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Responsible and Editor/Author:	Organization:	Contributing WP:
Arjen Holtzer	TNO	WP5

Authors (organisations):

Annelieke van der Giessen, Silvain de Munck, Rob Smets (TNO), all contributors to the survey

Abstract:

This deliverable D5.21 presents the GEN6 baseline measurement. It describes the expected outputs, outcomes and impact of the GEN6 project, based on the expectations of the pilot leaders of the active GEN6 pilots and the individual consortium partners. The baseline measurement helps to focus the monitoring towards the most relevant achievements of the project. These achievements can be related to both: the IPv6 and CIP goals of the European Commission as well as the goals from individual organisations participating in the GEN6 pilots.

Keywords:

IPv6, Governments, monitoring, baseline measurement, pilots, national, cross-border, partners, outcome, impact, intervention logic, goals, results, awareness, technical implementation, governance, human capital, social networks, knowledge

Revision History

The following table describes the main changes done in this document since its creation.

Revision	Date	Description	Author (Organization)
v0.1	30-01-2013	Document creation, final inputs to surveys received from partners	Arjen Holtzer (TNO)
v0.2	04-02-2013	Initial draft for TNO internal review	Arjen Holtzer (TNO)
v0.4	07-02-2013	Draft v0.4 for GEN6 project internal review	Arjen Holtzer (TNO)
v0.5	12-02-2013	Processed review comments from Uwe Kaiser (Fraunhofer) and Antonio Skarmeta (UMU). **This preliminary version is released to the European Commission for the technical review meeting February 2013. After the EC review, the document will go through a final GEN6 consortium review and will be finalized.**	Arjen Holtzer (TNO)
v0.6	13-02-2013	Prepared for delivery	Uwe Holzmann-Kaiser (Fraunhofer)

Disclaimer

Executive Summary

This Deliverable 5.21 (draft version) describes the methodology and results of the GEN6 baseline measurement. The goal of the baseline measurement is to focus the monitoring framework[1] by analysing the expected output, outcomes and impact of the project and how the project expects to contributes to the CIP goals of the European Commission and the project goals of the EC and the GEN6 consortium. The baseline monitor is followed by a second ('check-up') measurement at the end of 2013, which updates the baseline measurement by going into more detail and a final measurement in 2014.

Two surveys have been developed and carried out: one targeted at the pilot leaders of the active GEN6 pilots and one targeted at all GEN6 consortium partners. The response to the survey has been analysed and a summary for each of the impact channels *technical implementation*, *knowledge*, *awareness*, *human capital*, *social networks*[2], *cost & benefits* and *governance* is presented.

The results of the baseline measurement show that the different impact channels need to be interlinked to contribute to the goals as much as possible: *Awareness* and *social networks* are the channels that measure impact outside the GEN6 project best. *Knowledge* and *cost & benefits* are essential in that they determine if the right information is disseminated; so what, how and to whom. *Technical implementation* is the key to the quality of the information that is disseminated.

For governance it is clear that to a large extent decisions on implementation of IPv6 are strongly driven by technical staff without too much pressure from either general management or government policies. The question that remains is how the drivers of IPv6 within specific organisations can help to stimulate investments in IPv6 in other organisations.

Furthermore this report gives an example to indicate that the GEN6 project is expected to contribute to EC goals and a list of IPv6 (project) goals and shows how this can be measured and interpreted during the final measurement. This is done using the concept of *intervention logic*, which is a concept that describes how a certain stakeholder intervention, for example the European Commission issuing a project such as GEN6, can contribute to (solving) certain issues, problems or needs.

[1] *The GEN6 Monitoring Framework is described in GEN6 Deliverable D5.1: Monitoring Framework and Description of Indicators*

[2] *The term "social networks" refers to networks and relationships between people and organizations. It does not refer to social media (although social media may be supportive to it).*

The expectations show that the monitoring framework works well for impact monitoring of GEN6 and enables the monitoring team to focus on relevant aspects and make decision to go into more detail on some aspects and less on others.

In order to be able to actually measure the contribution of the GEN6 pilots to EC goals and IPv6 intervention logic, a more in depth understanding of certain mechanisms and rationales behind the expectations of the partners is valuable. For example, if several partners expect an increase in complexity of the network, insight in the actual reasons behind this will help understanding a certain IPv6 issue/problem/need, which may be essential when trying to disseminate the gained knowledge to other organisations.

Finally, for each of the impact channels a *focal point* has been given that should be kept in mind in the following measurements. The most important notion here is that the expected technical implementation output of GEN6 is on top of mind of the project, so a great source of information and experience is at hand. The main challenge for GEN6 is to focus on what knowledge is valuable to transfer to which organisations outside GEN6 and in what way that knowledge should be presented. To this end, better insight should be gained in the technical, organisational and financial barriers that the pilots have encountered and how the GEN6 solutions contribute in overcoming those barriers. Also, a clear view on dissemination possibilities, either through awareness, social networks and human impact, should be a natural part of the pilots.

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1. INTRODUCTION

This deliverable D5.21 describes the *baseline measurement* of the GEN6 project. It describes the expected outputs, outcomes and impact of the GEN6 project. This mainly includes the expectations of the pilot leaders of the active GEN6 pilots and the individual consortium partners, but also some aspects of the current status of the pilots and achievements of the consortium partners so far.

The baseline measurement helps to focus the monitoring towards the most relevant achievements of the project. These achievements can be related to both: the IPv6 and CIP goals of the European Commission as well as the goals from individual organisations participating in the GEN6 pilots.

The baseline measurement will be followed by a *monitoring check-up* end of 2013, which aims to update the expectations half-way the project, thereby monitoring any new insights. Interviews will complement the check-up measurement and will contain additional details on specific outputs, outcomes and impact. When the pilots are running, in the third year of the project, the final measurement will be performed.

During the baseline measurement, the expectations of the GEN6 project were investigated using the monitoring framework and the related indicators presented in Deliverable 5.1[3]. Based on the analysis of the responses from both a Pilot Leader survey and a Consortium Partner survey this deliverable describes on the values of which indicators the highest outcome or impact is expected. In the monitoring framework the indicators are clustered in impact channels: *technical implementation*, *awareness*, *knowledge*, *human impact*, *social network*, *costs & benefits* and *governance*.

Chapter 2 describes the methodology that was used for the analysis. This includes a summary of the monitoring framework presented in Deliverable 5.1. It also introduces the individual pilots and summarizes the composition of the GEN6 consortium. A detailed description of the pilots can be found in the deliverables from Work Packages 3 and 4 of the GEN6 project. In Chapter 3 the analysis of the baseline measurement is presented, describing the expected output, outcome and impact per impact channel. For each impact channel the expectations are summarized in a section on *main* observations. Chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** contains a discussion on the findings of the baseline measurement in relation to the CIP goals and IPv6 intervention logic, as presented in the monitoring framework.

[3] *GEN6, Deliverable 5.1 - Monitoring Framework and Description of Indicators, February 2012, http://www.gen6.eu*

2. METHODOLOGY AND CONTEXT

This chapter describes the methodology used in the baseline measurement and gives short descriptions of the GEN6 pilots. It also describes the composition of the consortium.

2.1 Methodology

The input for the baseline measurement was collected using two surveys:

- A survey targeted towards pilot leaders only
- A survey targeted towards all consortium partners

This was done since some of the impact channels are only relevant from either a pilot or partner perspective, while some are relevant from both perspectives.

Questions related to *technical implementation* and *awareness* are only targeted at the pilot leader. The questions targeted at the pilot leader cover the entire pilot team, which may include organisations that are not part of the GEN6 consortium.

Governance is only part of the consortium partner survey since it focuses on decisions made by and effects on an individual organisation. The same holds for *knowledge*, which targets the knowledge increase of individual organisations, not pilots. *Human capital* is part of the consortium partner survey only, as well.

Questions on *social networks*[4] and *costs & benefits* are part of both surveys.

The remainder of this section summarizes the monitoring framework from D5.1 by recapitulating the concepts of *intervention logic*, *input/output/outcome/impact* and *impact channels.*

2.1.1 Intervention logic

Deliverable 5.1 describes the monitoring framework that is developed for monitoring the GEN6 project, in particular the GEN6 pilots. It is based on the concept of *intervention logic*[5] which has the main purpose of being explicit about the logic – the rationale, the theory – of an intervention by policy makers and other stakeholders. It describes the mechanisms how a certain action, policy, statement, or any other type of intervention, may lead to desired results or contribute to certain goals.

[4] *The term "social networks" refers to networks and relationships between people and organizations. It does not refer to social media (although social media may be supportive to it).*

[5] *Explanation of intervention logic, http://ec.europa.eu/europeaid/evaluation/methodology/methods/mth_log_en.htm*

The 'intervention' in this case is the GEN6 project, commissioned by the EC as part of the ICT Policy Support Programme (ICT PSP), which is part of the Competitiveness and Innovation Programme (CIP), as described in the 2011 work plan[6]. The 'logic' in this case is contained in the way the GEN6 project is expected to contribute to the goals of the European Commission and the project participants, both on the policy level (e.g. overall CIP goals) and the technical level (e.g. IPv6 implementations).

Central to the analysis are the project goals set by the EC in the CIP ICT PSP 2011 work plan:

- Stimulating IPv6 upgrades of public networks and eGovernment services.
- Stimulating the development of new innovative IPv6 enabled content and services benefitting from new functionalities.
- Contributing to the prevention of a secondary IPv4 market and a quality drop in online public services caused by a depletion of the IPv4 address space.

The goals and intervention logic are described in more detail in D5.1. In the analysis in Chapter 4, parts of the goals and intervention logic will be referred to.

2.1.2 Input, output, outcome and impact

The monitoring framework uses indicators on the level of *input*, *output*, *outcome* and *impact*.

Key **inputs** are money, time, facilities, devices, etc., brought into the project by a range of actors involved in the project. Note that this can be a mix of technological and economic inputs. Via a series of activities, inputs can lead to outputs. Examples of relevant **outputs** are patents, publications, events, demonstrators and new services. Both inputs and outputs are to a large extent planned and controlled by the project leader and other participants. They will have far less control over outcomes and impacts.

As opposed to inputs and outputs, **outcomes** do not only concern the short term and the main participants in the pilots, but also the medium term and other stakeholders. For instance, new services can be launched by participants of the project or pilot, in collaboration with other stakeholders outside the pilot or project, and leading to new business practices. In this process, patents may be licensed and the organisations involved are recognised as having state-of-the-art knowledge. New social networks are created. These are all outcomes that are less under direct control of the project leader and the project/pilot participants. This also applies even more so to impacts.

Impact is the most important yet most difficult to predict or steer. The organisations involved,

[6] *CIP Workplan 2011*

their suppliers, clients or entire sectors and regions may structurally increase their R&D activities, revenues and productivity, partly as a result of the project or pilot. Alternatively, the project or pilot may be recognised as effectively addressing societal challenges such as energy efficiency. Again, note that this often is a mix of technical, economic and social indicators. Impact is difficult to assess, due to timing and attribution issues. Often, impact is only realised after a longer period of time, long after the immediate effects of project or support programme have been assessed.

Figure 2-1 illustrates the relation between inputs, outputs, outcomes and impacts, the policy objectives and the issues that need to be addressed, which together shape the intervention logic. A more detailed explanation of these concepts is given in Deliverable D5.1.

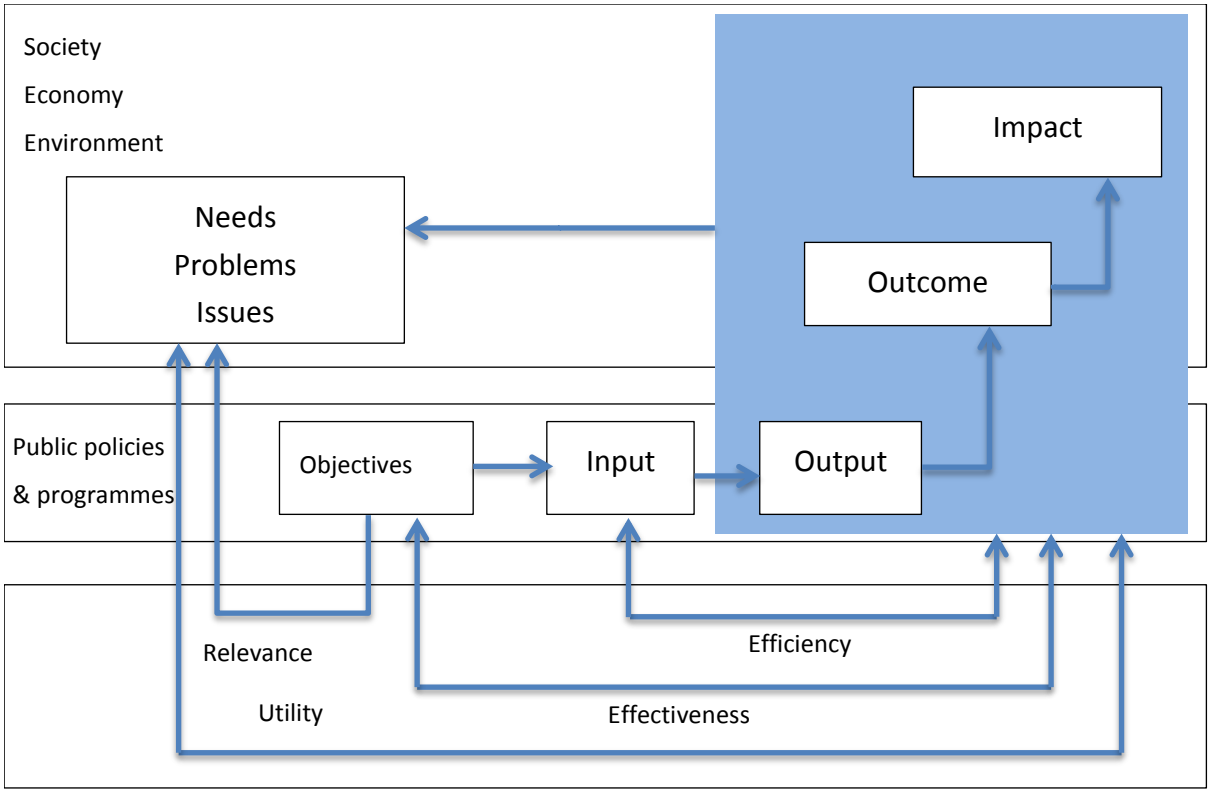

Figure 2-1: Intervention logic

2.1.3 Impact channels

The monitoring framework uses six *impact channels* to link the levels of inputs, outputs, outcomes and impacts. It also includes the aspect of *governance*. The impact channels are visualized in Figure 2-2.

The first impact channel concerns the **technical implementation** of IPv6 and focuses on the effective technical implementation of IPv6, by organisations that use IPv6 and by suppliers of IPv6. One of the prime drivers for organisations to engage in IPv6 activities (and one of the

main concerns) is the impact of the introduction of IPv6 on existing processes in the organization. For example, organisations are concerned with the reliability and availability of a service or application. At the level of inputs, indicators address the current stock of systems, standards and services. The output level concerns any changes and new elements. Outcomes can be related to network efficiency, performance levels, etc. Impact can be on – for instance – the overall quality of networks and applications, and on energy consumption.

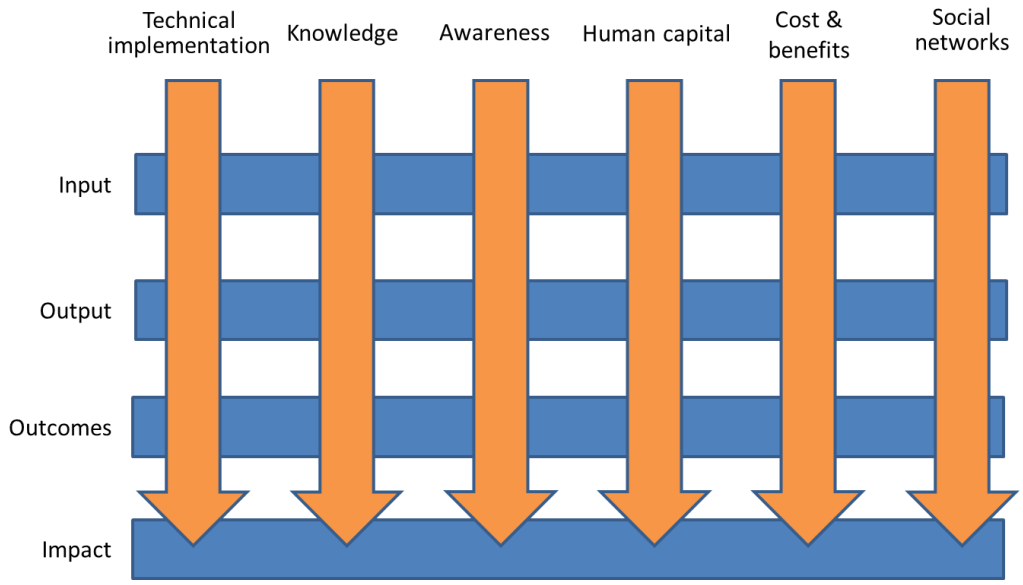

Figure 2-2: Intervention logic: the impact channels

The second impact channel takes into account the expected increase in **knowledge** within the organisations participating directly and indirectly in the pilots. This refers to knowledge of effective and cost efficient implementation of IPv6, but also to knowledge of individual providers of IPv6 hardware, software and services, with respect to the demand for IPv6. Again, the indicators need to reveal how the pilot uses input (existing knowledge), creates output (e.g. publications), and contributes to outcomes and impact.

A third impact channel focuses on the expected increase in **awareness** of IPv6 inside and outside the pilots, including organisations that do not yet have implementation plans. An example at the input level is the awareness of the participants in the pilot; they participate, so a basic awareness is present. Subsequently, the question is how their awareness increases and – more importantly – how the pilots increase awareness across a larger group of stakeholders inside and ouside the pilots and even GEN6 project.

The fourth impact channel concerns the expected increase in IPv6-related **human capital** within organisations that are closely involved in the pilots. Human capital refers to the set of skills people gather and develop during the course of the pilot.

The fifth impact channel focuses on the societal, technical, security and economic **costs and**

benefits of implementing IPv6. Only to some extent, they are known at the start of the pilot. An understanding of the main costs and benefits - for different types of actors - can be an explicit objective of the pilot (e.g. an output or outcome). It can also be implicit. When the costs and benefits are known in more detail, and are shared with more stakeholders, the pilot can increase its impact.

The sixth impact channel is **social networks**. Strengthening of existing and the formation of new social networks between different stakeholders (within and outside the pilot) can support other mechanisms, e.g. increasing awareness. The emphasis can also be on - for instance - collaboration and trade across Europe's Member States, and between different types of actors in the innovation process, such as users, suppliers, consultants and policy makers.

The concept of **governance** will be included in the monitoring framework. In the context of IPv6 pilots, most relevant are decisions about the timing of IPv6 implementation. A number of factors can be relevant in making this decision (human capital, costs, benefits, risks, public policies, etc.). The monitoring framework will include a number of questions and indicators on the decision making process (who, why, when?), and the influence of public policy on decisions about the timing of IPv6 implementation (e.g. subsidies, regulations and campaigns). Given the emphasis on decisions about the timing of IPv6 implementation, the set of indicators is structured around potential factors that influence these decisions. The potential influence of public policies is addressed explicitly, to increase the relevance of the results for policy debates about IPv6. This allows commenting on the relevance of national IPv6 awareness campaigns, support schemes and regulations, as perceived by the participants in the GEN6 pilots, in the various EU Member States.

2.2 Pilots

The baseline measurement covers six national pilots and two cross-border pilots, as shown in Table 2-1.

Pilot Leader	Pilot
Citkomm	Germany
CTI	Greece
UL	Luxembourg
ULFE	Slovenia
MINETUR/MINHAP	Spain
TUBITAK	Turkey
UL	Cross-Border Public Safety
UMU	Cross-Border Pilot eGovernment Services

Table 2-1: Pilot leaders in GEN6

This section contains a short description of each of the pilots. A more detailed description can be found in deliverables from Work Packages 3 and 4.

2.2.1 Germany

The German pilot focuses on enabling IPv6 in eGovernment services on the local level. This mainly involves enabling dual stack on the backbone network and application backbone. Also some first services will be enabled with IPv6. The German pilot will focus on connections with other German government networks as well, most notably the German government backbone (DOI). This will include enabling IPv6 on network services, such as DNS, proxies but also e-mail. The requirements for the German pilot can be found in GEN6 Deliverable D3.1.

2.2.2 Greece

The Greek pilot aims to interconnect intelligent smart meters over IPv6 in 50 schools and influence the behaviour of the school communities so as to reduce energy consumption. The requirements for the Greek pilot can be found in GEN6 Deliverable D3.2.

2.2.3 Luxembourg

The Luxembourg pilot focuses on enabling secure cloud services with IPv6. The requirements for the Luxembourg pilot can be found in GEN6 Deliverable D3.3.

2.2.4 Slovenia

The Slovenian pilot develops an Advanced Emergency Response Communication System (A-ERCS). It focuses on the IPv6 communication needs of a specific domain, that is, a fire fighter unit utilizing communications on field during an intervention. The requirements for the Slovenian pilot can be found in GEN6 Deliverable D3.4.

2.2.5 Spain

The Spanish pilot consists of three main activities. All these activities are based on *Red SARA* as the core network for the interconnection of the Spanish Public Administrations, so on a national level:

- The upgrade of Red SARA so that it can transport IPv6 natively, therefore allowing IPv6 communications between administrative units.
- The implementation of a transition mechanism that allows Public Administrations to offer online services accessible by means of IPv6, based on a shared service approach.

- The evolution of the MINETUR network so that it can provide native IPv6 services (eITV application[7]) to be consumed by other administrative units (DGT, Directorate General for Traffic).

The requirements for the Spanish pilot can be found in GEN6 Deliverable D3.1.

2.2.6 Turkey

The Turkish pilot aims at enabling IPv6 in the eGovernment Gateway (EGG), which is a website that offers access to public services from a single point. The aim of the gateway is to offer national public services to citizens, businesses, and government agencies in an efficient and effective manner through information technologies. The Turkish pilot focuses on both the frontend (ISP connection and webserver) and backend of the EGG. The requirements for the German pilot can be found in GEN6 Deliverable D3.1.

2.2.7 Cross-border Public Safety

The cross-border pilot on public safety will focus on two scenarios. The first one is called *International on-site intervention*. It is an emergency response scenario, where disaster relief teams from foreign countries can connect to a national emergency response communication system, based on IPv6. The focus here is on developing an IPv6 enabled interoperability point (GEN6 IOP).

The second scenario is called *group communications*. It focuses on a large scale emergency situation where the intervention of teams from other regions or nations with specialized skills may become necessary. The teams communicate to each other over an IPv6 enabled network and IPv6 enabled applications.

2.2.8 Cross-border eGovernment Services

The cross-border pilot on eGovernment services focuses on ensuring interoperability between national infrastructures with respect to IPv6. A common connection infrastructure will be used, for example sTesta or GEANT3. The pilot will test and validate electronic Identification (eID) solutions for authentication and authorization over IPv6 between different countries.

[7] *ITV is the card used in Spain to register the technical inspections on motor vehicles, which is required by law. eITV is the electronic version.*

2.3 Partners

The survey for baseline measurement was only sent to partners of the GEN6 consortium. In some pilots, organisations outside the GEN6 consortium are participating. These non-GEN6 pilot partners will be included in the check-up measurement D5.22, in order to minimize the work load for them with regard to the monitoring work package.

All active GEN6 consortium partners are part of the baseline monitor. In total sixteen partners gave input to the Consortium Partner survey. These organisations are listed in Table 2-2.

The sixteen partners are from the following nine countries: Cyprus, Czech Republic, Germany, Greece, Luxembourg, The Netherlands, Slovenia, Spain and Turkey. Thirteen are involved in one of the pilots and three are not. Those who are not directly involved in a pilot have specific project management and monitoring tasks.

Nine of the respondents categorize themselves as research organisations, five are governments and two indicate they are a consultancy firm. Thirteen partners indicate they have been involved in IPv6 activities already prior to the GEN6 project.

Eight partners indicate they are hosting the piloted networks or services and eight partners indicate they develop and the IPv6 implementation of the pilot. There is only one vendor among the consortium partners. Four partners indicate they are the actual users of the pilot implementation.

Respondents to the baseline measurement survey	
Devoteam Danet GmbH Germany	Devoteam
TUBITAK ULUSAL AKADEMIK AG VE BILGI MERKEZI Turkey	TUBITAK
UNIVERSIDAD DE MURCIA Spain	UMU
UNIVERSITE DU LUXEMBOURG Luxembourg	UL
MINISTERIA DE POLITICA TERRITORIAL Y ADMINISTRACION PUBLICA Spain	MINHAP
UNIVERZA V LJUBLJANI Slovenia	ULFE
NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK – TNO Netherlands	TNO
KDVZ Citkomm Germany	Citkomm
FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V Germany	Fraunhofer
MINISTERIO DE INDUSTRIA, TURISMO Y COMERCIO Spain	MINETUR
TURKSAT UYDU HABERLESME VE KABLO TV ISLETME AS Turkey	TURKSAT
GREEK RESEARCH AND TECHNOLOGY NETWORK S.A. Greece	GRNET
COMPUTER TECHNOLOGY INSTITUTE & PRESS DIOPHANTUS Greece	CTI
INTELEN SERVICES UNLIMITED Cyprus/Greece	Intelen
MINISTRY OF INDUSTRY AND TRADE Czech Republic	MoIT
CZ.NIC Czech Republic	CZNIC

Table 2-2: GEN6 Consortium Partners that responded to the baseline measurement survey.

3. EXPECTED IMPACT

This Chapter describes the results of the baseline measurement for each of the impact channels *technical implementation*, *knowledge*, *awareness*, *human capital*, *social networks*, *costs & benefits* and *governance*. A short description of each of these impact channels is given in Section 2.1.3.

For every impact channel a summary of the findings is presented, followed by the main observation and an overview of the indicators for which the most impact is expected. Note that the expected impact may at some point be expressed in more generic terms: 'yes, we expect to develop two IPv6 tools' or 'we expect a slight decrease in complexity of the network'. Details on the expected impact and arguments will be discussed in the following measurement.

A conclusion at the end of this Chapter finalizes the result description. An analysis with respect to the EC goals and intervention logic follows in Chapter 4.

Note that for the impact channels that were targeted at the pilot level, the summarized responses of the individual pilots can be found in the Appendix of this document and only a section on 'main observation' can be found in this Chapter. This was done to improve the readability of the document.

3.1 Technical Implementation

Since the technical implementation in GEN6 is carried as part of the eight pilots, the questions for this impact channel were targeted only at pilot leaders. This section will describe the expected outputs, outcomes and impacts for the eight pilots. Note that this Section will only describe the summary and main findings for the impact channel. The descriptions of the responses for the individual pilots can be found in the Annex 1.

3.1.1 Main observations

In most pilots, no large changes in complexity of the architecture are to be expected. Also, the complexity of the implementation, network and service management of IPv6 is not likely to deviate much from the IPv4 implementation. Most of the pilots do not expect that the introduction of IPv6 requires changes in (IT) processes.

The only exceptions is the Slovenian pilot, who expects a great increase in complexity because of the enablement of new services, and the Greek pilot, which expects great reductions for an IPv6-only scenario for smart metering compared to an IPv4-only scenario. Figure 3-1 shows the

expectations of the pilot leaders with respect to the relative architecture complexity between IPv6 and IPv4 in their pilot. It shows that quite some differences are expected in the network architecture.

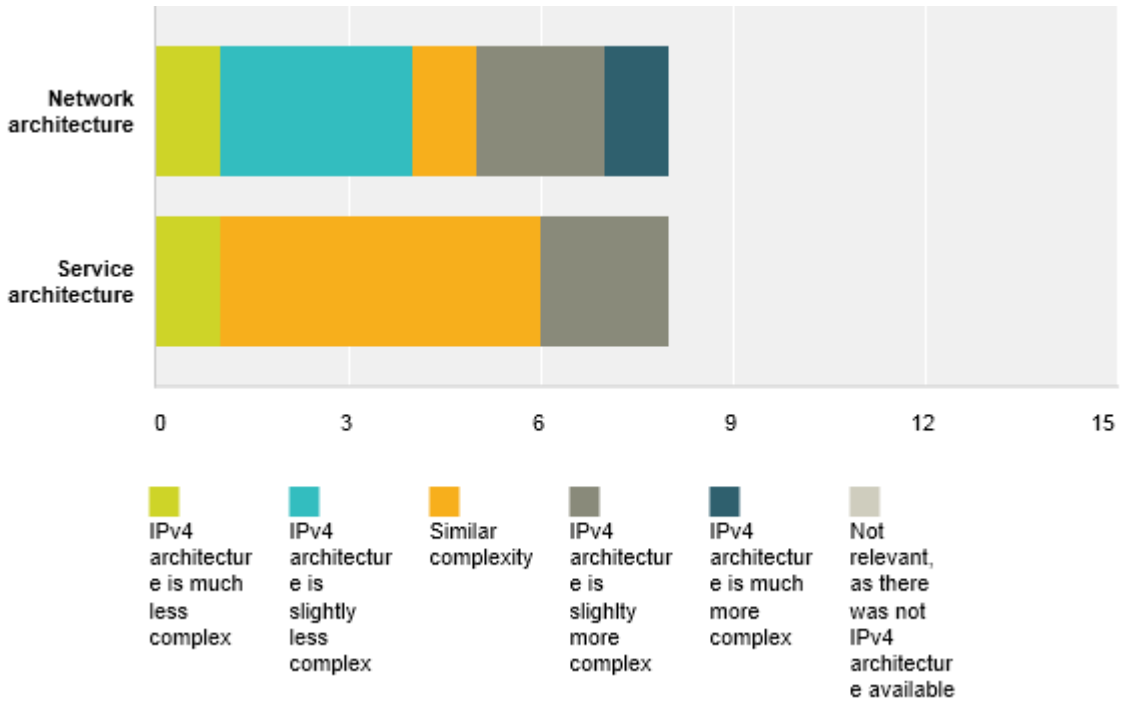

Figure 3-1: Expectations of the pilot leaders on the change in complexity of the IPv6 network and service architecture compared to the IPv4 network and service architecture.

In case of changing threats, most pilots expect that at most changes in firmware and software are sufficient to meet security demands. This could indicate that the pilots expect the hardware partition of equipment and the chosen architecture to be sufficiently mature and future proof for IPv6. In one pilot, applying changes in rules applicable to security devices is considered enough to deal with new threats. One pilot has reservation with respect of the maturity of the equipment.

The Slovenian pilot is the only one expecting to enables services with IPv6 that are not possible with IPv4, mainly because of Mobile IPv6, network mobility and multicast scoping attributes of IPv6.

Introducing IPv6 will not lead to disabling IPv4 services, but the introduction of IPv6 is also not expected to affect the requirement set of IPv4 will not change in general. One exception exists where data transport is also transitioned to IPv6 resulting in less stringent bandwidth requirements for the IPv4 network.

All of the pilots require new equipment and new software. The amount depends on what can be reused. When equipment is to be reused this usually needs a software update. Reusing

equipment as is and replacing hardware modules are rare. Re-use of equipment is between 1-24% for most of the pilots, as shown in Figure 3-2.

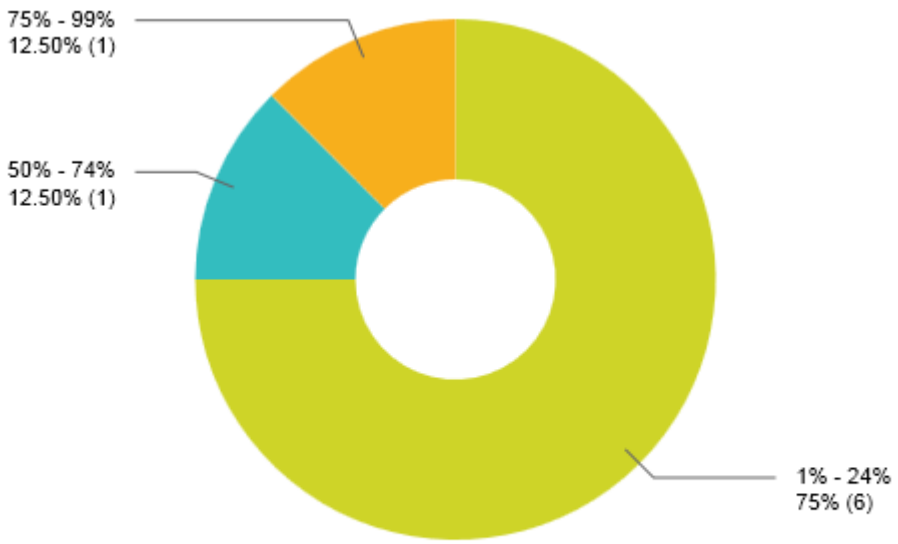

Figure 3-2: Percentage of total equipment in the pilots that is expected to be re-used.

When implementing IPv6, the pilots do not start from scratch. It turns out that in most cases some of the requirements are already in place. This suggests that by looking carefully at the current network a “hot” start is possible.

Most pilots have already implemented part of the IPv6 features that fulfil the requirements. There is no unusual distribution according to requirement type of requirement. All types of requirements are present, with some pilots focusing a bit more on one type of requirements than the other.

3.2 Knowledge

3.2.1 Summary of responses

The impact channel knowledge focuses on what the partners in the pilot expect to learn from the GEN6 project. Knowledge is measured by asking what the participants actually expect to learn.

Approximately half of the participants already think their organisations’ efficiency (8 out of 16 organisations) and effectiveness (9 out of 16) on IPv6 implementation has increased since the start of the pilot. The rest experienced no difference yet.

Almost everyone expects to learn something on IPv6 requirements. IPv4/IPv6 transition mechanisms are rated highest, followed by IPv6 addressing and IPv6 enabled software. IPv6 protocol knowledge scores lowest. Organisations claim that they already learned some things on IPv6 requirements, mainly on addressing, transition mechanisms and protocol knowledge. Security, authentication and privacy are mentioned as other topics for which partners learned on setting requirements. The learning expectations on these technical IPv6 aspects are shown in Figure 3-3.

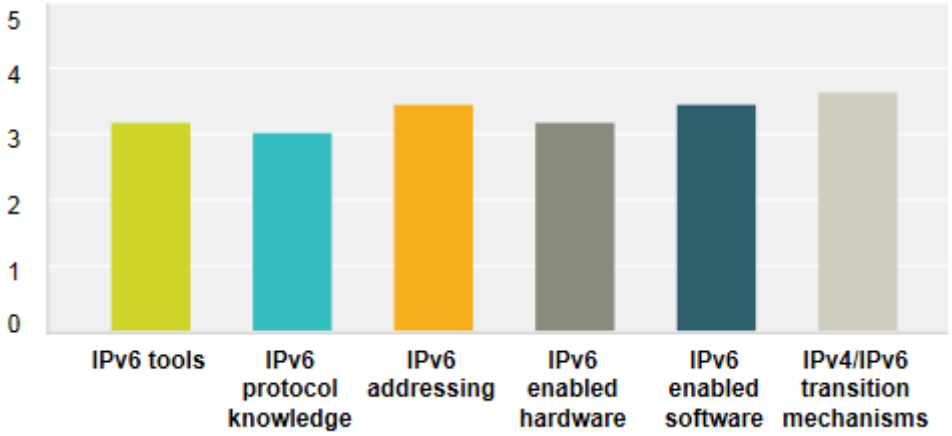

Figure 3-3: Average expected knowledge increase on several technical aspects of IPv6. 1 = expect to learn nothing at all, 3 = expect to learn a fair amount, 5 = expect to learn very much.

On the requirements of end users 7 organisations claim to have learned a 'fair amount'. One organisation claims to have learned very much and one a substantial amount.

The GEN6 project so far has been somewhat influential on overcoming barriers to implementing IPv6. Two organisations clearly state the project had substantial influence to overcome financial barriers. For example, without the GEN6 project the training for public administrations would not have been able to take place. Other financial barriers that are mentioned are large reductions in budget for public administrations, cost of smart meters and provided services, budget cuts, the absence of a system update period and necessary resources to upgrade the infrastructure.

The technical barriers that are mentioned are IPv4/IPv6 transition mechanisms, IPv6 addressing problems in smart meters, IPv6 compatibility in some equipment and services, end-user devices such as modems, specialized equipment compliancy, different implementations of protocol features by different vendors, incomplete feature implementation, no IPv6 support at all, non-IPv6 enabled network components ('legacy') and dependency on external resources, such as ISPs.

Organisational barriers that are mentioned are organisation size - large organisations have a slow decision process - , the internal organization of services, finding the right time for network

changes and influencing the existing network architecture and policy.

Other barriers are security concerns, being one of the first to implement IPv6 and having almost no one to exchange experiences and staff training and experience.

Few partners claim to have learned a substantial amount or very much already. Especially three organisations have learned a lot about IPv6 network architectures, network management and IPv6 implementation. One of them learned a substantial amount on implementation. The majority of other partners have learned some things on these topics.

An open question on what partners expect to learn in the GEN6 project resulted in the following list of topics:

- Implementation of v6 in small (non-standard) IT systems
- Transition mechanisms
- (Improvements) in security
- IPv6 introduction in countries with a different political structure (federal vs. central)
- Deployment strategies
- How to enable IPv6 in services and infrastructures
- IPv6 as an enabling technology: reduction of energy consumption, emergency services
- IPv6 addressing: address plans and governance
- IPv6 in sensor networks (6lowpan)
- IPv6 in cloud computing infrastructures
- Coordination of IPv6 implementation among different organisations
- Best-practices for IPv6 implementation: showcases
- Enable smart meters on IPv6
- Service quality and interoperability
- End-to-end network management

3.2.2 Main observations

Knowledge in GEN6 focuses on practical knowledge and experience and it turns out that the expectations are quite diverse. Some of the topics on which partners expect to learn are quite obvious such as IPv6 addressing and transition mechanisms. Other topics, such as learning on ‘coordination’ and using IPv6 as enabling technology require more investigation to make the lessons-learned valuable to others.

Half of the organisations claim to have seen an increase in efficiency and effectiveness of introducing IPv6.

The GEN6 project seems to have had some influence on overcoming barriers for introducing IPv6 so far, but not yet in an extensive way. It would be valuable to look at the actual barriers mentioned by the partners and see how the pilots actually contribute to overcoming those barriers.

In general, everyone expects to learn some things, but the greatest learning experience thus far comes from actual implementation, as is indicated by some partners of the Greek and Turkish pilot.

3.3 Awareness

Note that this Section will only describe the summary and main findings for the impact channel. The descriptions of the responses for the individual pilots can be found in the Annex 2.

3.3.1 Main observations

Although the 8 pilots have only recently started, most pilot teams have made efforts to prepare and organize dissemination activities. Information about the individual pilots is mostly available online, mainly through existing websites, including the GEN6 project website. For three pilots, information is not available online at the moment, but it will become available through a dedicated website.

Popular publications and conference presentations are dominant, but seven pilots have contributed to workshops as well. Two pilot teams have been involved in trainings and courses. Two pilot teams have prepared pilot material such as booklets/guidelines/handbooks and one pilot has received 10 requests for accessing this material. Figure 3-4 shows the average number of contributions of the pilots to several dissemination activities.

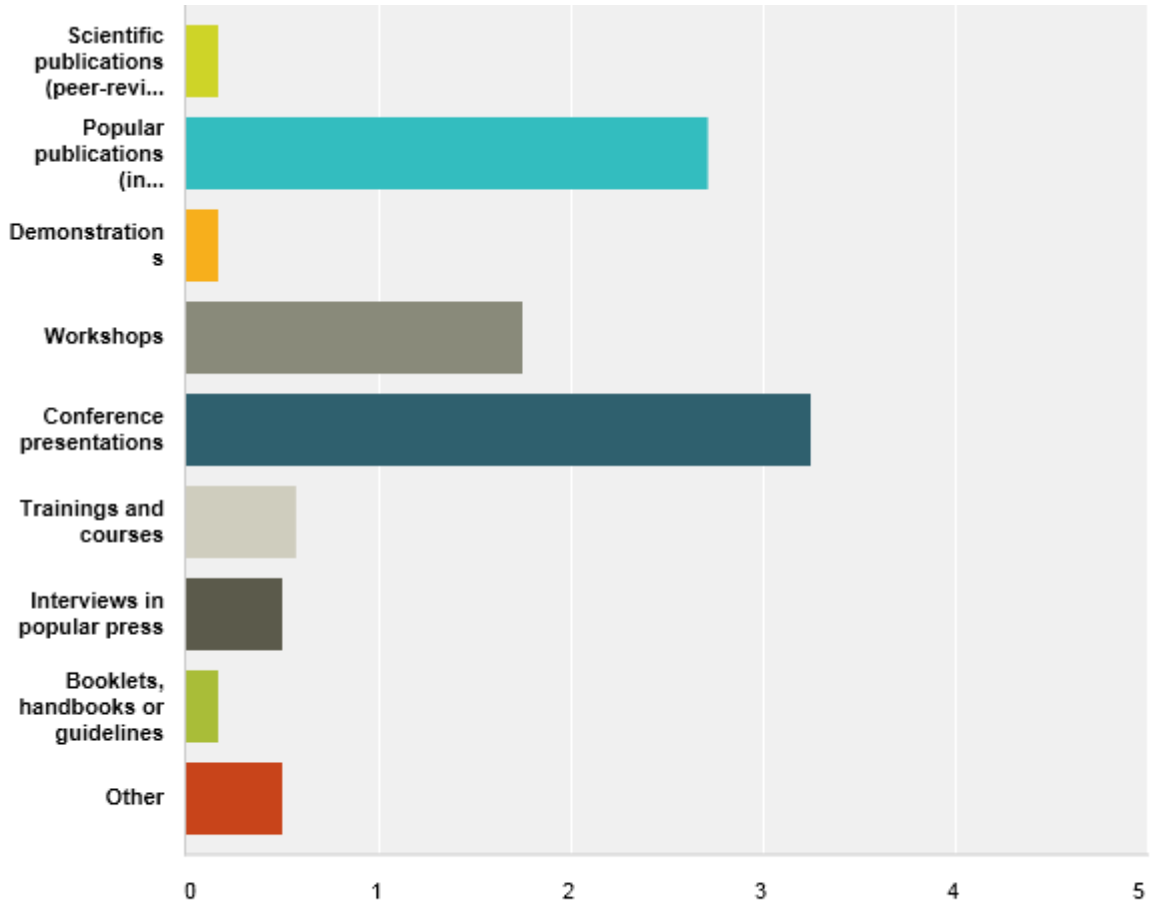

Figure 3-4: Average number of dissemination activities per pilot, in the first year of GEN6.

Two of the eight pilot teams have organized events to disseminate information and results of the pilot and the GEN6 project. These workshops mainly involved participants from both pilot and consortium partners and external stakeholders.

The resources spent on organizing and preparing the dissemination activities differs among the various pilots. Three pilots have spent 15 to 27 days on preparing website information and publications since the start of the pilot, while the other pilots have spent a few person days or no days at all. The pilot teams that have (co)organized dissemination events, have spent between 10 and 37 person days in total. Preparing the pilot materials required a few days only; one pilot has spent 10 person days.

Since the start of the pilots, six of the eight pilot teams have received requests for information; four received up to 10 requests, while two partners registered 60 to 70 information requests. These requests mainly concerned the implementation of IPv6 in networks, the pilot in general, implementation of IPv6 in services, IPv6 training, and the impact on end-users. Almost all pilot teams spent several person days on handling these requests, between 2 and 24 person days in total (average 7.29) since the start of the pilots.

So far, for six of the eight pilots the disseminations activities have not led to contacts with organisations that then started implementing IPv6 for the first time.

3.4 Human Capital

Note: The number of Full Time Equivalents (FTE) in this description is an indication and serves the purpose of monitoring only. The official efforts spent by consortium partners in the GEN6 project will be reported to the EC though, by the Quarterly Reports and Use of Resources documents.

3.4.1 Summary

The average number of FTEs participating per partner amounted to 3.5 FTEs, most partners contributed with 1-3 FTEs. The largest number of FTEs participating in the project was 12. Later on in the pilot, an average of 1.9 FTEs per partner will be added. Approximately half of the partners do not add personnel later in the project. Those partners that add personnel later to the project do this with relatively large numbers (e.g. 10 employees from one partner). Six partners have hired new personnel (across GEN6 this adds up to a total of seven newly hired employees) for the GEN6 pilot. Only four of the newly hired employees remain employed after GEN6 ends.

Of the personnel employed in the project an average of 1.5 FTE per partner has a senior role in the organization, 1.4 FTE per partner should be considered medior, and 0.4 FTE per partner are juniors. Deploying IPv6 in an organization can therefore be regarded as relatively complex.

0.6 FTE per partner holds a Ph.D. On average each partner employed 0.9 FTEs with a Master's degree. Of employees with a Bachelor degree, 2.2 FTE per partner participated in GEN6 on average. Workers with an education degree lower than Bachelor were found at an average of 0.5 FTE per partner. Eleven Bachelors (one peak value) have been employed for the Spanish trial.

Significant IPv6 training was issued by two partners, to 20 and 10 employees, respectively. On average each partner organized one workshop for technical experts (one partner peaked with six workshops). A total of nine workshops were given to decision makers (approx. 0.5 workshops per partner).

No IPv6 certificates focused on hand-on qualifications were received by personnel of the partners. A tot of six workers obtained project management skills. Three persons obtained commercial skills.

Eight persons became senior architects (of which 5 received this title from a single partner). Hence a total of eight persons obtained proof of improved skills.

An average of 2.2 employees per partner that participate in GEN6 will also work on other IPv6 projects if such projects are initiated (two partners peaked with respectively seven and ten employees).

Job mobility has been negligible; only one person exchanged their current employer for an IPv6 supplier.

3.4.2 Main observations

The responses don't show a lot of impact on human capital, nor lot expectations. Of course, experience is gained by the employees working in GEN6, but little mobility to other places from this experience through human capital is experienced and expected.

3.5 Social Networks

Note that the descriptions of the responses for the individual pilots can be found in Appendix 3.

3.5.1 Summary of pilot partner responses

Nine of the 16 partners indicated that some partnerships with the other partners in the pilot evolved from a weak tie into a strong tie, since the start of the pilot. For one partner this change in relationship happened with eight of the partners in the pilot, but for the other partners this was limited to one or two partnerships. For six of the 16 partners some partnerships have extended to other technology or activity domains.

Seven of the 16 partners indicated that the pilot activities resulted in new contacts or partnerships in other technology or activity domains.

So far, participation in the GEN6 pilots has not led to large involvement in other IPv6 related pilots or research programmes; only two partners have got involved in national pilots or research programmes after the pilot started. Nevertheless, four partners have established or joined national and international new IPv6 networks since the start of the pilot.

3.5.2 Main observations

The number of partners in the pilots differs between two and eight partners in total. Two of eight pilots only involve partners that also participate in the GEN6 consortium, but the other pilot teams also include several (one to seven) partners from outside the consortium. For three

pilot teams there had been no collaboration among the partners before; for one pilot team all partners were familiar with each other. Six pilot teams consist of new and familiar partners.

Although the pilots are still in the beginning, more than half of the pilot partner's partnerships have strengthened and for almost 40% of the partners involved partnerships have extended to other technology and activity domains. Moreover, almost half of the pilot partners have already established new contacts and partnerships because of their involvements in the pilot and four partners have joined other new IPv6 networks.

3.6 Costs & Benefits

For many partners it was difficult at this stage of the project to indicate costs other than costs as reported in the quarterly reports of the GEN6 project. Other costs may include costs made by non-GEN6 pilot partners and dissemination activities carried-out outside the GEN6 project. Therefore, actual costs have been omitted from the response summary. Some indicators on expected costs, however, are part of the following description.

3.6.1 Summary

Change in operational cost is not seen as a benefit of IPv6 by most consortium partners. Several partners predict a moderate increase of operational, management and troubleshooting costs. This is mainly because IPv6 is introduced alongside IPv4. A strong increase on network and application operational costs is expected by two partners. A moderate decrease is expected by two other partners. This diversity in expectations between the partners is shown in Figure 3-5.

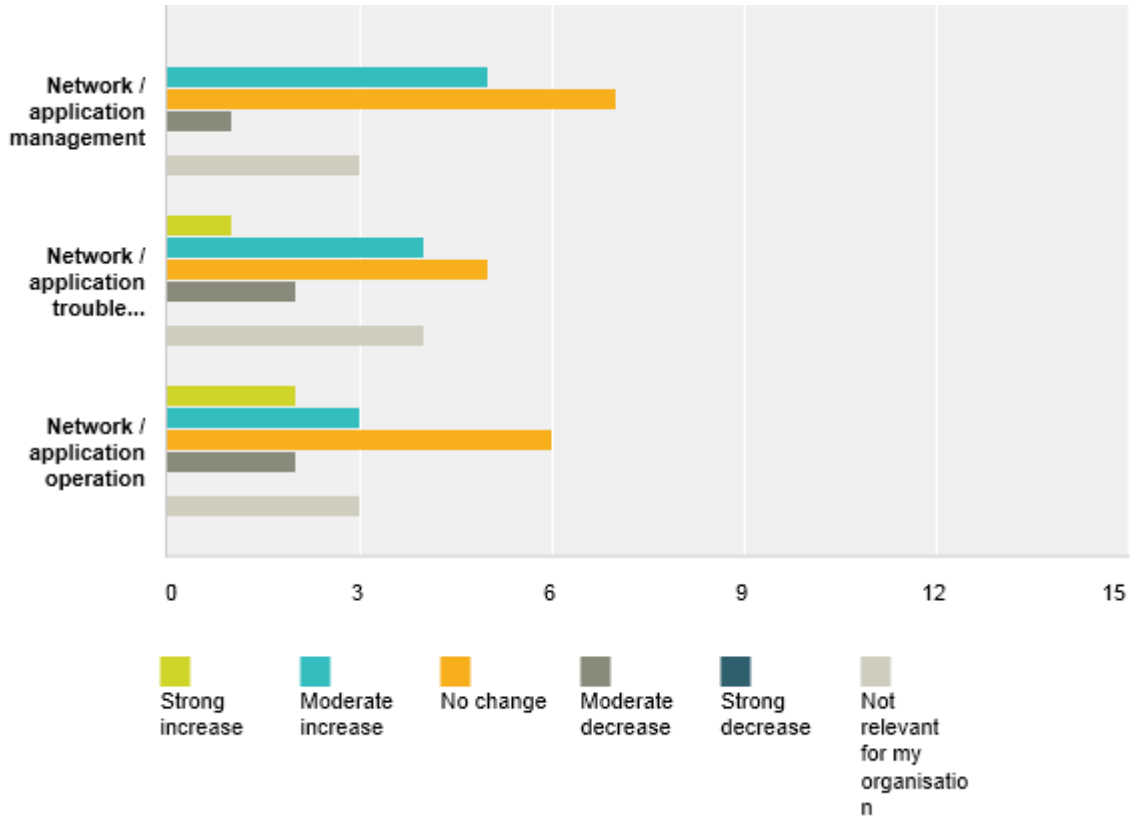

Figure 3-5: Partners' expectations on whether their pilot leads to security benefits for IPv6.

Most participants don't expect changes in availability, safety, environmental footprint and price of their piloted networks and services. A light increase in reliability is expected and also a minor increase in safety is expected. The reputation of the networks and services offered to users is expected to increase the most because of enabling them on IPv6.

With regard to security, one organisation expects a large cost reduction because of improved security due to IPv6 (75%-100% reduction). Five other organisations expect a minor reduction (0-19%). Overall, most organization don't expect benefits with respect to privacy, authentication and identification in their pilot. But six do expect benefits on privacy and identification and 4 expect benefits on authentication. This is shown in Figure 3-6.

The GEN6 pilots are expected to lead to the development of the following new products during or after the GEN6 project: a cloud testbed that is IPv6 ready, energy meters enabled with IPv6, an energy aware service monitoring real time energy consumption, an IPv6 management and monitoring tool, an analysis tool for IPv6 readiness of public websites, Internet of Things services for emergency response, services through eGovernment Gateway, a PEP connection for STORK and other LSP and end-to-end communication services (e.g. videoconferencing).

Participants on average expect to become more competitive because of their participation in GEN6. However, most do not expect any increase in sales, turnover, market share or profitability. Strong increase on competitiveness is expected by two partners. Only one partner

expects a strong increase in market sales because of their participation in GEN6.

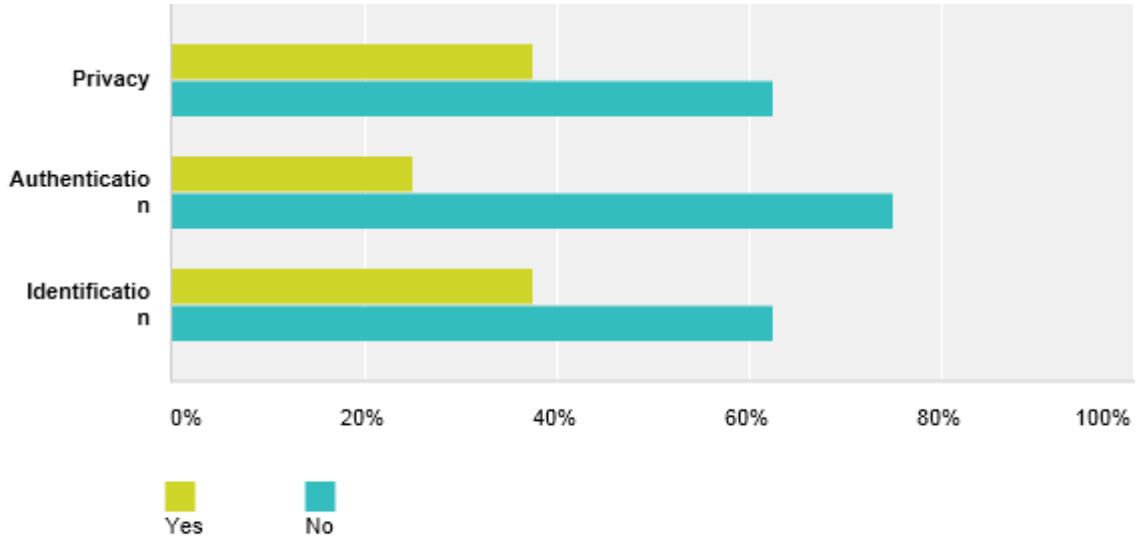

Figure 3-6: Partners' expectations on whether their pilot leads to security benefits for IPv6.

Several spin-offs are expected to result from the GEN6 pilots, for example collaboration with the Freesic project, the addition of new services to the piloted networks and services, extend IPv6 to other parts of intergovernmental networks, e.g. Red SARA, application of the service on other locations, e.g. smart meters in other public buildings than schools.

Extension or expansion of the pilot after GEN6 is expected by some of the participants. Another part of the partners is not sure about this yet.

Participation in GEN6 leads for a majority of the participants to an increase in activity and investment in R&D and innovation related to IPv6 and to ICT in general. Two organisations expect a strong increase in ICT R&D activities.

Most pilots do not expect new services or applications arising from the use of IPv6. However, two pilots do. The Slovenian pilot expects to enable concepts like IPv6 Network Mobility, DSMIPv6 host mobility and multicast scope options. The Greek pilot expects to increase the support of autonomic networking characteristics and reduce the monitoring and management complexity.

No disruption in IPv4 services are expected by any of the participants.

The pilots expect a lot (37) of IPv6 enabled services at the end of the GEN6 project. One pilot is expected to account for 22 of those services. 10 new IPv6 practices, standards, protocols etc. are expected to be developed and 7 IPv6 tools and technologies. No IPR will be developed with

regard to IPv6 services in the GEN6 pilots.

6 of the 8 pilots expect the use of developed best practices and tool etc. in the pilot to be used by organizations outside the pilot team.

Finally, the pilot leaders were asked what kind of achievements they expect from their pilots. This resulted in a long list of 6 pilots contributing to IPv6 support in certain equipment, 5 pilots contributing to best practices on dual stack, IPv6 addressing plans for governments and the improvement of IPv6 support of applications. 4 pilots expect to contribute to improve IPv6 support of middleware or operating systems and 4 pilots contribute to IPv6 requirement best-practices for governments. The overview is shown in Figure 3-7.

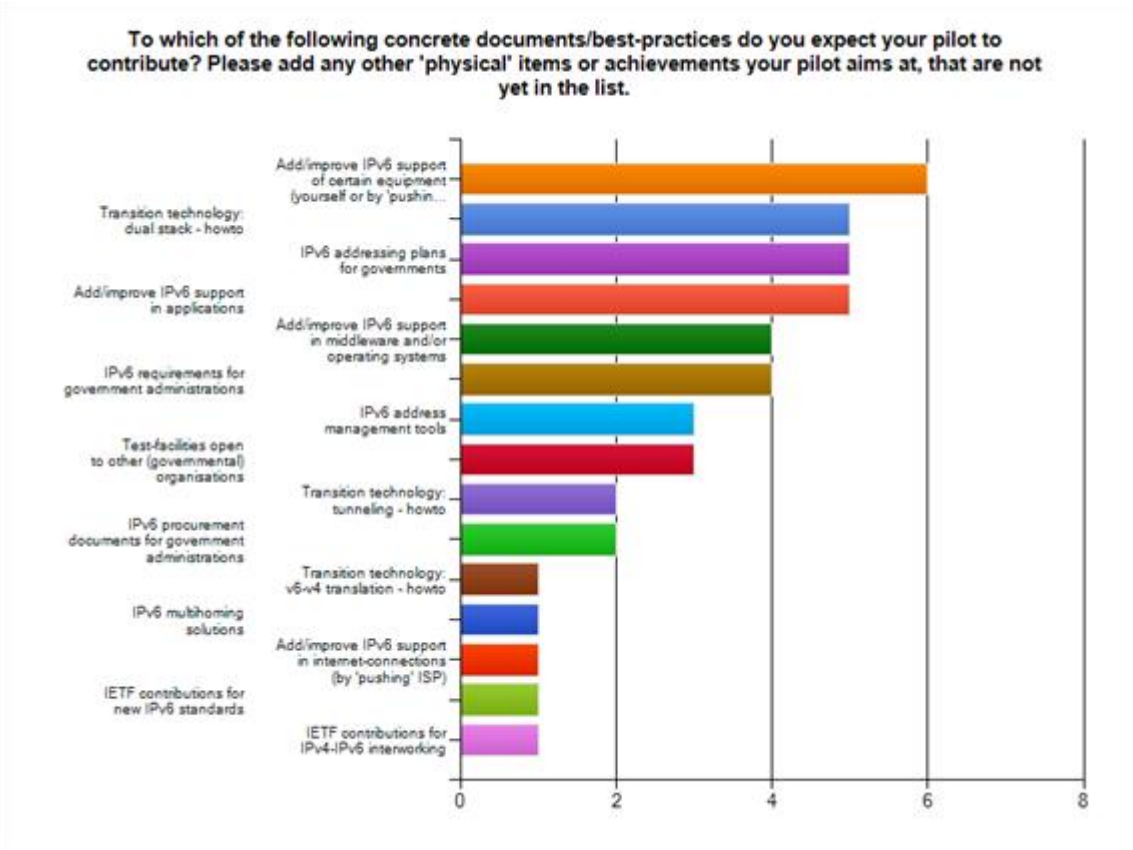

Figure 3-7: Overview of concrete expected 'achievements' of pilots

3.6.2 Main observations

The actual expected benefits from IPv6 features enabling new services that were not possible using IPv4, seem to be limited to the Greek and Slovenian pilot. However, the other partners do see several other benefits from participating in GEN6 and introducing IPv6 in their networks and services. These benefits are mainly experienced in having services running on IPv6 and the ability of expand these services to other places.

Cost aspects seem to be a less prominent topic for the pilots and partners. No real benefits are

expected from a cost perspective, although small disadvantages are expected, e.g. an increase in operational costs.

3.7 Governance

3.7.1 Summary

The impact channel governance focuses on governing and policy making by public organizations, about the structure of responsibilities and accountability of firms (e.g. towards shareholders and other stakeholders) and public private partnerships. In the context of IPv6 pilots, most relevant are decisions about the timing of IPv6 implementation; a number of factors can be relevant in making this decision (human capital, costs, benefits, risks, public policies, etc.).

In most cases the Network / infrastructure manager (7 out of 16) and the Chief Information Officer / Chief Technology Officer (6 out of 16) were mentioned as the key people deciding on the timing of implementing IPv6 in the networks and services. This is shown in Figure 3-8. Half of the respondents did not experience any pressure within the organization concerning the timing / planning of the implementation of IPv6 in the networks and services.

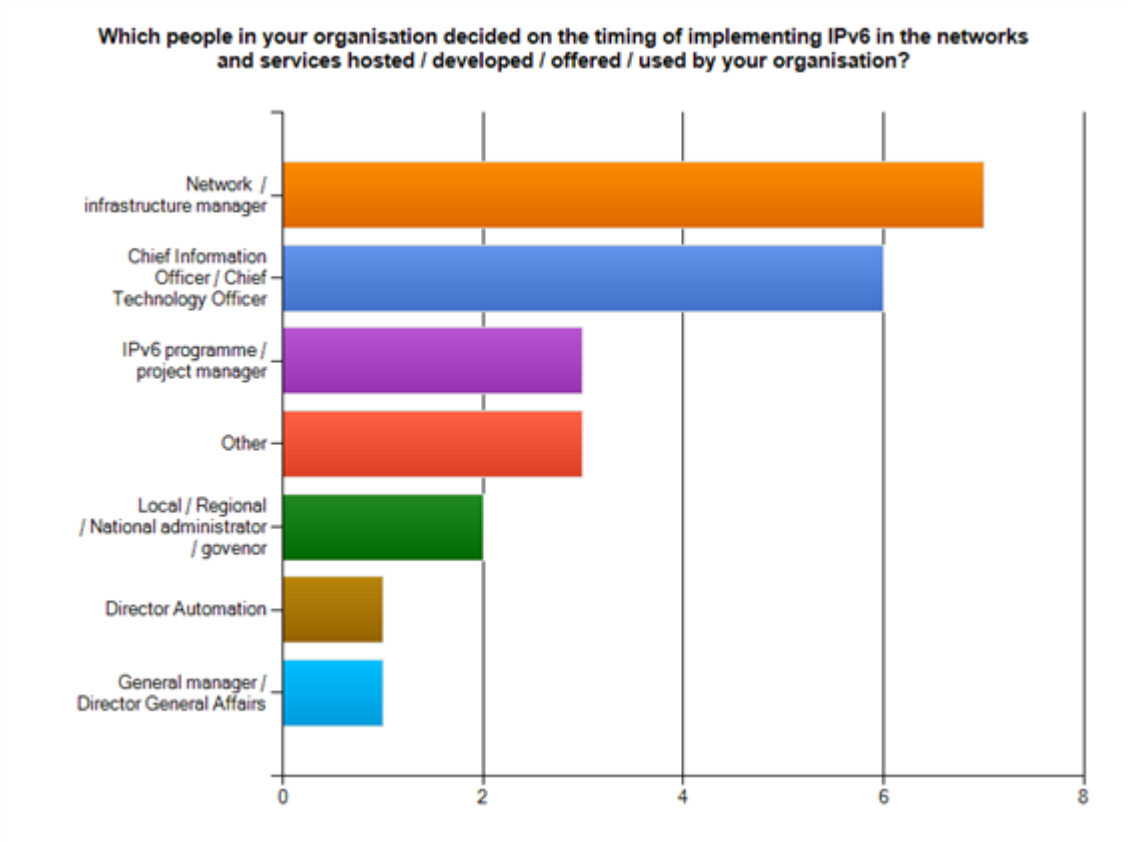

Figure 3-8: Overview of who decided on the timing of IPv6 implementation in the partner organisations.

In most cases (10 out of 16) government policies were not a source for informing organizations on arguments for deciding on the implementation of IPv6. Surprisingly only 7 out of 16 respondents indicated that government policies were not relevant for the decision to adopt IPv6, for 5 out of 16 these were very relevant.

In a majority of organizations the management readiness, e.g. in terms of priorities, knowledge and personal involvement related to ICT and innovation was considered to be high (9 out of 16), only one respondent considered management not to be ready at all. All organizations consider this management readiness to be somewhat (8 out of 16) to very important (8 out of 16) with regard to ICT and IPv6 for the organization's decision to implement IPv6. A majority (10 out of 16) do not see government policies that are influential on management readiness, and 9 out of 16 do not consider government policies relevant on the decision to implement IPv6.

Taking into account the overall incentive structure, management and activities of the organization, most respondents consider their organization somewhat (9 out of 16) to very sensitive to costs (4 out of 16). Not surprisingly this sensitivity to costs is considered somewhat (9 out of 16) to very important (3 out of 16) for the organization's decision to implement IPv6. The majority (10 out of 16) of respondents does not see government policies that aim to influence the costs of implementing / operating IPv6. Half of the respondents considers government policies not relevance for the costs.

Most respondents (14 out of 16) did not experience any pressure by government policies to implement IPv6 (see Figure 3-9) and a majority (10 out of 16) also did not experienced any influence from other organizations or experts on the decision about the timing of IPv6 implementation. Those that did indicate influence mentioned participation in R&D and research networks e.g. IPv6 Forum and research projects such as 6NET, 6DEPLOY, 6DEPLOY2 & EFIPSANS.

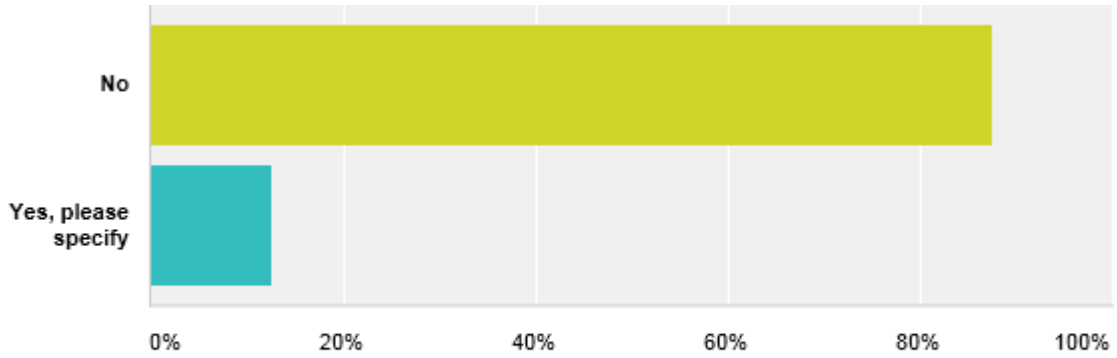

Figure 3-9: Indication whether partners experienced pressure from government policies to introduce IPv6.

Other motivations that influenced the organization's decision about the timing of IPv6

implementation are differing among partners, ranging from new market opportunities (getting ahead of competition) to the need to address issues due to expansion of IPv6 in networks and the desire to be innovative.

3.7.2 Main observations

A decision on investment in IPv6 and timing thereof seems to be largely driven by technical staff in organisations. Although management readiness is considered important and in most cases was considered high, there was little actual pressure from management concerning the timing / planning of the implementation of IPv6 in the networks and services. The partners indicate the government policies in general weren't considered as a driving force for implementation of IPv6.

3.8 Conclusions

From the perspective of technical implementation, it is expected that the output will be high compared to other impact channels. The expected impact from technical implementation is mainly focused on usage and users, and not so much on improved availability, increased performance and increased safety, except for the Slovenian and Greek pilots. However, the actual technical work is essential since it is the basis for the impact channels that are expected to have higher impacts. As such, the technical implementation determines the quality of the GEN6 work.

The main impact of the GEN6 project is clearly to be expected on the level of knowledge and cost & benefits. These impact channels show the highest expectations on output, so the challenge is to converse those outputs to outcomes and actual impacts.

Partners find it hard to give meaningful responses to questions related to the impact of the awareness and social networks impact channels. It is therefore suggested to focus more on the approach and amount of awareness activities, and plans and actions with respect to social networks, rather than on the effects of them, since it is hard to give a justified qualitative measure of them.

Expectations that the impact though human capital working in the GEN6 project are not very concrete. Partners appear to have little influence on the mobility of their employees to other organisations, or at least little plans for influencing this. Given this observation, it seems that impact from human capital would be more relevant in the context of an external project impact analysis and evaluation several years after the end of the project.

For governance it is clear that to a large extent decisions on implementation of IPv6 are

strongly driven by technical staff without too much pressure from either general management or government policies. The question that remains is how the drivers of IPv6 within organisations are able to stimulate investments in IPv6.

4. EXPECTATIONS VERSUS RESULTS

The monitoring framework from D5.1 uses intervention logic and a list of indicators developed based on that, incorporating high level policy goals from the EC and low-level goals on IPv6 implementation. This chapter focuses on the question to what extend the GEN6 project can successfully contribute to these goals, based on the expected impact of the consortium partners, discussed in Chapter 3.

4.1 Expectations from monitoring framework

The EC goals for the GEN6 project are:

- Stimulating IPv6 upgrades of public networks and eGovernment services.
- Stimulating the development of new innovative IPv6 enabled content and services benefitting from new functionalities.
- Contributing to the prevention of a secondary IPv4 market and a quality drop in online public services caused by a depletion of the IPv4 address space.

Need/problem/issues	Possible contribution of pilots	Impact channels
A pending shortage of IPv4 addresses	Pilots can contribute to tackling this (macro) problem, by addressing several technical and economic issues of IPv6 implementation	Awareness, knowledge, technical implementation, costs and benefits
Continuity issues resulting from a shortage of IPv4 addresses or from delayed introduction of IPv6	Continuity issues can be both prevented and addressed by pilots, e.g. by reducing the number of late adopters, and by creating information about technologies and processes to manage continuity	Awareness, knowledge, technical implementation,
High costs resulting from a scarcity of IPv4 addresses or late implementation of IPv6 (e.g. costs of technical consulting)	Pilots can reduce the costs – for individual organisations and society at large – by stimulating a variety of organisations to adopt IPv6 early; i.e. to prevent the risks and high costs of last minute implementation	Awareness, costs and benefits
More effective and/or efficient network management, e.g. address configuration, zoning and using the opportunity to 'clean up' legacy and piecemeal network management systems	Pilots can provide concrete examples and best practices of how IPv6 implementation can lead to more effective and efficient network management. The implications will be different for different (legacy) network management systems, for different types of IT departments, users, applications, etc.	Technical implementation, costs and benefits, knowledge, human capital
Better network performance, e.g. improved QoS implementation and security via IPv6 instead of applications	Pilots can reveal the types and magnitude of improvements in network performance. Improved QoS at the level of networks can have implications for QoS at the level of applications	Technical implementation, knowledge
Demand for IPv6 by customers	Pilots can lead to information about the different reasons that customers may have for (early) adopting IPv6. This information can be used to further stimulate demand for IPv6, and to estimate demand by types of users, over a period of time. This information is valuable for suppliers of IPv6 hardware, software and services	Awareness, social networks, knowledge
New services or features	Pilots can lead to information about how IPv6 implementation triggers (or is complemented by) innovation in services and features, e.g. related to quality, security and privacy	Knowledge, costs and benefits
Action plans and regulations on IPv6 adoption	National, European and other governments have communicated their ambitions or even obligations related to IPv6. Pilots can amplify these signals, provide inspiring signals, link relevant actors, and lead to relevant information	Awareness, social networks, knowledge

Table 4-1 shows some possible intervention logic for IPv6. It lists a number needs/problems/issues associated with IPv6, the possible contribution of the pilots in solving them and the impacts channels from which indicators can be used to assess outputs, outcomes and impacts associated with specific inputs for the pilots.

These needs/problems/issues are based on analysis of other IPv6 studies and were already described in D5.1. The issues/problems/needs are as an initial list of how the intervention logic may work for IPv6 related issues. After the *check-up measurement* these issues/problems/needs may be updated for the final measurement.

Need/problem/issues	Possible contribution of pilots	Impact channels
A pending shortage of IPv4 addresses	Pilots can contribute to tackling this (macro) problem, by addressing several technical and economic issues of IPv6 implementation	Awareness, knowledge, technical implementation, costs and benefits
Continuity issues resulting from a shortage of IPv4 addresses or from delayed introduction of IPv6	Continuity issues can be both prevented and addressed by pilots, e.g. by reducing the number of late adopters, and by creating information about technologies and processes to manage continuity	Awareness, knowledge, technical implementation,
High costs resulting from a scarcity of IPv4 addresses or late implementation of IPv6 (e.g. costs of technical consulting)	Pilots can reduce the costs – for individual organisations and society at large – by stimulating a variety of organisations to adopt IPv6 early; i.e. to prevent the risks and high costs of last minute implementation	Awareness, costs and benefits
More effective and/or efficient network management, e.g. address configuration, zoning and using the opportunity to 'clean up' legacy and piecemeal network management systems	Pilots can provide concrete examples and best practices of how IPv6 implementation can lead to more effective and efficient network management. The implications will be different for different (legacy) network management systems, for different types of IT departments, users, applications, etc.	Technical implementation, costs and benefits, knowledge, human capital
Better network performance, e.g. improved QoS implementation and security via IPv6 instead of applications	Pilots can reveal the types and magnitude of improvements in network performance. Improved QoS at the level of networks can have implications for QoS at the level of applications	Technical implementation, knowledge
Demand for IPv6 by customers	Pilots can lead to information about the different reasons that customers may have for (early) adopting IPv6. This information can be used to further stimulate demand for IPv6, and to estimate demand by types of users, over a period of time. This information is valuable for suppliers of IPv6 hardware, software and services	Awareness, social networks, knowledge
New services or features	Pilots can lead to information about how IPv6 implementation triggers (or is complemented by) innovation in services and features, e.g. related to quality, security and privacy	Knowledge, costs and benefits
Action plans and regulations on IPv6 adoption	National, European and other governments have communicated their ambitions or even obligations related to IPv6. Pilots can amplify these signals, provide inspiring signals, link relevant actors, and lead to relevant information	Awareness, social networks, knowledge

Table 4-1: IPv6 needs/problems/issues and how pilots can contribute to them[8]

[8] *From GEN6 D5.1: Monitoring Framework & Description of Indicators*

4.2 Gap analysis

This section looks at the expectations of the GEN6 pilots and partners and gives an indication how the GEN6 project is expected to contribute to the high- and low-level goals. Two main sets of issues will be subject of the discussion:

1) The EC goals for GEN6

2) The IPv6 intervention logic

In the final measurement of the project, the contribution of GEN6 to these goals and overcoming or assisting in the issues/problems/needs will be determining the success of the project. Note that the issues/problems/needs will be finalized after the check-up measurement, since the interviews included in that measurement aim to get more insight into the mechanisms and rationales behind the expectations of the pilots and partners.

4.2.1 GEN6 expectations in the light of EC goals

Based on the baseline measurement results, the GEN6 pilot is expected to contribute to each of the EC goals from the 2011 Work plan: many IPv6 enabled eGovernment services and public networks are expected to be implemented and the project focuses on developing best practices and the dissemination of them. Also, innovative services enabled by IPv6 will be piloted in the project.

The third goal of the EC is addressed by the fact that the pilots do not expect service degradation due to IPv6 introduction. The expectations however, show some risk here; the fact that there might be moderate increases in cost and complexity, which could lead to organisations not implementing IPv6 on time. It would be valuable to focus a bit more on these aspects.

The main challenge of the GEN6 project is to have impact outside the GEN6 consortium. This should be achieved mainly via the impact channels awareness and social networks. The effectiveness of activities contributing to impact via these channels is steered largely by the impact channel knowledge and cost & benefits, since those channels focus on what barriers should be overcome and how and what organization can gain (or lose) by introducing IPv6. Finally, the quality of the work depends mainly on the technical implementation. Impact via human capital seems to be for a large part outside the influence of the GEN6 consortium: partners have only limited capability to mobilize their employees to other IPv6 projects in their own or to other organisations.

4.2.2 GEN6 expectations in the light of IPv6 intervention logic

The needs/problems/issues from the IPv6 intervention logic listed in Table 4-1 are expected to be addressed in GEN6. This section shows how the GEN6 project can be expected to contribute to (solving) the mentioned IPv6 issues/problems/needs. It should be noted that GEN6 was not meant to solve these issues entirely – the project is just a small part of the entire ecosystem – but merely contribute to issues like these as much as possible.

The pending shortage of IPv4 addresses is outside the influence of the GEN6 project. However the GEN6 project could contribute to make the introduction of IPv6 more attractive to organisations, thereby stimulating further uptake and less demand for IPv4. The project intents to do so by publishing and disseminating practical showcases, technical best practices and lessons learned.

Continuity issues resulting from a shortage of IPv4 addresses or from delayed introduction of IPv6 is addressed by many of the pilots that introduce IPv6 alongside IPv4. Continuity of the IPv4 services is required to be maintained, so the pilots are expected to come up with best-practices and implementation experiences that aim to fulfil the continuity requirement.

High costs resulting from a scarcity of IPv4 addresses or late implementation of IPv6 (e.g. costs of technical consulting) should be addressed by stimulating the IPv6 uptake among governments. GEN6 can contribute to this through the impact channels of awareness and social networks. Expected impact on especially the social networks is still limited and might be difficult to achieve, however it does remain within the final scope for the GEN6 pilots and projects.

More effective and/or efficient network management, e.g. address configuration, zoning and using the opportunity to 'clean up' legacy and piecemeal network management systems is addressed by several of the pilots. This aspect is not mentioned as an explicit pilot goal, mainly because this is not an issue in every situation: in depends on the legacy situation of the piloted network or service. Contributing to this issue could be one or more pilots that actually show the benefits of e.g. removing NAT or performing end-to-end monitoring.

Better network performance, e.g. improved QoS implementation and security via IPv6 instead of applications is addressed in the cost & benefits impact channel and technical implementation. The GEN6 project will contribute to insight in this issue through several pilots. Improved performance and security are not expected by most pilots, but some do.

Demand for IPv6 by customers is a market issue mainly outside the influence of GEN6. However, GEN6 aims to get insight in the requirements of different kinds of users. Also, the government entities in GEN6 could be pushing IPv6 in the future thereby driving the market as users.

New services or features are addressed by GEN6. New IPv6 features are not expected to arise, but new services because of existing IPv6 features are. It should be noted that this is currently expected only for specific service scenarios and not expected for mainstream eGovernment services.

Action plans and regulations on IPv6 adoption are not a topic on which the GEN6 partners expect a lot of impact at this moment. This governance aspect is touched upon in this baseline measurement and it turns out that IPv6 for the GEN6 partners is often not a decision originating from action plans and regulations. Note that the GEN6 project does expect to develop recommendations on the actual contents and technical aspects of action plans and regulations, for example supporting governments with writing national procurement definitions for IPv6.

5. CONCLUSIONS

This baseline measurement is the first step in bringing focus and more detail to the actual monitor at the end of the project. It provides a generic insight in the expectations of the pilots and partners for the indicators of the monitoring framework.

The expectations show that the monitoring framework works well for impact monitoring of GEN6 and enables the monitoring team to focus on relevant aspects and make decision to go into more detail on some aspects and less on others.

In order to be able to actually measure the contribution of the GEN6 pilots to EC goals and IPv6 intervention logic, a more in depth understanding of certain mechanisms and rationales behind the expectations of the partners is valuable. For example, if several partners expect an increase in complexity of the network, insight in the actual reasons behind this will help understanding a certain IPv6 issue/problem/need, which may be essential when trying to disseminate the gained knowledge to other organisations.

The different impact channels are interlinked to contribute to the goals as much as possible. Five impact channels are considered to be the most important:

Awareness and social networks are the channels that measure impact outside the GEN6 project best. Knowledge and cost & benefits are essential in that they determine if the right information is disseminated; so what, how and to whom. Technical implementation is key to the quality of the information that is disseminated.

For governance it is clear that to a large extent decisions on implementation of IPv6 are strongly driven by technical staff without too much pressure from either general management or government policies. The question that remains is how the drivers of IPv6 within specific organisations can help to stimulate investments in IPv6 in other organisations.

The next steps for WP5 are the check-up (Q4 2013) - in which the rationale behind the expectations will be investigated - and the final measurement (2014).

In the final measurement of the project, the contribution of GEN6 to the EC goals and overcoming or assisting in the issues/problems/needs will determine the success of the GEN6 project. Note that the issues/problems/needs will be finalized after the check-up measurement, since the interviews of that measurement aim the get more insight on the mechanisms and rationale behind the expectations of the pilots and partners described in this baseline measurement.

The aim of the baseline measurement, which focuses on the expectations for pilots and

partners, is to further focus the measurements to come. Based on the results of the baseline measurement a number of focal pints have been formulated, for each of the impact channels:

Focal point technical implementation: the introduction of IPv6 is expected to have small effects on the measured value of the indicators, yet they may prove valuable for deciding when and how to deploy IPv6: from a technical perspective these effects may seem small - the business impact may be more significant. The results of the baseline measurement suggest it may be worthwhile focusing more on rationale and mechanisms behind these effects. Also, the clear benefits should be prominently addressed.

Focal point knowledge: concerning this impact channel it would be valuable to focus mainly on barriers experienced by the partners and the required knowledge to overcome those barriers. This will give insight in the value of lessons-learned to other organisations, since they focus on encountered barriers.

Focal point awareness: it is often difficult to measure the full impact of awareness campaigns and dissemination activities. However, it would be good to focus more on the actual output of the awareness campaign and in what how pilots are undertaking actions to raise awareness.

Focal point human capital: with regard to human capital, the main focus should be on the ideas partners have and the actions they plan to undertake concerning the people that work in the GEN6 project and how to use these people in other parts of the organisation or outside the organisation. The result of such a focused monitor would lead to better insight in the impact of human capital in GEN6. It should be noted that human capital seems to be quite out of the influence of the pilot partners during the GEN6 project and that significant impact is expected to be measurable especially on the longer term.

Focal point social networks: the main issue that is of interest for social networks is whether GEN6 actually leads to the application of GEN6 results outside the initial GEN6 partnerships. It would be interested to focus on the advantages or disadvantages that organisations see in cooperating with other organisations outside GEN6.

Focal point costs & benefits: it could proof valuable to focus more on the rationale behind the benefits expected by the partners and if the expected achievement is actually reached. Especially the spin-off to other organisations that is expected by partners is only successful if they are in some way beneficial to those organisations. It is also important not to forget the cost aspect and look for a case that can give more insight in the cost of operation.

Focal point governance: the questions in the survey provide some first insight in those factors that were important in the decision on implementation of IPv6, however it would be very beneficial to extent the information base by looking in more detail at decision making processes

in the organisations involved and how these insights can help other organisation.

6. ANNEX 1: PILOT RESPONSES TECHNICAL IMPLEMENTATION

This Appendix describes the summarized responses to the survey for each of the GEN6 pilots for the impact channel *technical implementation*.

6.1 National Pilot of Germany

IPv6 will be implemented on Internet links and in the Wide Area Network (WAN), Local Area Network (LAN) and in the back bone networks. Several business applications and web-based applications will operate on IPv6.

Although the German piloted networks and services will have a slightly more complex architecture than the pre-pilot situation, the pilot team expects that the IPv6 network will be slightly less complex than the IPv4 network. The IPv6 service implementation is expected to be of the same complexity as the one for IPv4.

When future changes are needed with respect to security, the team expects that firmware or software upgrades will be sufficient.

Management of the network is expected to be of equal ease; however management of the services is expected to be more difficult on dual stack than on IPv4.

At the beginning of the project the German pilot did not have any services operational on IPv6. It is expected that services enabled on IPv6 will not be used by other organizations than those participating in the pilot. In the first year the German pilot implemented large parts of the network & service requirements and 'other' requirements. More functional requirements will follow later in the project. Of the implemented requirements actually between 1% and 24% is already operational.

After undergoing a software update the pilot can reuse about a quarter to a half of the existing equipment. Up to a quarter can be reused as-is, leaving a quarter of the equipment in need of full replacement, i.e. this was newly purchased. Approximately half of the existing software can be re-used as-is for the pilot and the other half of the software needs an update. In addition 50-75% of the software base needs to be newly purchased.

6.2 National Pilot of Greece

IPv6 will be introduced in the Greek school network, public schools and cloud management networks. DNS, DHCP and other network functions remain on IPv4. Applications such as websites, smart energy metering, data collection and management services will also run on

IPv6.

The Greek pilot expects network complexity to be reduced greatly once transitioned to IPv6. The IPv4 network is expected to be much more complex compared to IPv6. The service architecture in the IPv4 environment will be slightly more complex compared to a service architecture in IPv6.

The Greek pilot team expects that both network and service management is easier in the case of IPv6 compared to IPv4. The smart metering and monitoring services introduced by the pilot will work only work on IPv4. The Pilot will not disable services that run on IPv4 and requirements for the IPv4 network will not be relaxed.

Changes in processes needed to operate the IPv6 network and services are not expected to change. They can remain the same as for IPv4.

On average the Greek pilot has implemented 50% of the total set of requirements. All types of requirements are represented. Slightly more than 50% of the features and the requirements are operational in the pilot. Of the equipment available from the pre-pilot situation, approximately one quarter is reused as is, a volume between one fourth and a half is reused with hardware modifications, and a quarter is reused after receiving a software update. Between 50% and 75% of the equipment used in the pilot is newly purchased. A small amount of software is reused without modification, while almost all software used in the pilot has received an update. This is still a small amount as between 75 and 100% of the software used in the pilot is newly released. Between 50 and 75% of the piloted services was available on IPv6 at the beginning of the project. All of these services were used, but none of the content was made available via IPv6.

When needed, security updates are expected to take the form of a new firmware or software upgrade.

The team expects about 10,000 users outside the pilot will use the smart metering applications.

6.3 National Pilot of Luxembourg

The Luxembourg Pilot expects that the introduction of IPv6 in clouds will slightly increase complexity of the core and management network as well as the private cloud service architecture. The IPv4 core and management network architecture is considered slightly less complex compared to the projected IPv6 network architecture.

The pilot does not expect to enable services that could not be implemented on IPv4. It is

expected that services that transition to IPv6 will not do so because they cannot be deployed using IPv4. No services are planned to be disabled because of the transition to IPv6.

The Luxembourg pilot does not expect that the introduction of IPv6 will result in changing requirements for IPv4 network implementations and changes in operational processes are not expected for both network a service operations.

The requirements of the Luxembourg pilot focus on security, management (network and service) and functional requirements. Requirements on performance and miscellaneous requirements are not addressed at the time of the baseline measurement. At the start of the pilot no services were available on IPv6 and as such none were consumed. Less than a quarter of the IPv6 requirements have been implemented. This has been accomplished without implementation of IPv6 features. So far a maximum of 50% of the already available equipment has been reused as is or has received a software update. 25% of the equipment used in the trial is newly purchased. Almost all of the already present software has been reused without modification. Up to 25% of the cases where software was reused, a minor change was needed and a maximum of 25% of the software used in the pilot required a new release.

Firmware and software updates are believed to be the only changes that must be made in order to meet future demands on security.

Management of IPv6 networks is considered slightly more difficult while management of services in the IPv6 cloud is estimated to be the same.

One organization outside the pilot uses the networks and services. The pilot is an example of a monolithic service model.

6.4 National Pilot of Slovenia

The Slovenian pilot aims to build a system that integrates professional and commercial communication infrastructures to improve emergency response communication services. It is expected that the complexity of the network and service architecture will largely increase compared to the pre-pilot situation. The IPv4 network/services architecture is much less complex than the IPv6 architecture at the end of the pilot.

Networks, network services and application services in the pilot will be enabled with IPv6. This includes on-site networks, the A-ERCS node network, sensor networks, backhaul networks, DNS, DHCP, routing, IP mobility, QoS, profiling, admission control, websites, VoIP, data and sensor networks.

It is expected that over 75% of the equipment used in the pilot is newly purchased and approximately 25% can be re-used after performing a software update. Of the software that was already running before the pilot, 25%-49% can be re-used and up to a fourth of the software requires a minor update.

In relation to possible future security issues, the A-ERCS system is designed to enable as much flexibility as possible. Any future changes or additions can be done.

The pre-pilot ERCS system has limited IPv4 functionality and the different IP services are not integrated. When IPv6 is introduced this will improve the service, but it is also expected to result into a much more complex management of the IPv6 network, compared to the IPv4 network.

At the beginning of the GEN6 project none of the services of the A-ERCS where already available.

The Slovenian pilot expects to enable services with IPv6 that or not possible with IPv4. The technologies used to enable these services are NEMO (Network Mobility for IPv6), DSMIPv6 host mobility, multicast scope options. To the end-user this will result in an improved quality of experience for example when receiving video over IPv6, compared to the case in which the user receives video over IPv4.

The pilot does not expect to disable any IPv4-services because of introducing IPv6.

The introduction of IPv6 in the A-ERCS is not expected to influence the requirements for the existing IPv4 networks and services: they will stay the same. Also, the introduction of IPv6 in the A-ERCS is not expected to lead to changes in any network or services related processes.

The Slovenian pilot has started implementation in 2012. So far, up to a quarter of the requirements have been implemented.

6.5 National Pilot of Spain

The Spanish pilot expects a slight decrease in the overall complexity of the network and service architectures due to the work in GEN6. The IPv4 network and service architecture is expected to remain slightly more complex when the transition to IPv6 is completed. For both the network and services, the Spanish pilot indicates that IPv6 management is considered slightly easier than IPv4 management. IPv6 will be introduced on the Red SARA core network and the network containing the MINETUR area connections. A wide diversity of network related services will be transitioned to IPv6. These include DNS, proxies, and BGP routing. Website

related services and a Technical Inspection of Vehicles service will become operational on IPv6.

The Spanish pilot does not expect to enable services that could not be implemented on IPv4. No services are planned to be disabled because of the transition to IPv6. Introduction of IPv6 will not impact requirements on IPv4. When services are introduced on IPv6 services on IPv4 will not change. The Spanish pilot aims to perform transition to IPv6 with no impact on network and service related processes.

At the baseline measurement, the Spanish pilot has already implemented up to 50% of the functional IPv6 requirements. Security and performance requirements are met up to 25% each and the implementation of management requirements is between 25% and 50%.

Almost 25% of the IPv6 features have been implemented, covering between one quarter and a half of the IPv6 related requirements.

The Spanish pilot is predominantly reusing equipment “as is” and a small amount of existing equipment that has received software updates or both software and hardware updates. Less than a quarter of the equipment has been newly purchased. The software used by the pilot is in less than 50% of the cases reused without modification and in more than 50% of the cases the software is reused after an update. The percentage of new software is less than 25%.

The pilot expects that firmware or software upgrades are needed to remain flexible to security related threads. The pilot also does not exclude the need for a new network design when changes in security related threads occur.

At the beginning of the pilot up to a quarter of the services was already available on IPv6. And of these services and content, 25% for each was used over IPv6. 45 organizations outside the pilot use the networks and services.

6.6 National Pilot of Turkey

The national pilot of Turkey is expected to slightly increase network and service complexity. The IPv4 architecture is expected to remain less complex compared to IPv6. The IPv6 transition will not increase the complexity of the service architecture. IPv6 will impact the core network, DNS and webservers and electronic Government Gateway (EGG) Web Portals and associated load balancers and VPN services.

IPv6 will require a more complex network management compared to IPv4. Management of the services is expected to be of the same complexity as was the case in the IPv4 network.

No services are expected to be deployed that cannot be deployed on IPv4 and require IPv6. The

pilot is not likely to disable a service because IPv6 is introduced in the network and services.

The pilot expects that requirements for IPv4 will relax because of traffic and services are moved to IPv6.

Because of the introduction of IPv6 in some cases changes in processes are expected for both network and service operations.

Turkey's GEN6 pilot has already implemented more than 50% of management related requirements. Functional and security requirements are almost halfway implementation. A limited set of performance related requirements have been implemented. In total almost all IPv6 features have been implemented and they foresee in almost all of the IPv6 related requirements. More than 50% of the equipment will be reused by the pilot without applying changes. A small percentage of equipment will receive a hardware update or a hardware and software update. Less than half of the equipment requires a software update only to be reused. Less than a quarter of the equipment will be newly purchased, hence the majority of the equipment is reused existing equipment.

Less than 50% of already used software will receive a small change or an update in order to be redeployed. Less than 50% of the software does not require an update and can be deployed without modification. Less than a quarter of software can be considered a new release.

At the start of the pilot no services were available on IPv6. None were consumed using IPv6 and no content was available through IPv6.

The IPv6 implementation of Turkey will result in additional firewall rules, IDS/IPS policies and ACLs to meet future security related changes. No software updates or hardware replacements are necessary.

In case security issues appear in the future, the pilot implementation may require firmware or software upgrades, a change in network design and modification of rules and policies. Equipment is not expected to be changed.

60 external organization will use the piloted network and services.

6.7 Cross-border eGovernment pilot

In this pilot, IPv6 will be introduced in the management of networks, in network services such as DNS, PEPs[9] and VPN, and in application services. The pilot leader foresees that the

[9] *PEP stands for Pan-European Proxy*

complexity of the network and services architecture will be similar for IPv4 and IPv6 and the GEN6 pilot is not expected to change the general complexity of the piloted network and/or services. Regarding the management of the network, the pilot leader expects that this will be slightly easier for IPv6 than for IPv4. With regard to the management of services, the pilot leader foresees that this will have similar difficulty for IPv6 and IPv4. One organization outside the pilot will use the network and or services implemented in the pilot.

Since the start of the pilot, more than half of the functional requirements have been implemented. Requirements in relation to security are met for 25% to 50%, while the implementation of the requirements regarding performance, network and services management, and management procedures are still in an early stage (less than 25%). Regarding the IPv6 features implemented so far, over 50% is currently operational, while from the IPv6 requirements implemented so far 25% to 50% is currently operational.

For the pilot, up to a quarter of the total equipment used is newly purchased. From the existing equipment between 50 and 75% can be reused in the IPv6 pilot without any modifications, while 50 to 74% of the existing equipment would need both a software and hardware update and 75 to 99% would need a software or hardware update. Regarding software, up to a quarter of the software used is newly purchased. From the already available software, 50 to 74% can be reused without modifications, while 75 to 99% would need an update.

The implemented IPv6 enabled networks and/or services in the pilot will need changes, such as a firmware or software upgrade, replace of equipment, and a change in network design in order to be able to adapt to future security changes.

None of the services to be implemented were available via IPv6 before the pilot. However, the IPv6 enabled services do not offer features that are not possible over IPv4. Moreover, the introduction of the IPv6 enabled services will not lead to disabling any other service. The pilot leader also expects that the implementation of IPv6 will lead to less stringent and simpler requirements for IPv4. In some cases, changes in network and services related processes will be needed for the implementation of IPv6.

6.8 Cross-border safety pilot

The pilot team expects the network and service architecture to become slightly more complex than in the pre-pilot situation. The IPv6 network architecture is expected to be slightly more complex than the IPv4 network, but the service architectures of IPv4 and IPv6 are of similar complexity.

IPv6 will be introduced in the core network and management network. This pilot does not

include enabling networks, services, and application services with IPv6.

The majority of equipment used and necessary for the pilot is the same equipment of the pre-pilot situation without any changes: between 50% and 75% of the existing equipment is expected to be re-used without changes and up to a quarter is expected to be used with a software update. The same is expected for the software: 50-75% can be re-used as-is and up to a quarter needs updating. Less than 25% of the pilot equipment and software will be newly purchased.

The pilot solution is designed to be flexible in the sense that any necessary additions for security reasons can be carried out by performing a firmware or software upgrade.

Network management is expected to be slightly more difficult in the IPv6 network than in the IPv4 network. Service management is expected to have similar difficulty on IPv4 and IPv6.

At the beginning of the GEN6 project none of the services of the cross-border safety pilot where already available.

Besides the pilot team two external organizations will use the networks and service form the cross-border safety pilot.

The pilot team does not expect any new service that are enabled on IPv6 that are not possible using IPv4 only. Introduction of IPv6 in these services is not expected to disable any service on IPv4. It is not expected that the IPv6 pilot will lead to changes in requirements for the IPv4 networks and services in the pilot network.

No changes in network or service related processes are expected to be necessary in the pilot.

The cross-border safety pilot has started with some implementation in 2012, focusing mainly on functional, security, network, and service management requirements. Between a quarter and a half of the implemented requirements are already operational.

7. ANNEX 2: PILOT RESPONSES AWARENESS

This Appendix describes the summarized responses to the survey for each of the GEN6 pilots for the impact channel *awareness*.

7.1 National Pilot of Germany

Pilot information about the German pilot is available on the website http://www.citkomm.de/technologie/gen6-projekt.html, which is part of the website of the pilot leader. The number of unique visitors to the GEN6 page is not known.

In 2012, the pilot team prepared five popular publications, participated in one workshop and gave five conference presentations. Moreover, the pilot contributed to one IPv6 training session and organised a workshop about IPv6 implementation. This workshop attracted 20 visitors, all from organisations outside the GEN6 project and the German pilot team.

Since the start of the pilot, 1.5 person days have been spent on publications and the website. The participation in and organization of events took 2 person days. One person day has been spent on average on the preparation of booklets and guidelines. So far, guidelines, booklets or handbooks have not been published.

The pilot team received on average two requests per month on IPv6, since the start of the pilot. These questions were related to IPv6 implementation in networks, IPv6 training, the impact of IPv6 on end-users and questions for presentations and interviews. So far, two person days have been spent on answering pilot-related questions from external organisations.

So far, the dissemination activities have not led to contacts with organisations that start then started to implement IPv6 for the first time.

7.2 National Pilot of Greece

At present no information on the pilot is available online, but it is expected that information will be made available on a dedicated website.

Since the start of the pilot, 1 scientific publication, 5 popular publications and one conference presentation have been prepared. Moreover, three interviews have been given to the press. The pilot team has also prepared a handbook/guidelines/booklet.

Since the start of the pilot, 15 person days have been spent on the publications and presentations prepared. No efforts have been invested yet on organising workshops and

demonstrations and conferences. Preparing the booklet/guidelines/handbook has consumed 10 person days.

The booklet/guidelines/handbook prepared has been requested 10 times by external interested parties. Moreover, the pilot team has also handled 10 requests for information so far. These information requests concerned the pilot in general, IPv6 implementation in networks and software, impact on end-users, and questions for presentations and interviews. Answering these information requests took 3 person days.

So far, the dissemination activities have not led to contacts with organisations that start then started to implement IPv6 for the first time.

7.3 National Pilot of Luxembourg

At present no information about the pilot is available online, but it will soon be available on the GEN6 website.

Since the start of the pilot, the pilot team has participated in one workshop and prepared two conference contributions. No other publications, events or materials have been produced so far. Hence, no efforts and resources have been spent on the website, publications, dissemination materials, events etc. to advertise and created awareness for the Luxembourg pilot.

The pilot team has received 5 requests for information related to IPv6 implementation in networks and software and related to IPv6 training. The team has spent 5 person days to handle these requests.

So far, the pilot has not been able to trigger other organisations to implement IPv6.

7.4 National Pilot of Slovenia

Information about the Slovenian pilot is available on a website dedicated to the pilot: http://gen6.ltfe.org/. There is no information yet about the number of visitors to this website.

Since the start of the pilot, the pilot team has contributed to one demonstration and six workshops. Moreover, it prepared 3 other dissemination activities.

So far, the pilot team has spent 27 days on preparing the website information and the publications. In addition, contributing to the workshops and demonstration took 37 person

days. The team has not organized these events itself though. Moreover, booklets/guidelines/handbooks have not been prepared so far and no efforts have been made doing so.

Since the start of the pilot, the Slovenian pilot team spent 15 person days on answering pilot-related questions. The number of information requests is not known, but information requests relate to all kinds of information about IPv6.

So far, the dissemination activities have not led to contacts with organisations that start then started to implement IPv6 for the first time.

7.5 National Pilot of Spain

Information about the pilot is available on an existing website.

Since the start of the pilot, the pilot team has prepared two popular publications and prepared four conference presentations. The team has also organized three workshops. These workshops were visited by 40 participants. The conference presentations reached 150 attendants. The participants came from both pilot and consortium partners and external stakeholders.

The pilot team has not prepared booklets/guidelines/handbooks so far.

Preparing the information for the website, publications and presentations has required 5 person days since the start of the pilot. Ten person days have been spent on organizing the workshops.

Since the start of the pilot, the team received 60 requests for information. These mainly concerned the pilot in general, IPv6 implementation in networks and software, IPv6 training, impact on end-users and end-user services, as well as questions for new assignments and projects. Answering the requests for information took three person days, since the start of the pilot.

According to the pilot team, the dissemination activities did already lead to contacts with organisations that then started implementing IPv6 for the first time.

7.6 National Pilot of Turkey

Information on the pilot is available at the government website, http://www.ulakbim.gov.tr/ulaknet/abprojeleri/gen6.uhtml. Since the start of the pilot, 47

visitors have visited this website page.

Since the start of the pilot, the pilot team has created 7 popular publications, organised one workshop and three trainings and courses, and prepared five conference presentations.

Preparing the website information and the publications took 24 person days. The pilot team has also spent 36 person days on organizing events. The workshop attracted 250 participants and the conference presentations reached 500 attendants. Fifty people participated in the training and courses organized. The events involved participation from both pilot and consortium partners and external stakeholders

Since the start of the pilot, no booklets/guidelines/handbooks have been prepared. Hence, no efforts have been made so far regarding this activity.

Since the start of the project 24 person days have been spent on handling requests for information. In total, the pilot team has handled 70 requests for information so far. These questions focused on IPv6 network and software implementation, training and on impact on end-users.

Because of the dissemination activities the pilot team got in contact with several municipalities and universities that then started to implement IPv6 for the first time.

7.7 Cross-border Pilot eGovernment services

Information about the pilot is available via the GEN6 project website only. There is no information about the number of unique visitors to this webpage.

So far the pilot has not (co-)organized workshops, conferences or other events to support increasing awareness for GEN6 and/or the pilot, although the pilot team did participate in one workshop and prepared one conference presentation. In addition, the pilot team has prepared pilot documentation such as handbooks/guidelines/booklets. These handbooks, guidelines or booklets have not been accessed by external contacts so far.

The pilot team has spent 1 person day on content for the website information. Moreover, 2 person days have been spent on preparing handbooks, guidelines or booklets related to the pilot, since the start of the pilot.

Since the pilot didn't start before M12, the pilot team has not handled information requests, nor did the activities so far lead to new contacts with organisations that started implementing IPv6 for the first time.

7.8 Cross-border Pilot Public Safety

At the moment, no information about the pilot is available online, but it will soon be available using the GEN6 website.

Since the start of the pilot, the pilot team has contributed to one workshop and prepared two conference presentations. According to the pilot team, no resources have been spent so far on preparing publications, presentations, booklets/guidelines/handbooks or organizing events.

So far, the pilot team has handled 10 information requests, dealing with IPv6 implementation in networks, software and IPv6 training. In total two person days have been spent on answering pilot-related questions from stakeholders outside the pilot.

The dissemination activities have not resulted yet in contacts with organizations that then started to implement IPv6 for the first time.

8. ANNEX 3: PILOT RESPONSES SOCIAL NETWORKS

This Appendix describes the summarized responses to the survey for each of the GEN6 pilots for the impact channel *social networks*.

8.1 National Pilot of Germany

The German pilot includes two partners from the GEN6 consortium. These two partners have not collaborated before the pilot. Since the start of the pilot, no new partners have entered the pilot.

8.2 National Pilot of Greece

The pilot team for the Greek pilot includes three partners from the GEN6 consortium. Two partners have worked together before and one partner is new in the Greek pilot. None of the partners have entered the pilot only after the start of the pilot.

8.3 National Pilot of Luxembourg

The Luxembourg pilot team includes 2 partners, of which one partner is also part of the GEN6 consortium. The partners have collaborated prior to the start of the pilot and now new partners have entered the pilot since it started.

8.4 National Pilot of Slovenia

The Slovenian pilot includes one partner from the GEN6 consortium and seven partners from outside this consortium. Between six partners there had already been cooperation in the years before the GEN6 project. The seven partners that are not part of the GEN6 consortium entered the pilot after it has started.

8.5 National Pilot of Spain

The Spanish pilot team includes four partners that also participate in the GEN6 consortium and three partners from outside the consortium. Six partners did collaborate before the pilot started and one partner was new. Since the start of the pilot, no other partners have entered the pilot.

8.6 National Pilot of Turkey

The Turkish pilot team includes two partners from the GEN6 consortium and two partners from outside this consortium. Three partners have collaborated before and one partner is new. Two new partners started participation in the pilot after the pilot had started.

8.7 Cross-border Pilot eGovernment Services

The Cross-Border pilot on eGovernment services includes four partners from the GEN6 consortium and one partner from outside the GEN6 consortium. All partners in the consortium have not collaborated before the pilot in the past three years. After the start of the pilot, no new partners have entered the pilot.

8.8 Cross-border Pilot Public Safety

The Cross-Border Pilot Safety includes three partners from the GEN6 consortium and two partners from outside this consortium. No new pilot partners have entered since the start of the pilot. No collaboration between partners in the pilot team already existed the last three years before the GEN6 project. So, all partners were new to the pilot team.