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ICT SHOK Future Internet Testbed Service Development Framework

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www.tivit.fi

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Contents

1. INTRODUCTION

1.1. Document and its scope

This document is the ICT SHOK Future Internet WP4 deliverable DA4.2.5. It describes the testbed service development framework available and active at the time it was published. This work was supported by TEKES as part of the Future Internet program of TIVIT (Finnish Strategic Centre for Science, Technology and Innovation in the field of ICT).

1.2. Testbed architecture

The services on the ICT SHOK Future Internet testbed are divided on four architectural levels (Figure 1) each supporting a different kind of connectivity:

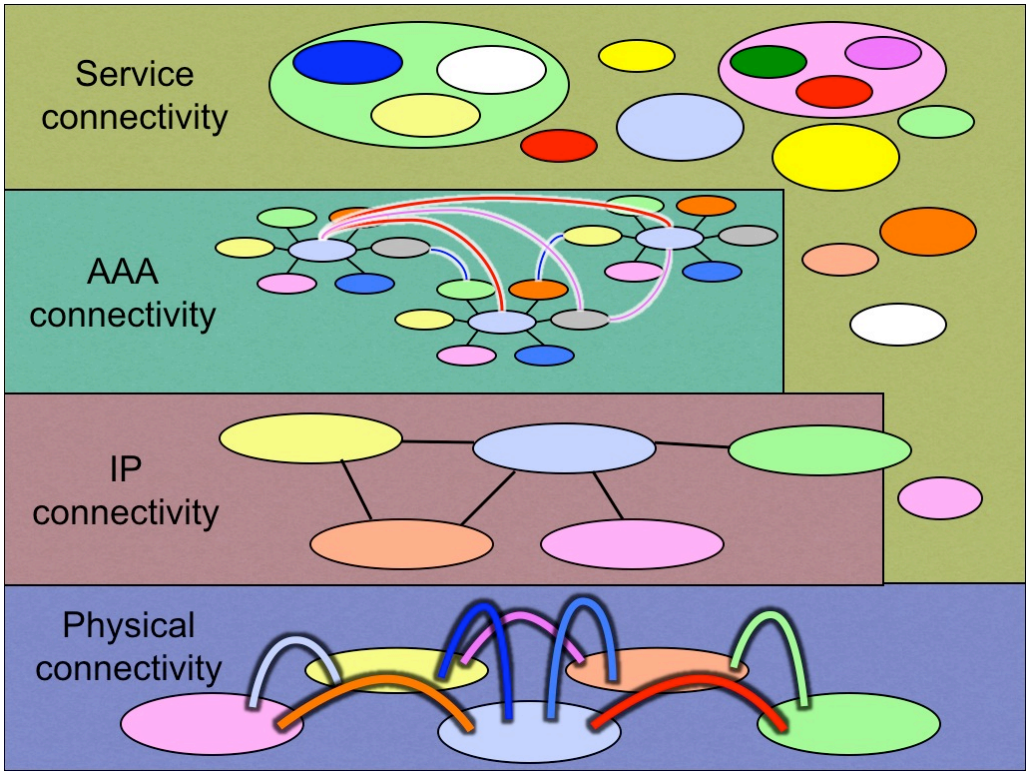

Figure 1: ICT SHOK Future Internet Testbed Architecture

The physical connectivity is for connecting organisations and services as well as research done below or instead of Internet Protocol (IP) connectivity. Examples of such research can be found within "next generation Ethernet" concepts and so-called Publish-Subscribe Internet Routing Paradigm [PSIRP]. The objective on this testbed level is to provide connectivity to the researchers that goes below the IP level, such as for example dark fiber backbone networks between various organisations.

The IP connectivity contains the research done to optimise and develop technologies and services to enhance and utilise IP connectivity. The technologies and services on this level include among others the optimisation of Internet routing tables, IPv6, non-

firewalled connectivity, and utilisation of IP multicast and the connectivity enhancement technologies and services both in the imperfect Internet now and in the future. The objective of the testbed on this level is to provide both the ideal IP connectivity (which is not often available to the researchers) and when needed also imperfect real-world IP connectivity for testing the future Internet solutions and technologies.

The authentication, authorisation and accounting (AAA) connectivity level is based on the assumption that in the future Internet as it is already in the current Internet, there will not exist only one dominating identity provider or collaboration federation between multiple providers, but instead several different ones. Various different identity providers and federations create the need for "routing" (in this context meaning usually "database lookup") and connecting these services on the authentication level to enable authentication connectivity without the need for every service provider to make direct connections to all other identity service providers. The objective of the testbed on this level is to provide the opportunity to connect to some of the authentication federations and not to limit the utilisation of other existing ones.

The service connectivity level is perhaps the least developed level in the current Internet. In the current Internet there already exists physical connectivity in the form of light paths, IP connectivity with both IPv4 and IPv6 and authentication connectivity with OpenID, Google/Yahoo/Microsoft accounts, SAML, eduroam etc., but inter-service connectivity exists usually only within one service provider. Some of the service providers have started opening up and standardising their service interfaces for service interconnectivity, but more research and work is still needed for fully open and standardised inter-service connectivity. This is, however, from the perspective of testbed development, only part of the larger concept, where in the testbed connecting completely unrelated services and solutions should be possible for creating inter-connected combination services.

For more information about the testbed information, please read the ICT SHOK Future Internet Testbed Architecture [FITestbedArch].

1.3. Existing testbed services

On a functional level the current services are separated to seven service categories:

- Backbone and connectivity services
- Access network services
- Authentication services
- Infrastructure services
- Content delivery services
- Measurement and monitoring services
- Support services

A service in general belongs to one service category but may function on one or more architectural levels. Table 1 gives an example of the service summary, categories and functional levels as presented by the ICTSHOK Future Internet Testbed Services document [FITestbedServices].

Service category	Service	Physical connectivity	IP connectivity	AAA connectivity	Service connectivity
Backbone and connectivity services	Funet light path service	X	-	-	-
	Funet routed IP connection	-	X	-	-
	TREX interconnection services	X	X	-	X
Access network services	OpenVPN connectivity service	X	X	-	X
	Experimental networking with virtual machines	X	X	-	X
	Jyväskylä AMK SpiderNet research network services	X	X	-	X
	TUT research network services	-	X	-	X
Authentication services	Funet WLAN roaming services	-	-	X	X
	Haka authentication federation	-	-	X	X
Infrastructure services	Funet NTP service (IPv4/IPv6)	-	-	-	X
	Funet DNS recursive resolver service (IPv4 and IPv6)	-	-	-	X
	TREX DNS/Mail Secondary service	-	-	-	X
Content delivery services	Funet Antenna: IPTV broadcast of your own content ("Your Own Channel")	-	-	-	X
Measurement and monitoring services	im.funet.fi - network monitoring service	-	X	-	X
	PERT Live-CD - a simple user tool for network performance analysis	-	X	-	-
	iperf.funet.fi - a traffic volume based tool for network performance analysis	-	X	-	X
	Volume Statistics - traffic volume summaries	-	X	-	-
Support services	Funet NOC – network operations centre	X	X	X	X

Table 1: Testbed services

2. SERVICE DEVELOPMENT FRAMEWORK

2.1. Objective

The objective of the ICTSHOK Future Internet Service Development Framework is to provide the procedure for programme participants and partners to introduce and integrate new and existing services to the testbed. As testbed consists of various services operating on different levels and functional categories, this service development framework will only provide guidelines for service development. The testbed architecture [FITestbedArch] and the testbed operations procedures [FITestbedOps] can then be used for more guidelines on architectural and operational issues.

2.2. Introducing a new service

1. Contact the ICTSHOK Work Package 4 Testbed leader Pekka Savola (pekka.savola@csc.fi) to inform about a potential new service for ICTSHOK Future Internet Testbed.
2. Write a service description and a use case to ICTSHOK Future Internet WP4 Testbed wiki or send similar information to the WP4 leader Pekka Savola (pekka.savola@csc.fi). The wiki contains templates and example service descriptions and use cases to help in structuring the information. This information may also be used to advertise the service to the rest of the programme in a WP4 newsletter.
3. Inform work package leader of the available new service and advertise the service on the WP4 Testbed mailing list.

2.3. Updating a service

1. Inform the users of the service
2. Update the service description and the possible use cases.
3. Inform the testbed work package leader, service users and WP4 testbed mailing list of the updated service

2.4. Removing a service

1. Inform the users of the service. Give enough time before end-of-life to search for other solution or service providers.
2. Inform the testbed work package leader and WP4 testbed mailing list about the removing the service and end-of-life timeframe.
3. Update the service description and possible use cases to include the removal schedule.

2.5. Integrating and combining to existing services

1. Contact the testbed work package leader and service contact persons.
2. Create together a service description and use case(s) for the new integrated or combined service.
3. Inform work package leader of the available new service and advertise it on the WP4 Testbed mailing list.

3. REFERENCES

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