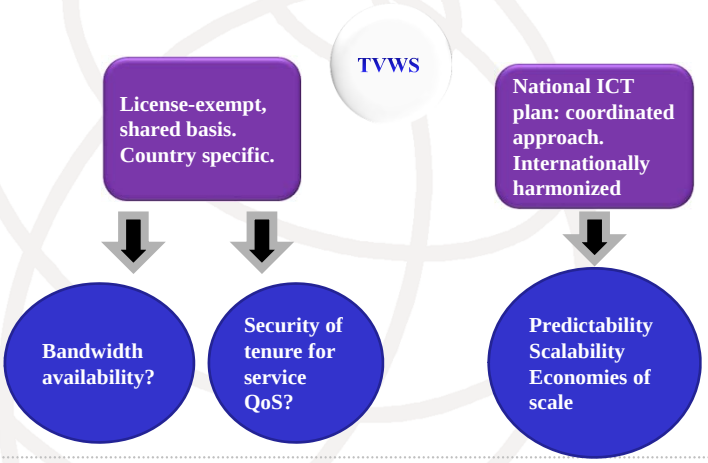
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TVWS: Managing the spaces or better managing inefficiencies?

Discussion paper highlights

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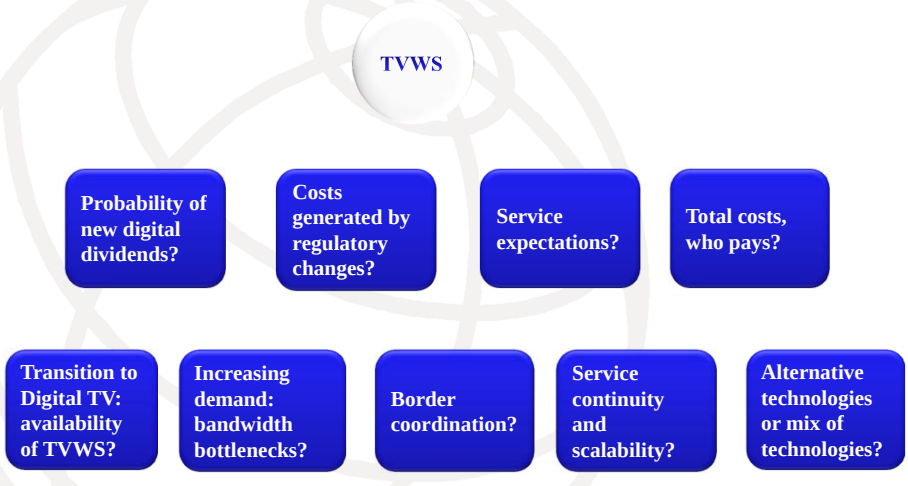
TVWS: Managing the spaces or better managing inefficiencies: short-term? long-term?



7

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Considerations for implementing TVWS



8

Conclusions from the paper

- Spectrum sharing as an alternative to address efficiency.
- Long-term strategy is needed to benefit from spectrum sharing without incurring in future increased costs.
- Potential for expansion of Digital TV and future changes in the nature of the current primary service can limit and/or exclude opportunistic TVWS services in UHF TV spectrum bands.
- There is a need to consider aspects of security of tenure and market harmonization in order to achieve long-term benefits from TVWS in the UHF TV spectrum bands.
- The paper provides a regulatory checklist as a set of questions for regulators to consider when assessing TVWS.

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4th Generation Regulation

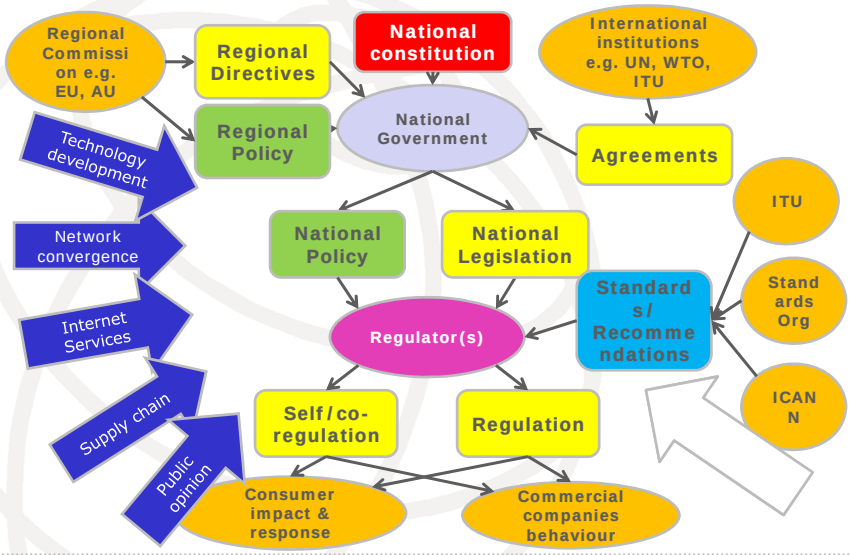
Alan Horne
ICT Senior Telecom Expert

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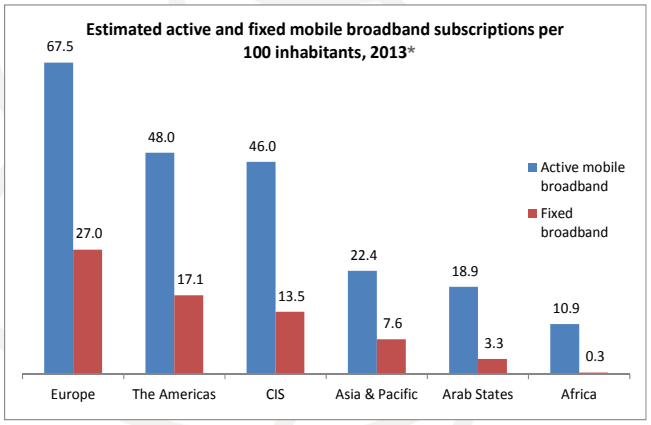
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Changing Environment

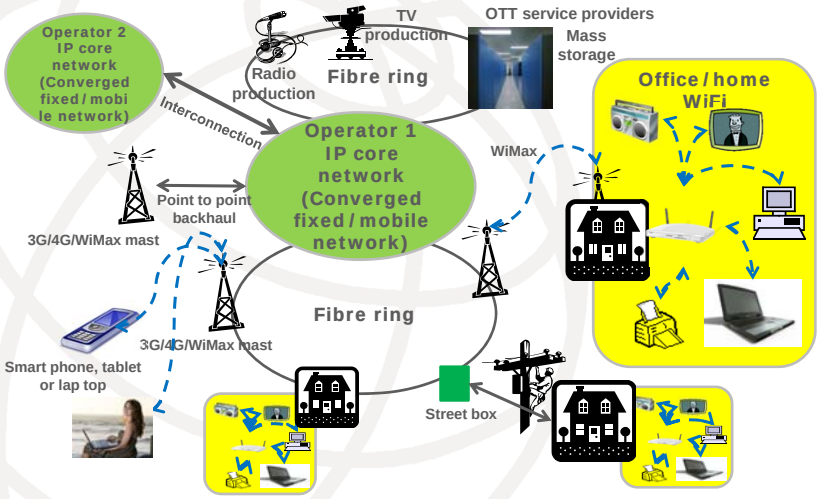


Broadband delivered over mobile devices



Note:* Estimate
Source: ITU World Telecommunication/ICT Indicators database.

Digital converged IP World



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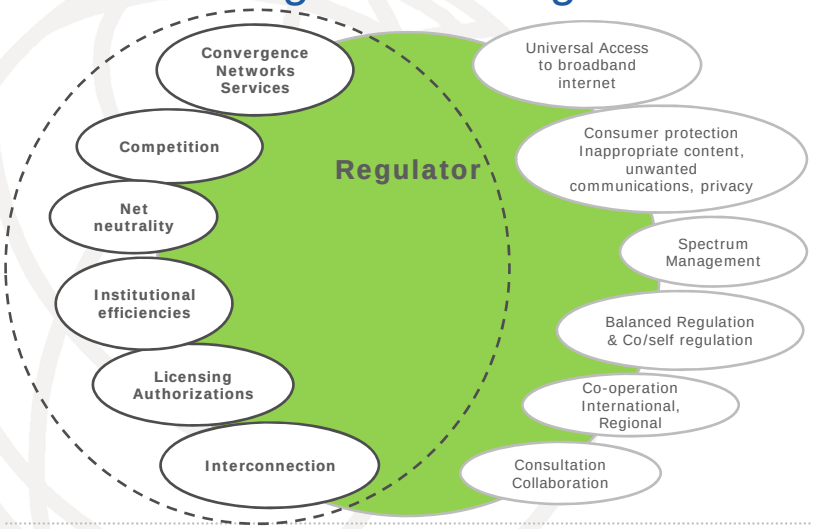
Top 15 Social networking sites

facebook 1st 750,000,000	my 5th 70,500,000	TAGGED 9th 19,500,000	meetup 13th 7,500,000
2nd 250,000,000	the Google+ 6th 65,000,000	orkut 10th 17,500,000	my life 14th 5,400,000
LinkedIn 3rd 110,000,000	deviantART 7th 25,500,000	cafemom 11th 12,500,000	MULTIPLY 15th 4,000,000
Pinterest 4th 85,500,000	LIVEJOURNAL 8th 20,500,000	Ning 12th 12,000,000	

Source eBizMBA May 2013

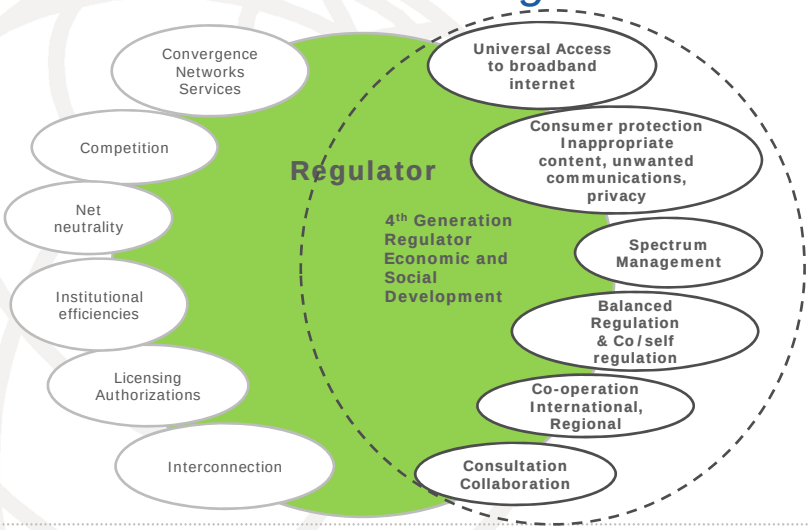
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Evolving role of regulators



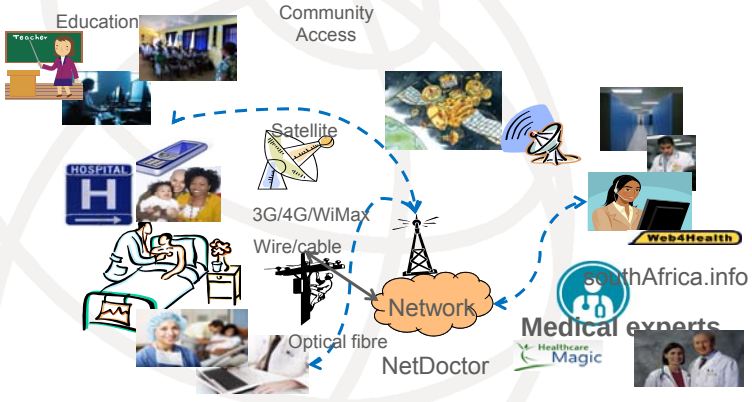
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4th Generation Regulator



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Sustainable broadband needs community wide involvement



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Conclusion

- Competition & Technology development
- Convergence of services
- Realisation of benefits to economic & social development
- 4th Generation Regulator implementing Government Policy
- Balancing regulatory measures to achieve objectives

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With effective cooperation of all stakeholders and the right balance of regulation, together we will maximise the immense benefit the digital ecosystem can bring to the people of our world.



Interconnection charging models in a national broadband environment

David Rogerson
ITU Consultant

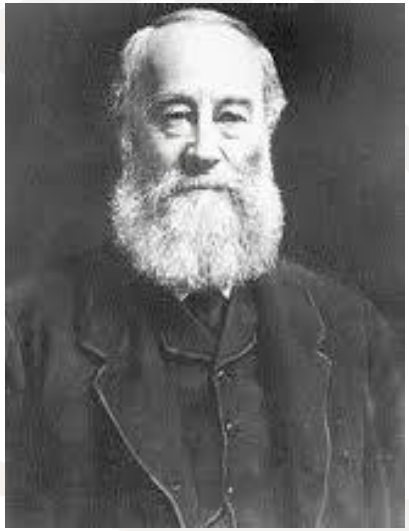
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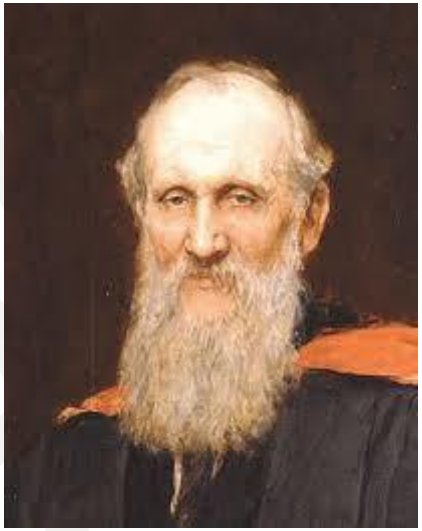
Three influential men you probably don't recognise



Sadi Carnot
(the "father" of thermodaymics)



James Joule
(proved the theory of conservation of energy)



William Thomson
(**Lord Kelvin**)
(coined the term "thermodynamics")

What have these men to do with broadband interconnection?

- Their work lay behind the fundamental truths that describe physical systems in terms of base elements such as heat, energy and matter.
- Their work revolutionised 19th century physics and became known as The Laws of Thermodynamics.
- An equivalent set of "Laws of IP Interconnection may be postulated to describe fundamental truths about broadband telecommunications systems.
- These "Laws" challenge received wisdom and may revolutionise 21st century interconnection charging models for the national broadband environment.

*The proposed Laws of IP Interconnection**

0. If network A is interconnected with B, and B is interconnected with C, then network A is in effect interconnected with C

1. Within any interconnected system, profitability cannot be increased without an increase in price or usage, no matter how fast IP is installed.

2. Within any IP system, the complexity always increases with time.

3. The IP world will gradually move towards a state in which market power is removed.

* Source: Rogerson D, Horrocks J, Hin J, Lavender T: "IP Interconnect: Commercial, Technical and Regulatory Dynamics"; Ovum (2002)

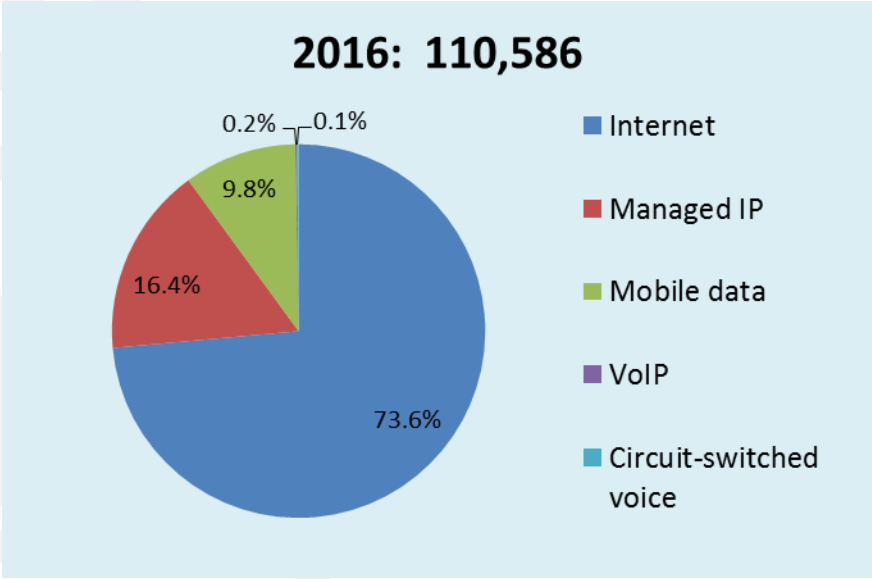
Is any-to-any connectivity necessary?

- Regulators set a requirement for any-to-any connectivity (A2A) to protect voice telephony users in a network system.
- But the Internet has shown us that:
  - A voluntary system of peering and transit can work equally well
  - Over time the model can mutate to the benefit of all – e.g. regional peering and IXPs
- Regulators should extend A2A beyond voice services if and only if three tests are met:
  - There is supply-side dominance
  - There are substantial network externalities
  - The benefits of any-to-any outweigh the costs.

The Zeroth Law suggests that the market will find alternative arrangements that are just as effective as the regulatory imposition of A2A.

Should NGN interconnection be regulated?

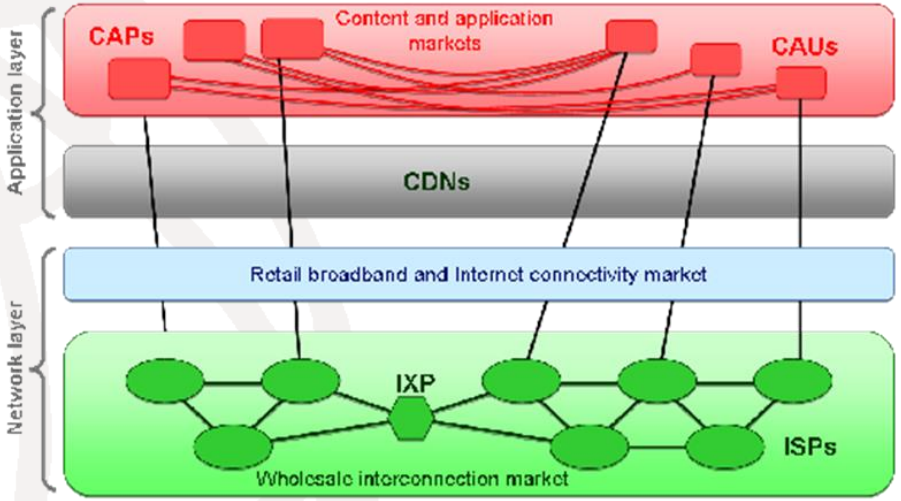
- NGNs have not replaced circuit-switched networks as the principle 21st century service-delivery mechanism.
- They may still need some form of regulation:
  - Prevent monopoly rents from broadband infrastructure
  - Allow service development in competition with the Internet
  - Remain neutral as to technology (TDM or IP) for interconnection.



NGNs fell foul of the First Law in that they, unlike the Internet, have failed to deliver the service growth necessary for sustained profitability.

Are minimum QoS standards needed?

- There is a rapid increase in number and variety of market players, applications, traffic levels and interconnection relationships.
- Regulation needs to keep things simple as "what can go wrong will go wrong".



- On QoS regulatory forbearance is required:
  - It is difficult to set economically optimum QoS standards via regulation
  - Retain minimum (benchmark) standards for circuit-switched voice
  - Encourage industry to define and apply suitable standards for IP networks

The Second Law argues that complexity will always increase over time; regulation must not add unnecessarily to that burden.

Can dominance be fully overcome?

- Traditional regulation has focused on curbing market dominance … but experience (and the 2nd law) tell us this is an almost impossible task
  - Inexorable falls in termination rates have not curbed dominance
- The Internet has shown us another model – dynamic markets find their own equilibrium over time, without regulatory intervention.
- There is increasing evidence that interconnection of broadband networks can do the same
  - (e.g. recent agreement between Google and Orange)
- Regulatory forbearance (and ex-post intervention where necessary) is generally the way forward

The Third Law suggests that, absent regulation, the broadband market will move towards a position of near-perfect competition (with one exception …)

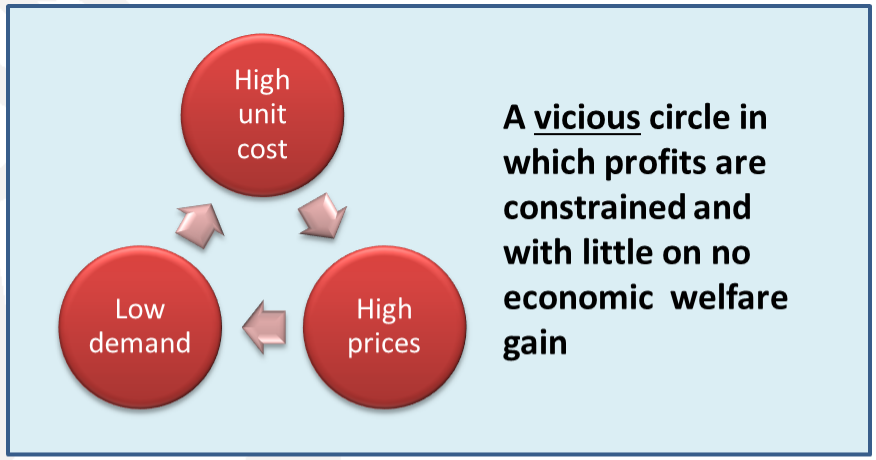
Regulation of infrastructure access

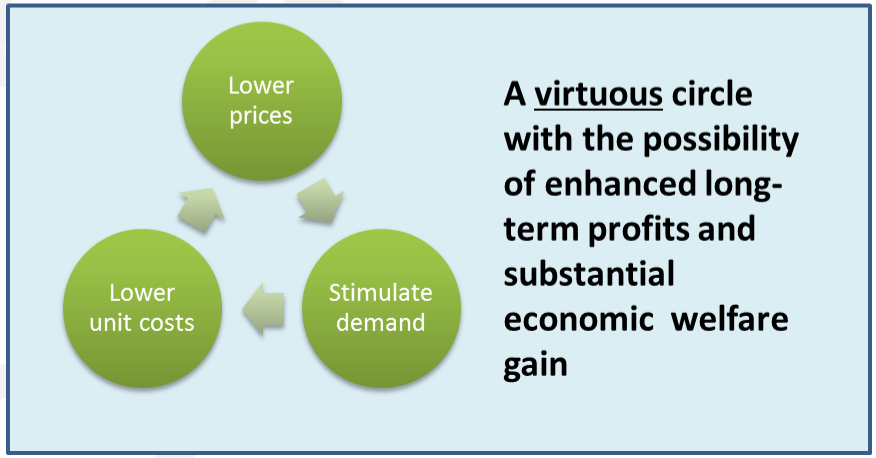
- Example of submarine cable access
- Regulation must strike a careful balance to stimulate demand as well as investment

Option 1: Establish prices based on expected ROCE (typically the regulated WACC)

Submarine cable investment: high fixed cost; high capacity; low utilisation.

Option 2: Accept very low or negative ROCE in early years to stimulate demand





Conclusions

- Allow the market to establish interconnection arrangements within a principle of any-to-any connectivity.
- Do not extend circuit-switched regulation to IP networks unless justified and proportionate.
- Keep interconnection regulation as simple as possible to avoid unintended consequences.
  - Establish "bill and keep" or "free peering" wherever possible
  - Do not mandate minimum quality of service standards, other than those which apply to circuit-switched voice telephony
  - Increasingly focus on principles of transparency and non-discrimination.
- Regulate primarily on an ex-post basis.
- Retain ex-ante cost-based regulation for broadband infrastructure access (and backhaul in remote areas).

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Digital broadcasting and online content delivery

John McInnes
Webb Henderson LLP

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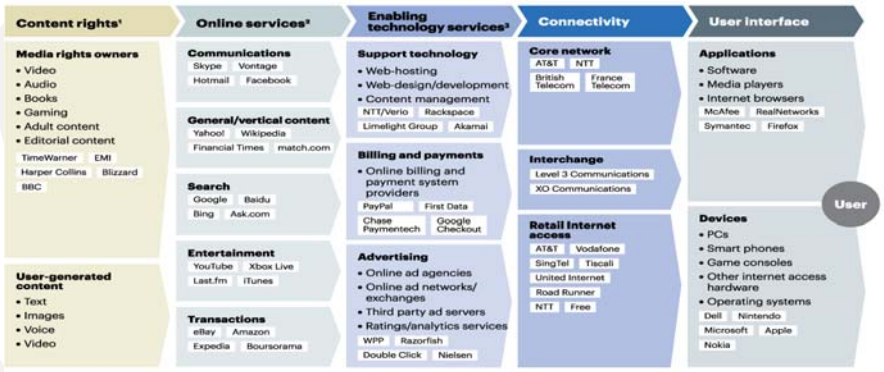
Overview

- What impact has convergence had on content delivery?
- What new business models are emerging?
- What are the key trends in terms of regulation and what are the main issues that regulators face in the converged environment?

The impact of convergence (1)

- Increased range of players and blurring of traditional supply chains
  - various players moving into multiple parts of the value chain (e.g. Google) - all want direct channel to customer rather than being "disaggregated"
- Evolution in the way that content is delivered to end users
  - huge growth in delivery of content online - increased demand for bandwidth and discussions over payment for same
  - multiple platforms and devices (e.g. smart TVs, smartphones, tablets)
  - content distribution networks
- New types of content offering
  - move from "linear" services (traditional TV) to "non-linear" services (video on demand)
  - growth in user-generated content (e.g. YouTube)
  - bundled packages (e.g. triple- and quadruple play deals)

The impact of convergence (2)



¹Content rights abbreviated to CR in subsequent value chains
²See online services categories list in methodology for details
³Enabling technology/services abbreviated to ETS in subsequent value chains
Source: A.T. Kearney analysis

New business models

- Subscription-based models
  - monthly subscription fee or "pay as you go"
  - free v. paid content
- Online advertising
  - cost per click/pay per view
  - cost per action
- Hybrid models including telecoms operators attempting to branch out from pure pipe and capacity charges
- Other revenue sources
  - e.g. product placement

Key issues facing regulators (1)

- Do traditional regulatory models still work in a converged environment?
  - Is there a need for a converged regulator covering both telecoms and content regulation? - still relatively rare (e.g. Malaysia, UK)
  - What should the thresholds for intervention be and should these be the same for both telecoms and content?
    - e.g. EU telecoms regulatory framework largely based on competition law principles, but content is excluded
  - How to keep pace with technological change?
    - licences based on particular technology/service can act as a barrier to change
    - move towards technologically neutral regulation (e.g. Malaysia, EU) and/or principles-based regulation (e.g. as proposed in Convergence Review in Australia)
  - Whether/how should OTT services and online advertising be regulated?
    - ensuring level playing field with telecoms network operators
    - difficulty in enforcing compliance – global jurisdictional issues

Key issues facing regulators (2)

- Access bottlenecks
  - Well-developed rules on access to telecoms networks, but only limited understanding of how to deal with other access bottleneck issues
  - Issues in relation to premium content:
    - e.g. exclusive content deals, tying of content to a particular platform or device, bundling of services
    - some attempts at regulation (e.g. in the UK) but often intervention left to antitrust/merger control authorities
  - Is competition law sufficient to deal with these issues or is a more interventionist regulatory approach required?
    - difficulty in using competition law to achieve industrial policy objectives
    - need for certainty
  - New issues raised by next generation networks
    - balancing appropriate incentives for investment v. promoting competition
    - regulatory forbearance (e.g. draft EU Recommendation)

Key issues facing regulators (3)

- Consumer protection
  - Divergent approaches in different countries:
    - little scope for standardisation on substantive rules, which reflect particular national sensibilities
    - but elements of good practice in terms of procedure, e.g. transparency of rules, due process and independent appeals framework
  - Should all types of content (offline and online) be regulated in the same way? What about user-generated content?
  - What role for self-regulation/co-regulation?
    - e.g. ATVOD (co-regulatory model for video on demand in the UK)

Key issues facing regulators (4)

- Data protection and privacy
  - Personal data as a source of revenue, e.g. behavioural advertising
  - Investigations into Google and Facebook – the tip of the iceberg?
  - What is a legitimate use of personal data? Is it just a question of transparency and consent?
- Net neutrality
  - Whether/how to regulate the use of traffic management measures?
  - Range of approaches taken by regulators
  - Move towards a more interventionist approach? (e.g. European Commission's recent proposals on net neutrality)

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Digital Transactions in Today's Smart Society

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13th Global Symposium for Regulators
"4th Generation regulation: driving digital communications ahead"
Warsaw, Poland, 3-5 July 2013

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Context for digital transactions discussion

- **Acceleration in Launches (but Market Still at Early Stage)**
- **Breadth of Services Will Increase**
- **Wide Variety of Models Adopted**

Acceleration of launches, but market still at an early stage of development

Mobile Money (for the Unbanked)[1] Deployments



Number of Deployments

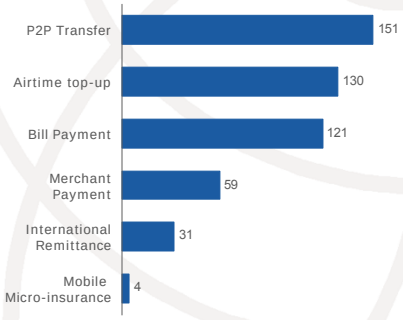
2006: 10 | 2010: 38 | 2013: 183

1. GSMA MMU Deployment Tracker monitors the number of live and planned mobile money services for the unbanked

Source: GSMA

Initial deployments focus on a handful of offers, but providers will broaden

Mobile Money (for the Unbanked)[1] Deployments



Service Offers from Selected Providers

Service	WIZZIT (SA)	SMART (PH)	MTN (UG)	Easypai-sa(PK)
Transfers (dom)	Yes	Yes	Yes	Yes
Transfers (int.)	Yes	Yes	Yes	Yes
Pay in shops	Yes	Yes	-	-
Pay bills/salary	Yes	Yes	Yes	Yes
Cash in	Yes	Yes	Yes	Yes
Cash out (Agent)	Yes	Yes	Yes	Yes
Cash out (ATM)	Yes	Yes	-	-
Buy top-up/ send airtime	Yes	Yes	Yes	Yes
Airtime loyalty	-	Yes	Yes	Yes
Mobile wallet	Yes	Yes	-	-
Internet banking	Yes	-	-	-

1. GSMA MMU Deployment Tracker monitors the number of live and planned mobile money services for the unbanked

Source: GSMA

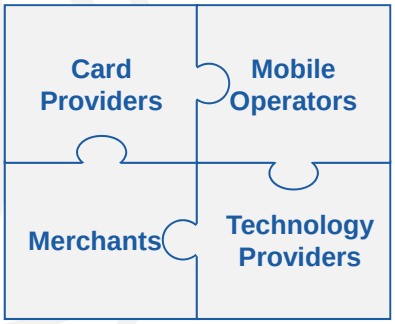
Mobile Point of Sale – emerging service with multiple parties involved

Mobile Point of Sale Solutions



- Acceptance via mobile
  - Mobile phone loaded with payment app
  - Card reader connected

Parties Involved



Wide variety of models adopted

Bank-Led

FNB
Deutsche Bank
Bank Polski

MNO-Led

M-PESA
Globe GCASH

MNO-Bank Collaboration

docomo
SMBC
Santander
Zap
Telefónica
CaixaBank

Tech-Led

Google wallet

Merchant Closed Loop

STARBUCKS COFFEE
MCX MERCHANT CUSTOMER EXCHANGE

De-centralised

bitcoin

Amidst activity, not all launches successful

Some services and countries have seen incredibly rapid adoption…

SMART MTN ECOCASH M-PESA

…but a large number have struggled in spite of clear benefits to users

What is slowing mass adoption?

- **Consumer Barriers**
- **Merchant Barriers**
- **Supply-side Challenges**
  - **Market**
  - **Regulatory**

End user barriers to adoption

Consumer

- Lack of awareness
- Lack of willingness
  - Security concerns
  - Limited places to use service
- Willing but unable
  - Lack of ID
  - Lack of mobile internet (coverage or cost)
  - Device requirements

Merchant

- Lack of awareness of services and of consumer usage
- Uncertainty over which service to adopt
- Low volume of sales due to lack of consumer adoption

Supply side challenges

'Market' issues

- Fragmented market where scale required
- Lack of dominant technology increases risk of investment
- Lack of clarity on best commercial model

'Regulatory' issues

- Lack of clarity on regulation
- High cost of compliance
- Innovation blocked by regulation

Role of regulators in supporting industry development

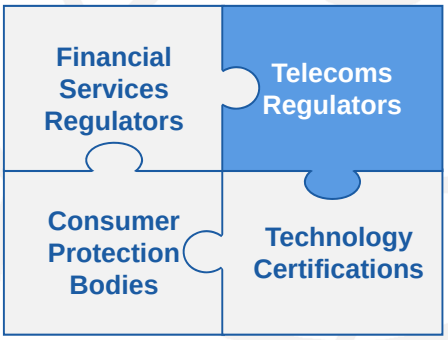
1. Providing Clarity on Digital Payments Regulation

2. Addressing Security Concerns whilst Encouraging Adoption

3. Non-Regulatory Measures to Address Barriers and Increase Adoption

Providing clarity on digital payments regulation

Intersection of Regulatory Bodies



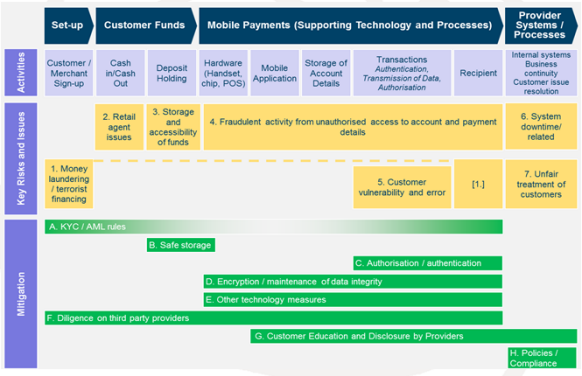
- Risks of gaps and confusion for providers, so:
- Clarify roles of regulatory bodies where unclear
- Support providers in understanding all regulatory requirements[1]

1. I.e. Telecoms regulators helping operators to understand financial services, consumer, and tech related regulations

Source: GSMA

Addressing security concerns…

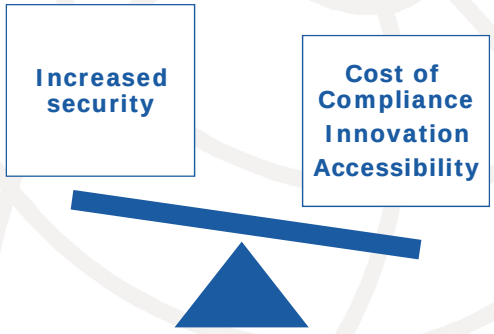
Risks and Mitigation



- Security a concern for customers and authorities
- Wide range of risks to address

(Paper provides detailed discussion)

…whilst encouraging innovation and user adoption

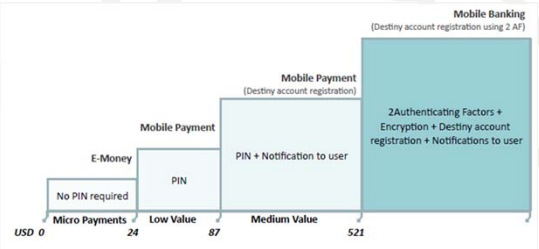


- Recognise there may be a trade-off between security measures and adoption
- Set regulation in proportion to risks…
- …and consider alternative:

Are lightly regulated digital transactions preferable to cash?

Example: Increasing accessibility by lowering authentication requirements

Authentication



Mexico:

- Authentication requirements for low value payments minimal
- Removes 'lack of ID' as barrier to adoption

Non-regulatory measures to address barriers and increase adoption

- Raising end user awareness of services and benefits
- End user research to support understanding of needs and barriers
- Engaging industry to move to interoperability of services
- Boosting demand by working with government departments to adopt services e.g. for welfare payments

Thank you and Q&A

Universal Service Fund Study

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13th Global Symposium for Regulators
"4th Generation regulation: driving digital communications ahead"
Warsaw, Poland, 3-5 July 2013

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How Do USFs Operate?

- Designed to support/assist in the achievement of the universal service objectives of:
  - availability
  - accessibility
  - affordability
- Used as an incentive to encourage operators to assist administrations in achieving their universal service goals
- Typically funded via some form of contribution mechanism from telecommunications service providers/operators e.g.,
  - separate levy on operator annual revenues
  - portion of international call revenues
  - apportionment/allocation of regulatory fees
- Other funding sources include:
  - contributions from international agencies (e.g., World Bank, regional development banks, etc.)
  - proceeds from spectrum auctions
  - directly financed through government budget allocations

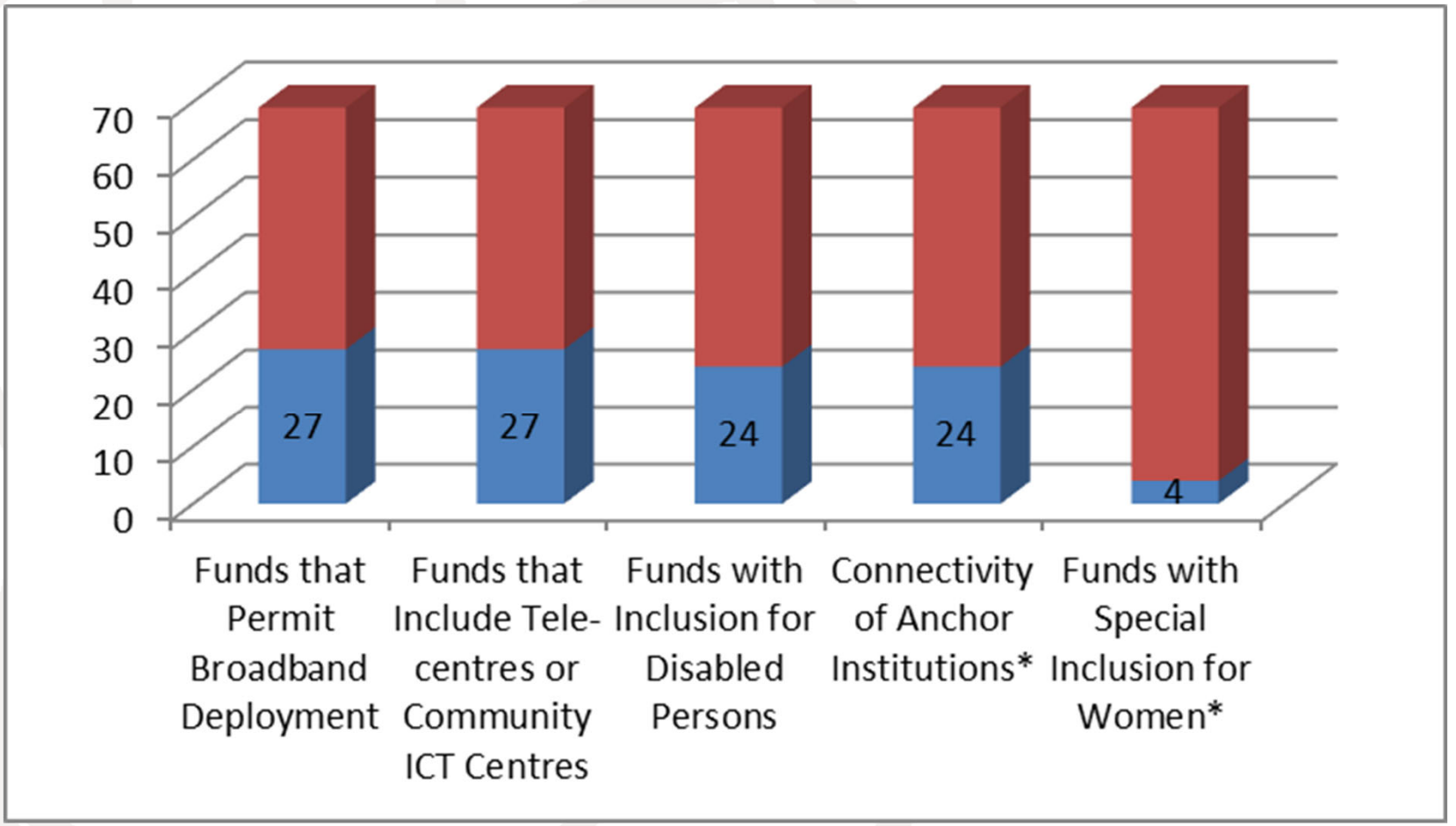
Areas Addressed by the USF Study

- Global study of 69 countries in which USFs are currently in existence or are in the final planning stages
  - existing regulatory frameworks that govern or will govern these USFs
  - general success factors as they relate to successful USF management
  - overview of challenges and restrictions of some existing USFs
  - examination and review of best practices of the existing USFs
- Examination of the extent to which digital inclusion is or is not addressed under current USF schemes
  - funding the connectivity and equipment of anchor government institutions used as public Internet centres
  - telecommunications for persons with disabilities
  - subsidizing the cost of ICT access for girls, women and persons with disabilities
  - digital literacy training
- A high level overview of some alternative methods being utilized to achieve universal Broadband service
- Development of a blueprint/proposed plan for the improved/enhanced management and administration of existing funds plus development of new funds

Overview of Funds Studied

Region	Africa	Arab States	Asia Pacific	Europe and CIS	The Americas	TOTAL
Total Number of Funds Studied	22	7	16	8	16	**69**
Funds that Permit Broadband	4	4	9	2	8	**27**
Number of Funds with High Activity	4	2	8	3	9	**26**
Number of Funds with Moderate Activity	6	2	2	1	1	**12**
Number of Funds with Low Activity	5	0	1	4	3	**13**
Number of Inactive Funds	7	3	5	0	3	**18**

How Well Do Funds Currently Address Enhanced USF Requirements?



Main Challenges Faced by USFs Today

Many of the challenges are due to rapid change and technology evolution.

- Weak and/or inflexible underlying legal and regulatory framework
- Inability to adapt to changing requirements and focus
- Lack of correlation between the USF levies collected and actual universal service demand
- Structural deficiencies
- Poor or non–existent definition of USF strategy and objectives
- Managerial, operational and capacity issues (poor or ineffective management)
- Lack of transparency, visibility and accountability in USF reporting
- Weak or minimal oversight and governance
- Inefficient, inequitable or non-transparent project allocation process
- Failure to consider/incorporate digital inclusion
- Inability to deploy broadband
- Deficiencies in or lack of underlying infrastructure and facilities
- Lack of availability of resources (or of appropriate resources) and knowledge
- Challenging local conditions and related security issues

Digital Inclusion

There is a growing awareness and need for digital inclusion (not only in USFs), meaning that all communities and targeted population groups must be included.

- Need for persons with disabilities, women and girls, youth or children and indigenous peoples to have affordable access to ICT for their social and economic development
- Connectivity of anchor institutions (e.g., schools, hospitals, post offices, libraries, etc.) is also key
- The now widespread existence of tele-centres must be enhanced and equipped so as to:
  - equipped to support persons with disabilities
  - provide a safe and welcoming environment, especially for women and the elderly
  - provide digital literacy training and support
  - respect the cultural heritage of the indigenous population

USF Critical Success Factors

The following are examples of critical success factors in the USFs that are currently functioning well.

- Legal and regulatory framework
- Autonomy and independence
- Policy articulation
- Consultation with stakeholders
- Delineation of responsibilities between USF and other government entities or external agencies
- Defined and measurable objectives
- Flexibility and neutrality in service deployment
- Fair and objective project allocation process
- Capacity building and sustainability; complementary services
- Innovation and incentives
- Visibility, transparency and accountability
- Digital inclusion responsiveness

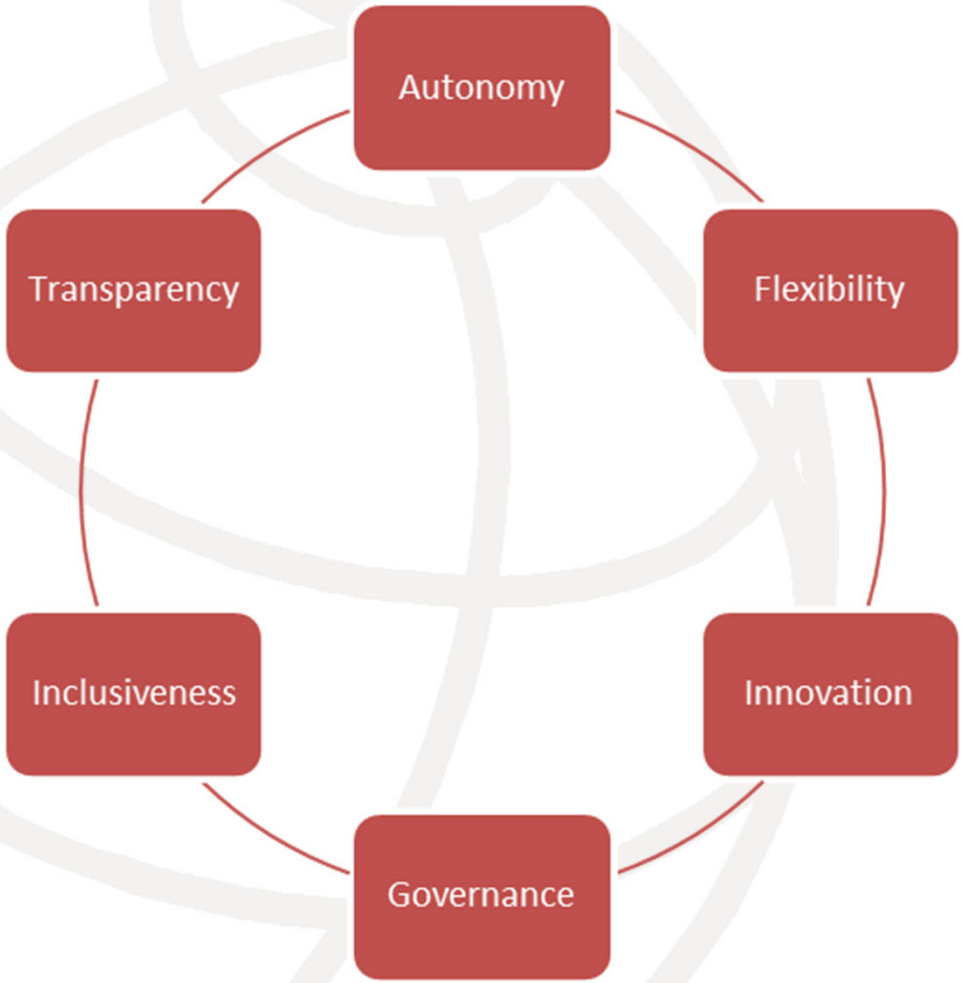
Operational Blueprint for Success

Operational Blueprint for a Successful USF	Best Practice Examples
Well-articulated policy with respect to how Universal Service (US) will be achieved and organized	Malaysia, Uganda
Development of an appropriate and well-defined legal and regulatory framework permitting maximum flexibility	Chile, Colombia, Peru
Establishment of the USF as separate, independent (autonomous) entity	Nigeria, Thailand, Pakistan
Clear definition and delineation of fund responsibilities	Chile, Uganda, Colombia
Development and clear definition of measurable overall Fund objectives which can subsequently be tracked and monitored	Colombia, Malaysia, Pakistan
High level of transparency, visibility and accountability to all stakeholders	India, Peru
Active participation in and input from all concerned stakeholders regarding fund objectives and administration	Canada, Morocco
Guidelines and procedures for working with other funding sources	Afghanistan, Mongolia
Ensure that full range of sustainability elements and ancillary services are taken into consideration in both policy formulation and project definitions	Bolivia, Ghana, Indonesia
Fair and unbiased process to allocate subsidy and /or project	Colombia, Nigeria
Incentives for project participants	Chile, Dominican Republic
The need for digital inclusion as part of the USF	Bulgaria, Jamaica

Strategic Recommendations

- 'Future proof' USFs by structuring underlying legal and regulatory frameworks to ensure that policies and parameters can be modified quickly to accommodate need for new USF vision and respond to rapidly changing and evolving priorities.
- Increase transparency and accountability to improve buy-in and commitment from stakeholders across the board.
- Where funds are struggling or existing framework is in need of modification, initiate a public consultation process and make concrete use of the feedback to effect change.
- Ensure that digital inclusion is globally accepted and implemented.
- Where USF constraints currently exist, seek interim and creative work-around solutions that until changes can be made to the USF.
- Consider additional models to further expand the scope and reach of the USF whether that be PPPs, supplementary direct government funding, contributions in kind.
- Where the collected USF levies have not yet been disbursed, prepare disbursement plans to make use of the funds as fairly and transparently as possible.
- Where the fund is constrained by the existing legal and regulatory framework, initiate the steps to set the necessary changes in motion.

A Takeaway - Guiding Principles for USF



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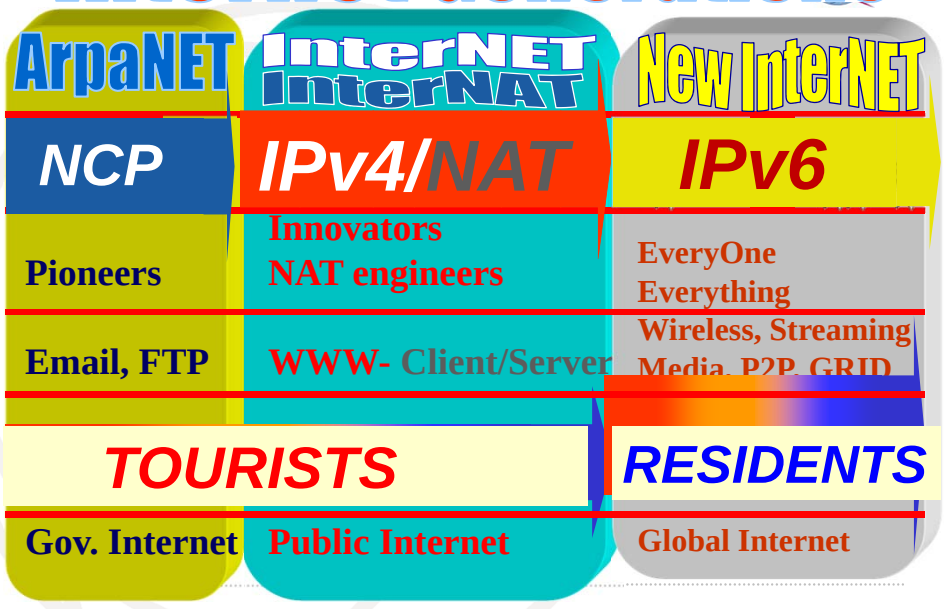
The Need for More IP Addresses

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13th Global Symposium for Regulators
"4th Generation regulation: driving digital communications ahead"
Warsaw, Poland, 3-5 July 2013

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Internet Generations



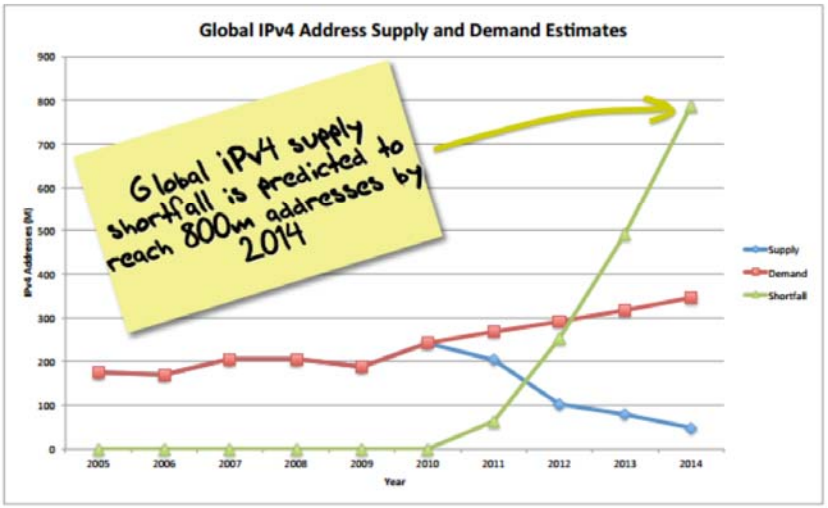
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The IPv4 Address Exhausting Debate

Central IANA Pool Registry Pool



Coping with Demand



Source: Geoff Huston, APNIC

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WORLD INTERNET STATISTICS

	Individuals using the Internet (in millions)				Per 100 inhabitants			
	2010	2011	2012*	2013*	2010	2011	2012*	2013*
Africa		101	120	140	10.1	12.4	14.3	16.3
Arab States	90					29.8	33.7	37.6
Asia & Pacific		99	1,133	1,269	22.5		8.8	31.9
CIS	95					40.9	46.4	51.9
Europe	411	428	443	467			71.2	74.7
The Americas	458	502	542	582	49.3			60.8

First IPv6 Killer App!

Note: *Estimates
Source: ITU World Telecommunication/ICT Indicators database.

5

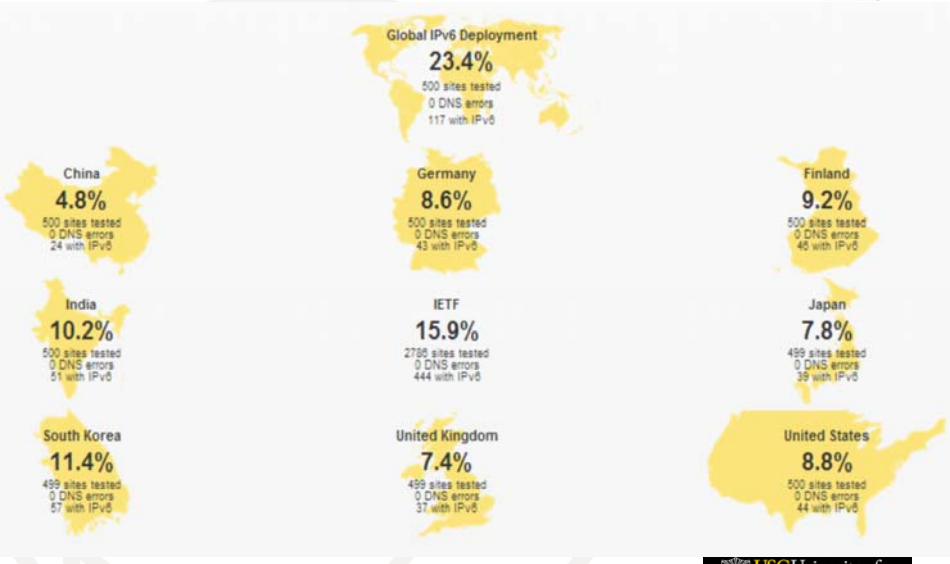
Threshold of 1% Crossed Google Users over IPv6.



Source: Google

Key Performance Indicators: 500 Sites Tested

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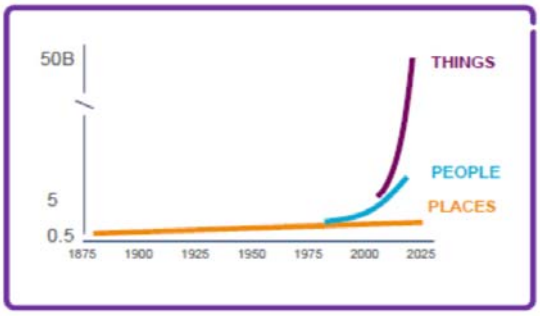


Lars Eggert , IRTF Chair– IPv6 Deployment Trends

USC University of Southern California

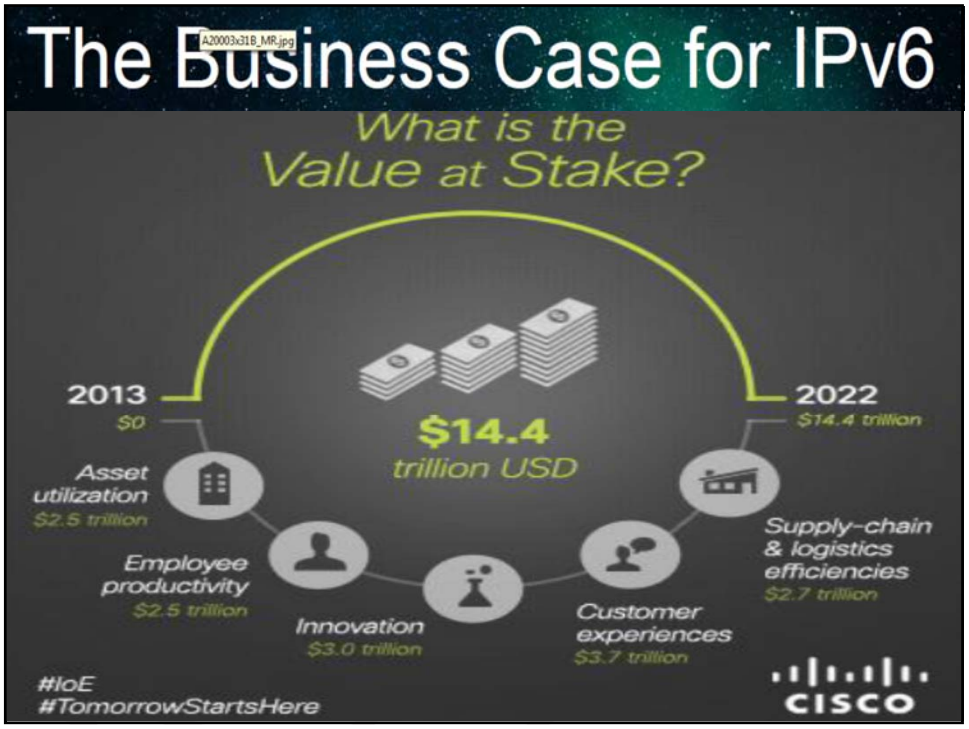
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50 BILLION CONNECTED DEVICES



Everything that benefits from being connected will be connected

Source: Ericsson



Selected Governments IPv6 Deployment Roadmaps

Governments	IT Policy -- IPv6 Roadmap -- Adoption Year	Milestones 1	Milestones 2
United States	• IPv6 Strategy -- Year 2009 • Refreshed -- Year 2012	• Public web sites –2012 • Result: 35% - May 2013	• Complete transition to IPv6 (dual stack) by December 2017
Australia	• AGIMO IPv6 Strategy – Year 2008 • Stage 1: Preparation (2008-2009) • Stage 2: Transition (2010 - 2011) Stage 3: Implementation (2012)	• Tasks: • Review Procurement Policy. • Stocktake of Equipment. • Stocktake of Applications.	Government Transition to IPv6: Stage 2: Transition: Jan 2010 – Dec 2011 Implementation: Jan 2012 – Dec 2012
Canada	• IPv6 adoption strategy – Year 2012	• Enabling Phase – Sep 2013 • Deployment Phase - 2015	• Completion Phase – 201X?
India	• IPv6 Policy -- Year 2010 • Updated -- Year 2013	• Public web sites – 1.1.2015	• Complete transition to IPv6 (dual stack) by December 2017
China	• CNGI -- Year 2006 • NDRC -- Year 2012	• 8M IPv6 users by 2013	• 25M IPv6 users by 2014-5
European Commission	• i2010 • EU IPv6 Task Force Year 2001 • IPv6 Communication 2004 • 2008	• 25% IPv6 users by 2010 • Result: 1%	•
Indonesia	• IPv6 Task Force -- Year 2005 • Phase 1: 2006 Dissemination, Research	• Phase 2: 2007 Development of infrastructure and Content	• Phase 3: 2008 - Development of Applications and Transition Process
Korea (Rep. of)	• IT839 Strategy-- Year 2004	• ISP Readiness	• IPv6 service
Japan	• U-Japan -- Year 2001	• ISP readiness	• IPv6 service

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National Regulators IPv6 Deployment Roadmaps

Regulator	IT Policy -- IPv6 Roadmap -- Adoption Year	Milestones	Results
India TRAI	• IPv6 Recommendation -- Year 2005	• DOT – TEC to take over 1.1.2006	• IPv6 Strategy & Roadmap published in 2010 and 2013
Europe	• Finnish Ficora – Year 2001 • Austrian RIR Year 2006 • French ARCEP Year 2002 • European BEREC	• Recommendations • In the BEREC board of Regulators 2013 Workprogramme dated December 12, 2012, the board in § 6.5 outlines an action item for IPv6 in relation to Machine to machine (M2M)	•
Saudi Arabia CICT	• IPv6 Strategy -- Year 2008 • 3 Studies: • IPv6 Readiness Assessment • IPv6 Countries Benchmark • IPv6 International bodies & Organisations	• Infrastructure Track • Awareness Track	• 14 ASNs support IPv6 • 3 ASNs have IPv6 traffice Transition Process
Oman TRA	• Oman IPv6 Strategy-- Year 2010	• IPv6.om Web Site	• OmanTel Testing IPv6
Morocco ANRT	• IPv6 Study -- Year 2012	• ISP Readiness work	• Strategy published in 2013

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Core IPv6 Policy Recommendations

Recommendations	IT Policy	Objectives	Impact
Top down	• CEO Round Table	• Decision-making on investment	• Priority setting for budget
IPv6 Service	• Broadband (Fixed & Mobile)	• Integrate IPv6 in new broadband infrastructure investment right from the beginning • Future proofing investment	• IPv6 Service readiness for broadband apps for public services • e-Gov; e-Learning; e-Health
Capacity Building	• Launch IPv6 Competence Centres, Educational Programs and Test Labs	• Build Skills & Expertise • IPv6 Skills Contest • (see Singapore iDA Program)	• High level LOCAL Skills is the cheapest transition tool as 80% of the transition cost is labour.
National Research	• Fund IPv6 Research projects	• Gain higher level Skills • Add IPv6 in Higher education Curriculum	• Gain skills parity with international links
National IPv6 Task Force	• Bottom-up stakeholder Forum to define a national IPv6 Roadmap	• Consensus building PPP-based Objectives • See example of Saudi Arabia IPv6 Task Force)	• National IPv6 Strategy with key-players involvement • Promote DNSSEC