

Lessons Learned from Workshop I on Addressing Barriers to IPv6 Deployment

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Lessons Learned from Workshop I on Addressing Barriers to IPv6 Deployment

- Lessons Learned? From Where?
- Public administration IPv6 experience
- EU research
- Characterising the barriers to IPv6 success
- Overview of the lessons learned
- Key lessons learned

Lessons Learned? From Where?

- Previous Public Administration Experience
 - There is quite a bit of this
- Previous ISA2 Project
 - GEN6
- Current IPv6 Implementation Project
 - Research
 - Workshop I
- Experience and Best Practices from Private Sector

Public Administration IPv6 Experience

- There is quite a bit of this
- Largely undocumented and anecdotal in nature
- Key message is: One-size-DOES-NOT-fit-all
- Key variables
 - Government organization
 - Availability of funding
 - Leadership
 - Technology transfer and training

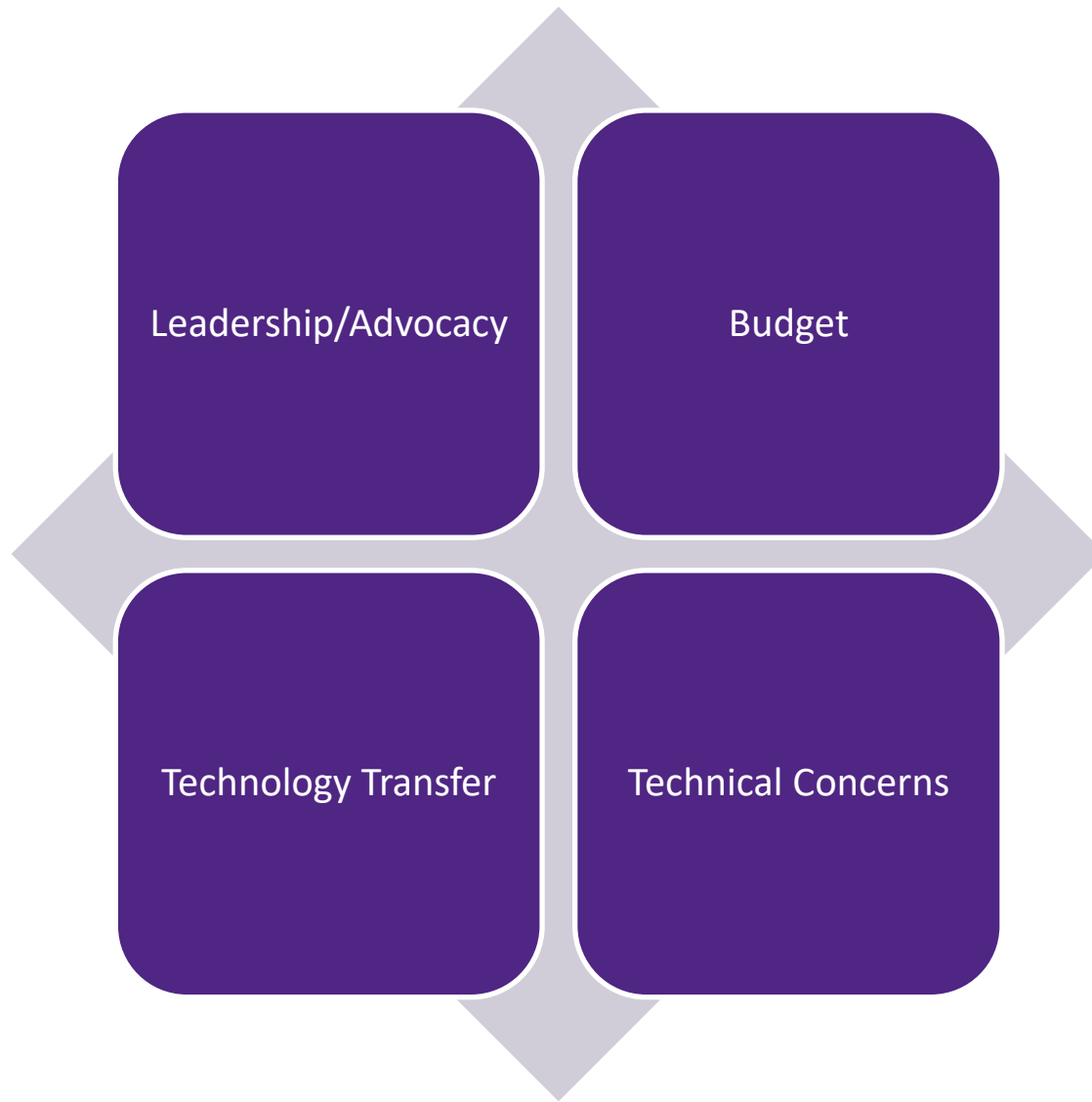
EU Research into IPv6 Deployment Barriers

- There is not a great deal of documented research on IPv6 deployment barriers
- Why is this?
 - In the past, IPv6 transition was seen as primarily a technical issue (it isn't any longer)
- In the past, the motivation to research barriers came from the technical community
 - It doesn't anymore
- Our research in 2017 and 2018 shows that the primary barriers to IPv6 deployment in public administrations are administrative

Characterising the Barriers to IPv6 Success

- Back in 2003, the European Commission's IPv6 Task Force identified 15 barriers to IPv6 adoption.
 - 12 of those 15 barriers were technical in nature
 - Today, those barriers have been largely overcome
 - For instance, Zero Configuration and End Node Support
- For EU public administrations, the barriers to IPv6 deployment are often not technical
 - Instead, the key barriers to IPv6 adoption in public administrations can be explained in business terms and not technical terms
 - This is a substantial change over the situation 10 years ago

Categorizing Barriers to IPv6 Adoption



Barriers Identified During this Project

- Lack of interest or involvement from many MS
 - Benefits of IPv6 deployment are unidentified and are considered unclear
 - These MS often leave IPv6 deployment to ISPs
 - This is mainly the case for MS that are not well advanced in IPv6 deployment
- Cost and budget necessary to complete the transition to IPv6
 - MS see IPv6 as essentially a cost center
 - MS see an increase in costs from having to support both IPv4 and IPv6
 - This is mentioned even by leading MS, that have later reduced their ambitions
- Not enough involvement of national ISPs
 - ISPs are often an additional roadblock to IPv6 deployment
 - The ISPs are themselves lagging behind in IPv6 deployment
- Lack of coordination and leadership in the public sector

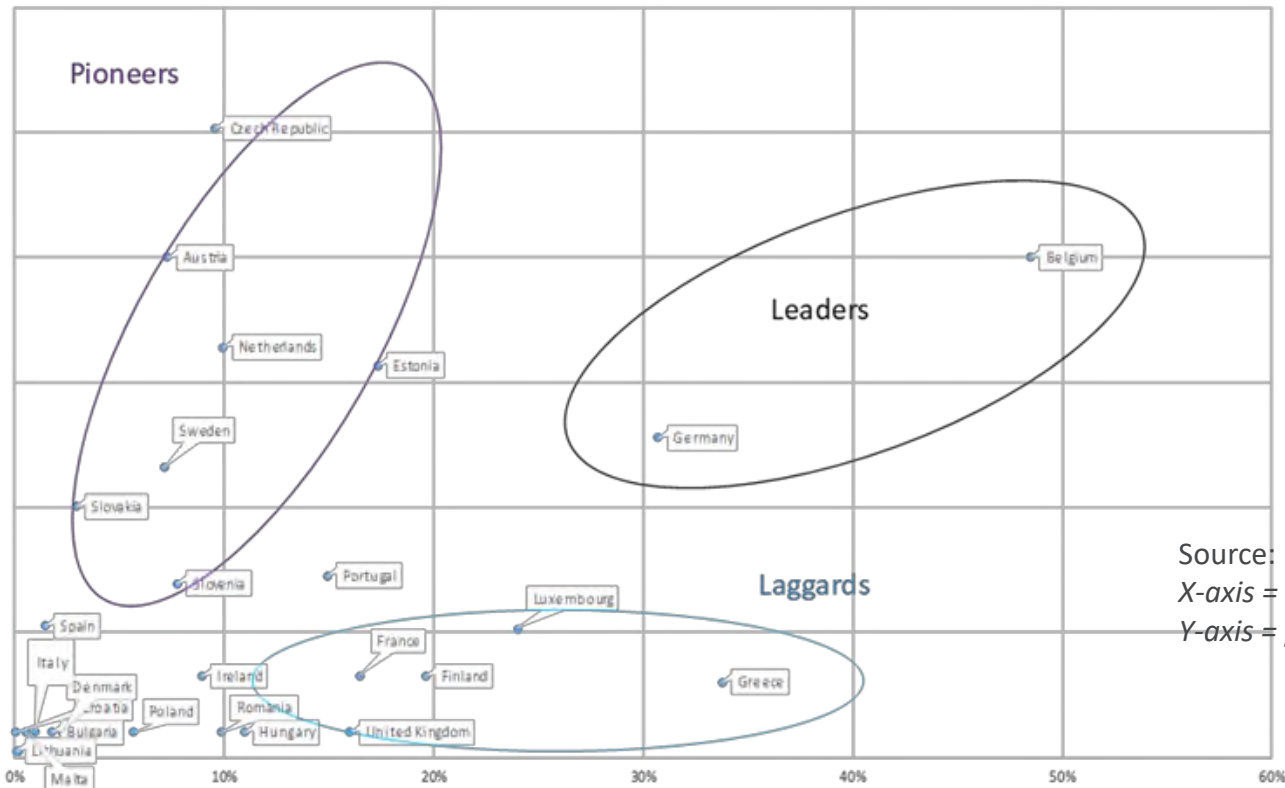
What Was Learned from GEN6

- GEN6 gave MS general guidelines for planning and transition steps
 - Documentation on technical issues (network topologies, addressing types)
 - Addressing plans for Governments
 - Identification of transition technologies
 - Deployment supports
- Pilot projects in a set of countries in Europe
 - Transition experience
 - Especially on technology and infrastructure
- Participation in the ETSI IPv6 Integration Industry Specification Group

GEN6 Documented Challenges & Successes

- Most of the challenges focused on the technical issues surrounding IPv6 deployment
 - Little about the planning, administrative or technology transfer issues
 - Some examples where there is a clear model for success
 - For instance, for federal governmental models – de.government
- In some cases, the success was built on pilot or academic implementations
- Many IPv6 Task Forces were set up in member states, but few survived

Different Situations in Different Countries



Source: IDATE

X-axis = penetration of IPv6 (global)

Y-axis = penetration of IPv6 (public sector)

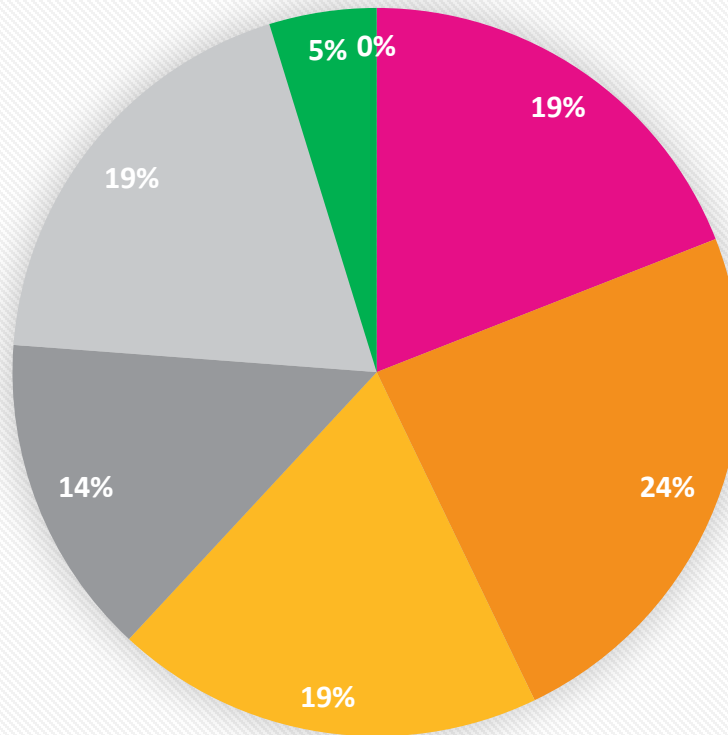
- Strong correlation between the adoption of IPv6 in the public sector and globally
- **Public Pioneers** - advanced users in the private sector, low adoption overall
- **Public laggards** – low adoption in the public sector despite good adoption overall
- Some MS on their own (e.g. Belgium and Germany) appear as the **leaders**

Other Characteristics of the IPv6 Experience

- Specific IPv6 roll-out plans in the public sector
 - Specific plans for public sector are quite rare but often have good results
 - Netherlands, Belgium, Germany, Czech Republic are examples
- A lot of plans for IPv6 are not specific to the public sector
 - Examples would include Sweden, France, Spain and others
- Many member states have no plans at all
- Many plans have no targets or metrics for success
 - Those that do often need to have the initial targets modified
 - Often with a less ambitious plan

Where do Member States Stand?

What Stage of IPv6 Transition are You In?



- Not Thinking About It
- Aware, but not doing anything
- Starting to think about it
- Planning stage
- Started transition
- Advanced transition
- Completed

Workshop I - Presentations from Member States

- Four member states gave presentations about their successful IPv6 deployments
 - Germany
 - Spain
 - Belgium
 - The Netherlands
- Germany and Belgium are in this project's "Leaders" group
- The Netherlands is in this project's "Pioneers"
- Spain is just outside the "Pioneers" group

IPv6 Within the German Public Administration

- Decision to adopt IPv6 was made in the public sector in 2007
- The migration process is driven by the Federal Ministry of the Interior (BMI) and the Federal Office of Administration (BVA)
- The government is a Local Internet Registry (LIR)
 - Different needs of governments led to a change of RIPE policy (RIPE 655)
 - Created a detailed addressing plan
- The government developed IPv6 deployment materials:
 - IPv6 Profile (German/English)
 - Migration Plan (German/English)
 - Workshop Modules
- A number of pilot IPv6 deployments have taken place
 - Example: Datacentre migration

Workshop I Addressing the Barriers to IPv6 Deployment: Spanish Use Case

- Plan to adopt IPv6 created in 2011: “Initiatives for the IPv6 Deployment”
- IPv6 deployment is driven by the Ministry of Energy, Tourism and the Digital Agenda and the Ministry of Finance and Civil Service (for public administration deployment)
- The government is an LIR
- The government has:
 - Carried out IPv6 deployment pilots
 - Created a portal for the dissemination of IPv6 deployment information
 - This coordinates the deployment of IPv6 across all levels of government
 - Specified IPv6 as a requirement in purchasing
 - Planned to deploy IPv6 in the public administration
 - Begun work on a single IPv6 addressing plan for the whole government

IPv6 in Belgium

- 2012 Belgium Code of Conduct set a limit on CGN compression of 16:1
- Belgium only has three major ISPs easing coordination
- A national IPv6 plan was supported by Belgian council of ministers
- The Belgium government is not an LIR
 - Still debating Provider Assigned (PA) vs. Provider Independent (PI)
- By 2016 almost 50% of traffic in Belgium was IPv6
- Belgium is gradually enabling IPv6 on federal web-sites
- Used abstract paragraph in public tenders “IPv6 must be equivalent to IPv4”
- Found that working closely with IPv6 Council was beneficial
- Attempted an IPv6-only datacentre deployment in 2012/2014
 - Was not successful then **BUT** could work now
- Still on-going checking with suppliers for IPv6 support – gradually upgrading hardware and software

Workshop on Addressing the Barriers to IPv6 Deployment: the Netherlands

- Logius is the digital government service of the Netherlands Ministry of the Interior and Kingdom Relations
 - Was tasked with obtaining IPv6 address space and distributing it to ministries (excepting the ministry of defence)
 - Is an LIR and has obtained IPv6 address space from RIPE
 - Created a government wide IPv6 numbering framework
- Ministries, provinces and municipalities are very autonomous
 - However, there is a requirement for IPv4 **and** IPv6
 - Deployment is responsibility of individual organisation
- Lack of budget is a barrier to deployment
- Mandates need to have teeth to be effective
- Lack of IPv4 addresses has not been a driver for IPv6 adoption

What Were the Recommendations from Workshop 1?

- Interactive engagement in Workshop I led to a set of clear recommendations:
 - MS should remain in contact with their national Internet industry
 - MS should share addressing plans and strategies with other MS
 - There needs to be a mechanism developed for MS to engage in discussions on IPv6 deployment issues
 - The priority of IPv6 in ISA² should be raised via its interoperability requirement
 - Motivations for IPv6 deployment should be documented
 - MS should have a single focal point for IPv6 issues

What Are the Key Lessons Learned?

- There has been success in Europe
 - There are multiple IPv6 transition successes
 - Using very diverse models
- The key barriers to success are no longer technical in nature
 - Most of the technical barriers can be surmounted via technology transfer and the use of best practices
- National plans for IPv6 deployment can be a success
 - Especially if not too ambitious at early stages
- There are sources for support, training and technology transfer in Europe
- Many countries are not moving quickly on IPv6 transition for public administrations

Questions?