31-07-2017

SCOPE SIG Annual Report 2017

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Executive Summary

This document is the annual report of the GÉANT Special Interest Group (SIG) Sustainable Community Practice Exchange (SCOPE) for the first year of its existence, from June 1st 2016-2 until June 1st 2017. This report describes the joint SIG activities in the community. The efforts of the national working groups continue in the form of Task Forces, with three new groups: the Task Force on Research Engagement Development (TF-RED), the special interest groups on Transnational Education (SIG-TNE) and the special interest group on Cloudy Interoperable Software Stacks (SIG-CISS).

The initial activity for the group was to validate if the previous work assignments should continue, how a manifesto could be devised, and agreement for the potential merger of efforts between the Campus Best Practice and Green ICT teams. Different methods of communication have been trialled, including an online discussion forum, but the most effective method to focus energy and motivate contributors to promote their learning experiences is through small teams, such as: Campus Networking, Digital Assessment, Security, and Network Monitoring.

The focus of SIGs in 2017-18 will switch to activity promotion and awareness-raising, as well as improving visibility and access to current information repositories. SCOPE also plans to review archived Campus Best Practice documents to glean any information that may still be relevant for future business practices

1 Introduction

SIG-SCOPE (Sustainable Community Practice Exchange) is a GÉANT special interest group, linking like-minded professionals in the R&E community, to exchange experiences and foster new ideas in its mission to provide a leading forum for the advancement of IT best practice

SIG-SCOPE merged two leading networking groups in the GÉANT project: Campus Best Practice and Green ICT whose activities originated in the GEANT3 Project and expand in GEANT 4 Phase 1 .With contributions from over 40 dedicated staff members; campus IT staff from over 50 national working groups; an archive of over 200 best practice documents and a wide range of tested and proven IT sustainability tools and templates, SCOPE provides a wealth of experience and resources on its wiki for IT professionals.

2 Activities

SCOPE was established in June 2016 after the GÉANT Programme Planning Committee (GpCC) approved its charter. The new SIG held its first meeting by videoconference in early June 2016, and a steering group was also formed. SCOPE's mailing lists were set and web pages were designed and implemented. The ongoing work and documents from the former networking groups were transferred to the website [SIG-SCOPE]. The SIG draft manifesto draft was delivered to the SIG members for comments. The member NRENs continued their national activities and dissemination of SCOPE related work as it evolved.

2.1 SIG Meeting 8 June 2016

Topics:

- Mission statement
- Manifesto
- Updating the documents
- Showcases
- Posters
- Future meetings
- Dissemination opportunities
- Other topical items
- Initiatives to promote the activities

The first meeting of the SCOPE Special Interest Group was held by videoconference. Focus of the meeting was to discover what drives the SIG and to identify its vision, mission and way forward. The full agenda and notes from the meeting can be found on the website [SIG_SCOPE].

Topics discussed included the production of new work, with a focus on environmental issues, and the use of existing best practice documents, including storage location and public accessibility. To facilitate the SIG's requirements, a SCOPE website was built on the GÉANT intranet [SIG_SCOPE]. Further, many new ideas were raised, including: developing webinars from existing content, utilising additional communications channels to disseminate work, and to introducing games and competitions to raise awareness.

2.2   SCOPE Wiki

The SCOPE wiki was designed to provide information on SCOPE activities and to serve as a reference source for best practice documents, linking to archived campus best practice and Green ICT knowledge bases. The site is also linked to the campus best practice and Green ICT knowledge bases. While the SCOPE website is publically accessible, it also has restricted areas for SCOPE members to collaborate.

With the aim to foster and track of ongoing topics, a discussion forum function was added to the website, offering SCOPE members the possibility to raise online discussions within a certain topic category. The function allows for better traceability of topics and its content potentially feeds into new good practice developments. So far there has been little uptake of this functionality, possibly due to lack of awareness or difficulty accessing. Its usability and popularity amongst members will be surveyed in the next period.
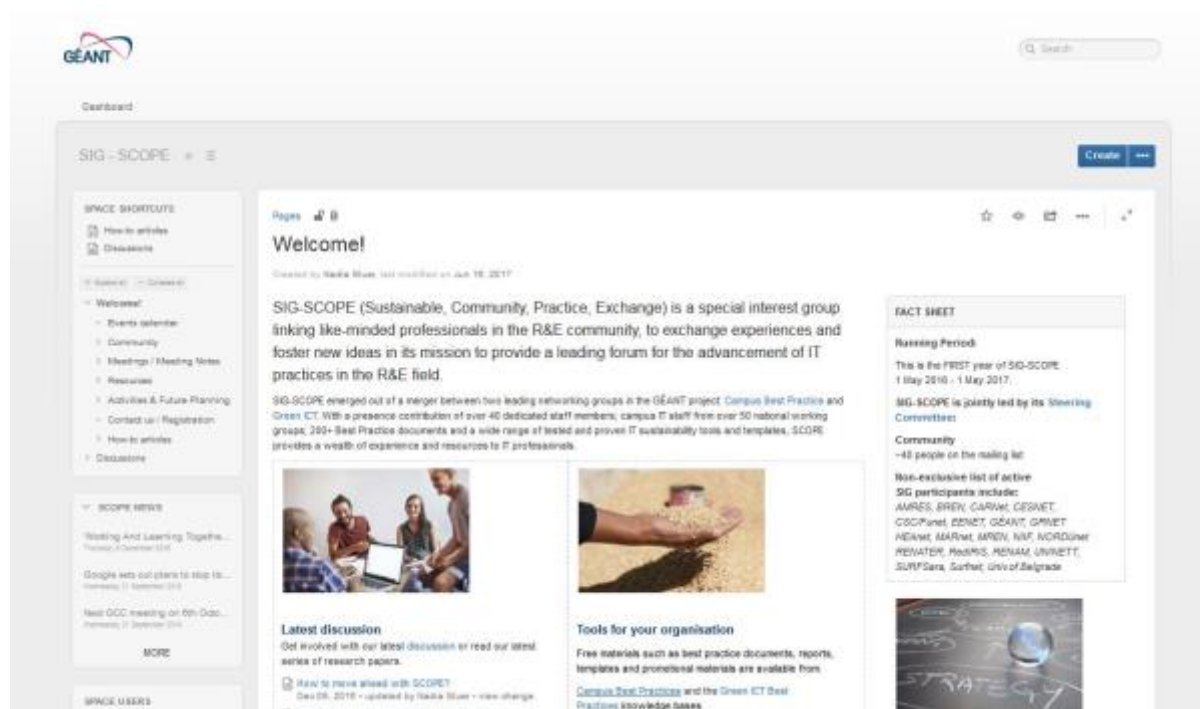
Figure 2.1: SIG SCOPE public wiki and links to the member areas of the site.

2.3   Work with Best Practice Documents and Test Cases

Table 2.1 below indicates NRENs that have contributed to or are working on best practice documents as part of SCOPE SIG activity, as well as particular work areas.

NREN	Work areas	Count
AMRES	Real-time communications, network monitoring, user services	3
CSC/Funet	Campus networking, wireless	2
FCT-FCCN	Security	1
HITSA	Campus networking, wireless	2
RENATER	Security	1
UNINETT	Physical infrastructure, real-time communications, wireless and mobility, security, digital assessment	5
Total number of working groups		**14**

Table 2.1: Active working groups. Detailed summary is included in the Appendix A.

Table 2.2 shows new documents written during SCOPE's first year while some of the latter list the documents had been in progress.

Document description					Comment
Work area	**Name**	**NREN**	**Language**	**Type**	
Security	Forensic Analysis and Incident Handling	RENATER, CESNET	English	BPD	New BPD
Digital assessment	Functional Description of AV Equipment in Lecture Halls and Meeting Rooms	UNINETT	Norwegian	BPD	Update to UNINETT UFS116
Digital assessment	Technical and Functional Requirements for AV Equipment	UNINETT	Norwegian	BPD	Update to UNINETT UFS119
Campus networking	Best practice document targeted for 2017: Discussion summary of the project called	GRNET	English	BPD	New BPD

	“ΕΝΕΔΗ» (Interreg V-A "Greece-Cyprus" 2014-2020 Programme)				
Total					**4**

Table 2.2: Documents prepared during the reported year. The document abstracts can be found from the Appendix B.

2.4   Manifesto of the Collaboration

As two groups with different responsibilities determine how to work together, it is important to define the interactions within the group and identify intended outcomes and deliverables. The SIG's manifesto was drafted by Albert Hankel and Jari Miettinen and circulated to the SIG participants in December 2016, in response to an assignment received from the kick-off meeting. The SIG members sought to clarify the purpose of the working group beyond the scope of a single-year action plan. The manifesto can be found in Appendix D.

The kick-off meeting provided four key ideas as the starting point for the manifesto:

- Outreach: It's important to be active in the communication and dissemination efforts and create awareness in the community.
- Sustainability: This should be the guiding principle for developing IT systems and services, considering the environmental, social and financial aspects.
- Practicality: The results and results should be viable and possible to produce.
- Influence: One should try to influence attitudes and behaviour of peer colleagues who have yet to experience these technologies or practical experiences- making an impact in reducing work efforts and fostering discussions about different implementation scenarios.

The manifesto included sections on identification, thesis, precepts, plan for action, elaboration of precepts and a conclusion. It turned out that the application of a more 'green' approach and ease of applying information to different environments called for deep change, both in research and education service development and the service delivery chain.

3 National Activities

3.1 ASNET

ASNET-AM participated in the GN4-1 project's Green Team, which was committed to promote energy-saving and ecologically sound applications layered over the GÉANT infrastructure. The main activities have been carried out to minimise energy consumption in CPU and memory level with ongoing work to test research scenarios and publish results of approaches used and savings achieved.

In CPU level, the Dynamic Voltage Frequency Scaling (DFVS) method, which is a power-aware algorithm that automatically and transparently adapts the voltage and frequency settings of the servers, has been studied and implemented [DFVS]. Memory ballooning method in the virtualization platforms has been implemented, which enables a host system to artificially enlarge its pool of memory by taking advantage or reclaiming unused memory previously allocated to various virtual machines. An energy optimisation methodology and energy efficient utilisation for the beneficiaries of the e-infrastructures to explore, optimize, and report the energy consumption and CO_2 emission of data, computing, and networking facilities has been developed [DFVS-ENERGY], [DFVS-ENERGY-SAVINGS].

3.2 AMRES

After the establishment of SIG-SCOPE, AMRES, the Serbian NREN, has been active in three of six technical focus areas: Network Monitoring, Campus Networking and Real-Time Communications, preparing for the planned best practice documentations. AMRES has been working on the revision of "Splunk Log Management" and "Deployment of Syslog Monitoring" documents.

In addition to SCOPE, AMRES took part in the 5th SIG-NOC meeting, which was held in CERN, Geneva, Switzerland in April 2017. This meeting had a general theme of Current Best Practice, and AMRES disseminated its best practice experiences on RADIUS monitoring and Splunk log management.

3.3 CESNET

Jean Benoit and Ales Padrta published a joint best practice document. CESNET was very active in several activity areas including IPv6, network monitoring, security inspections, and high-speed global communications. CESNET organises many different events for our users, including CESNET Days. In this format, specialists visit regions and deliver a series of lectures about CESNET's services. CESNET also organised special seminars, such as IPv6 days in June 2016 and 2017. This has now become a tradition, and it usually attracts a large number of visitors (250 persons). In monitoring, CESNET continues to organise practical courses on how to analyse flow-reports to defend campus networks. CESNET also participated on several cultural events worldwide, such as remote music performances, e.g. a distributed concert for two churches organs in Brno (the Czech Republic) and Trondheim (Norway) on 15 June, 2016 within TNC16 [CESNET_CONCERT].

3.4   CSC/Funet

CSC is owned by the Finnish Ministry of Education and Culture and maintains centralised IT systems and supports the R&E functions for higher education and the science sector. Funet, one of the services of CSC, is a high-speed data communications network serving the Finnish research community. It connects about 75 HEI and research organisations and has about 375 000 users.

CSC/Funet has participated in CBP activities starting from the GN3 project till GN4-1. Since the end of GN4-1 project CSC/Funet continued activities as a member of SIG-SCOPE by organizing national CBP workshops to share information and best practices.

The national collaboration working groups and focus areas are:

- AccessFunet (wired network technologies)
- MobileFunet (wireless network technologies)
- VideoFunet (video technologies)
- SecureFunet (security)

Two of these national working groups, AccessFunet and MobileFunet, are directly involved in the SIG-SCOPE. CSC/Funet has organised four national workshops covering wired and wireless campus network technologies.

3.5   FCT-FCCN

During the period of this report, the Portuguese national groups have not produced any best practice documentation. FCT-FCCN did discuss future BPDs during the annual NREN event – Jornadas 2017, held at Vila Real (UTAD) in April 2017.

3.6   GRNET

GRNET is still supporting eCO$_2$meter, a web tool developed as part of the GÉANT Green Team's work, for the collection of data calculating the yearly energy consumption and GHG emissions of NRENs and the online completion of their GHG Reports. eCO2meter is able to support the automatic extraction of statistics, the automatic conversion to CO_2 emissions and comparisons among different NRENs / sectors/ years / metrics etc.

GRNET also has installed an outdoor green datacentre in the northwest part of mainland Greece, close to a hydro-electric plant, while in parallel is taking actions to improve energy efficiency in the existing data centres.

GRNET is also a contributor to Interreg V-A "Greece-Cyprus" 2014-2020 Programme (ΕΝΕΔΗ), which aims to save energy in public academic buildings with datacentres. Research studies for this activity will be shared with other NRENs participating in SCOPE and GÉANT, in the form of best practice documents or as discussion articles.

3.7 HEAnet

HEAnet, the Irish NREN, is now working on the deployment of a new network solution for Layer 2 and Layer 3, and we expect that once fully deployed, this solution will provide about 15% saving on energy usage, compared to the last project network (GN4-1). The deployment at the client has been slow, as it has to use a fully automated provisioning tool, which also enables full monitoring of all network connectivity and services. The use of automated provisioning is expected to reduce inter-site travel for HEAnet, thus helping to reduce the company's carbon footprint. Faster turn-on of services and greater flexibility to introduce new connectivity options, including L3VPN and ELAN technologies, offers client capabilities to share services and resources at intercampus level, as well as using cloud technologies. All PoPs have now been fitted with power distribution units that record power consumption per device outlet and this data also will be used to analyse if extra power is being used setting up these new services.

HEAnet is also still working with the An Taisce Green Campus team to support their initiatives and maintain Green Campus partner status. As part of this activity a half-day set of events, such as a mini Green Seminar is being organised for staff, which features local industry representatives giving talks on new technologies that support a more sustainable environment.

3.8 RENAM

In the first year of SCOPE, the Moldovan NREN RENAM focused its activity on elaboration of a technical project of new CBF optical link construction to connect the GÉANT PoP in Bucharest. As a complementary action, the transition of the main national backbone links was raised to 10 Gbps. This project presumes development of access network and connection of 7 campuses to RENAM PoPs via 10 Gbps links.

Together with interested universities, RENAM carried out activities to extend eduroam coverage by installing access points in two new universities. As a part of Federation as a Service (FaaS) activities, work started for members of Erasmus+ projects in Moldova to register a centralised IdP, erasmus.md, and providing IdP services for students and teaching staff travelling abroad.

In January 2017, the RENAM Strategic Action Plan was elaborated to achieve the objectives of the "Memorandum of Cooperation and Partnership", to promote interoperability of RENAM NREN-based eInfrastructures and electronic systems for Research and Education at national and European levels in 2016-2020 [RENAM_ACTION]. The Memorandum was signed in April 2016, by rectors of ten leading universities of Moldova, by the President of the Academy of Sciences, Chairman of the Council of the Universities' rectors of Moldova and the President of the National Council for Accreditation and Attestation of scientific organizations [MEMORANDUM].

3.9 RENATER

During this first year, RENATER has continued to work mainly on the area of security. A collaborative work between CESNET and the French group has produced a best practice document, "Forensics analysis and incident handling" [BPD_INCIDENTS].

The University of Strasbourg and RENATER also organised a two-day event with CERT games and forensics training. A total 45 attendees from France, Germany, Switzerland, Ireland, Lithuania, Portugal, Poland and Czech Republic have participated. RENATER plans to organised a similar event with another university in 2018.

3.10 UNINETT

UNINETT, the Norwegian NREN, continued the work on developing and maintaining CBP documents during the first year of SIG-SCOPE. The work has focused on four areas: Physical Infrastructure, Real-Time Communications, Wireless and Mobility, and Digital Assessment. Even at the end of the reporting period, new BPDs are still being written, and older BPDs are revised and updated to current technology and standards.

UNINETT's Physical Infrastructure Group have revised and updated two BPDS as part of their contribution to SCOPE. The updated version of "Functional Description of AV Equipment in Lecture Halls and Meeting Rooms" and "Technical and Functional Requirements for AV Equipment" is now available in Norwegian and will soon be shared with other SIG members when translated into English. The Group has also started to revise BPDs on campus infrastructure, which is expected to be delivered by the end of 2017.

The BPD on "SIP infrastructure and VoIP in Norwegian HE" is still in progress.

In addition, the wireless and mobility group is discussing the need for a BPD on planning and surveying wireless networks in response to increased focus quality and capacity in wireless networks at the institutions in the Norwegian HE sector.

There have been no National R&E conferences during SIG-SCOPE Y1, the next conference is planned for Trondheim, Norway, in November 2017. In addition, UNINETT organised six national workshops in SIG-SCOPE Y1, within the following areas: Physical Infrastructure, Wireless and Mobility, Security, Real-Time Communications (SIP) and Digital assessment.

4   Results

During its first year, areas of focus for the SCOPE SIG have included:
- Setting up the SIG: members and steering group.
- Organising the first SIG meeting: videoconference.
- Establishment of the collaboration workspace: Confluence wiki provided by GÉANT.
- Relocation of the work in progress to the new workspace: salvaging the green team and CBP team heritage.
- Work on BPDs: continuing the compilation work.
- National activities: events, documents and dissemination.
- Maintaining the network of experts and national working groups: the working groups are functioning.

This report shows that although the group has maintained its existence, it now needs to start planning joint communications such as: holding extra face to face meetings and videoconferences for particular topic areas, to start to optimise the value that can be achieved by producing documents on particular areas of research or emerging business activities. Information also needs to be captured at training events, providing anecdotal information that the attendees use in their normal day to day operations.

The next version of the website repository will also need to count the number of document accesses and downloads from the site for particular documents. Consideration also needs to be given re: whether there is value in refreshing any of the current best practice documents to the latest, state-of-the-art practices or whether they should just be treated as legacy documents that can give guidance to clients or NRENs at a particular state of development.

5   Conclusions

The SCOPE SIG has now been established and contributors focus' has now switched to the new GÉANT operating environment for this group. It takes time to re-energise focus and resources to establish the best fora for the new group to present the outcomes of their activities.

Groups such as the Green Team and the Campus Best Practice Group have to work together in areas of mutual interest, and also need to poll their intended audiences on the output of this shared knowledge

In next year's report, the SCOPE SIG will show use of the materials generated in the day-to-day business of NRENS and institutions. Another task will be to demonstrate improvements in accessing best practice documents, discussion and training fora from the SIG.

Appendix A Working Groups

This appendix contains the list of active national working groups.

A.1 AMRES

#	Group	Current leader	Founded
1	Real-time communications	Andrijana Todosijević and Dragana Despić	Jun 2013
2	Network monitoring	Marko Eremija and Andrijana Todosijević	Sep 2009
3	User-services	Andrijana Todosijević	May 2015

Table A.1: Serbian working groups. The NREN coordinator is Andrijana Todosijević (AMRES)

A.2 CSC/Funet

#	Group	Current leader	Founded
1	AccessFunet	Janne Oksanen and Kaisa Haapala	February 2010
2	MobileFunet	Wenche Backman-Kamila, Juha Hopia and Tomi Salmi	May 2009

Table A.2: Finnish working groups. The NREN coordinator is Juha Hopia (CSC/Funet)

A.3 FCT-FCCN

#	Group	Current leader	Founded
1	Security	Carlos Friaças	July 2013

Table A.3: Portuguese working groups. The NREN coordinator is Carlos Friaças (FCT-FCCN)

A.4 HITSA

#	Group	Current leader	Founded
1	Campus networking	Mehis Tuisk	Sep 2015
2	Wireless	Indrek Rokk	Sep 2015

Table A.4: Estonian working groups. The NREN coordinator is Maria Ristkok (HITSA)

A.5 RENAM

#	Group	Current leader	Founded
1	Wireless and mobility	Alexandru Cacean	Oct 2012
2	Security	Alexandr Golubev	May 2009
3	Campus AAI, IdM and interfederation	Valentin Pocotilenco	Sep 2014

Table A.5: Estonian working groups. The NREN coordinator is Maria Ristkok (HITSA)

A.6 RENATER

#	Group	Current leader	Founded
1	Forensics Analysis	Jean Benoit and Aleš Padrta	Sept 2015

Table A.6: French working group. The NREN coordinator is Vanessa Pierné (RENATER)

A.7 UNINETT

#	Group	Current leader	Founded
1	Physical infrastructure	Helge Stranden	Jan 2006
2	Real-time communications (SIP)	Jardar Leira	Jan 2006
3	Wireless and mobility	Tom Myren	Dec 2006
4	Security	Arne Øslebø	Jun 2008
5	Digital assessment	Magnus Strømdal	Mar 2015

Table A.7: Norwegian working groups. The NREN coordinator is Magnus Strømdal (UNINETT)

Appendix B Document Abstracts

This appendix contains the list of new best-practice documents, including:

- Jean Benoit (Université de Strasbourg) and Aleš Padrta (CESNET): "Forensic Analysis and Incident Handling" (CESNET and RENATER)
- Bård Støfringsdal (COWI): New version of "Functional Description of AV Equipment in Lecture Halls and Meeting Rooms" (UNINETT)
- Bård Støfringsdal (COWI): New version of "Technical and Functional Requirements for AV Equipment" (UNINETT)
- Discussion summary of Interreg V-A Greece-Cyprus 2014-2020 Programme (ENEΔH) "Energy Saving in Public Academic Buildings with Datacentres, with learning experiences for NRENS" (GRNET)

B.1 Forensic Analysis and Incident Handling (CESNET and RENATER)

This document will show you how the forensic analysis can help in security incident handling.

It provides useful information on how to react thoroughly and properly when a security incident occurs. The proposed guidelines are intended to help not only the technical staff that will be performing the analysis (such as an established CERT, security team or any IT team member) but also the potential victims, who can benefit from the results of the analysis. The document can serve as guidance from the moment of first response till to the moment you file a complaint [BPD_INCIDENTS].

B.2 New version of Functional Description of AV Equipment in Lecture Halls and Meeting Rooms (UNINETT)

Norwegian title: "UFS 116 - Funksjonsbeskrivelse AV-utstyr for undervisnings- og møterom - Versjon 3.0"

This BPD document is updated to incorporate changes in technical equipment and changes in rules and regulations. It also includes experiences and inputs from discussions at the AV workshops. This updated document is available in Norwegian only.

B.3 New version of Technical and Functional Requirements for AV Equipment (UNINETT)

Norwegian title: "UFS 119 -Tekniske og funksjonelle systemkrav for AV-utstyr - Versjon 3.0" [UFS 119].

This BPD document is updated to incorporate changes in technical equipment and changes in rules and regulations. It also includes experiences and inputs from discussions at the AV workshops. This version of the BPD includes the content of the BPD "Operational Support Systems and AV Transmission" and the operational BPD is expired.

This updated document is available in Norwegian only.

B.4 Discussion summary of Interreg V-A Greece-Cyprus 2014-2020 Programme (ΕΝΕΔΗ) "Energy Saving in Public Academic Buildings with Datacentres, with learning experiences for NRENS" (GRnet)

The research and education community   uses large datacentres that increase energy footprint. In Greece, GRNET operates the three largest datacentres, and although all possible measures are taken to reduce consumption, it still remains high. Given the projected increase in demand for resources, special measures need to be taken. The ICT sector, as a whole, will account for 40% of energy consumption by 2030, and emits as much carbon dioxide as the entire aviation industry. Datacentres on campuses alone account for 8-10% of the electricity consumption. The energy needs of the universities of Crete and Cyprus are an important part of their operating costs. For their needs, universities operate datacentres, and GRNET has installed a large datacentre that caters to the needs of dozens of hospitals in Greece in a university building (Crete in Heraklion).

The three public entities jointly propose to proceed to energy savings and RES generation interventions, part of a wider energy saving and environmental awareness strategy for the academic community and the wider public sector. The collection / analysis of energy consumption data is an extremely important stage in making sound decisions.

The project will help in defining a strategic plan that will avoid fragmented interventions, to maximise net benefits and achieve the necessary synergies in a wider set of public buildings. The geographical location of the areas favours high temperatures for most of the year, making it necessary to use relatively larger heat dissipation systems in datacentres, but at the same time, long periods of sunshine favour photovoltaic power generation. The interconnection of the centres with each other and the combination of methods and mechanisms for optimising energy efficiency and reducing electricity costs are expected to have multiplier benefits. New systems of active computing load distribution management will be studied and implemented between the installations in Heraklion and Nicosia, resulting in a total reduction in consumption, and will coordinate photovoltaic energy generation and intelligent load distribution.

Appendix C List of Events

This appendix contains a table of SIG meetings and national events.

No.	Date	NREN	Topic	Country	#days	Partici-pants
1	March 8th 2016	SIG	Kick-off meeting, Vienna Austria	Vienna, Austria	1/2	20
2	April 13th - 14th 2016	UNINETT	Audio/Video infrastructure and equipment workshop spring 2016	Bergen, Norway	2	45
3	June 8th 2016	SIG	SIG SCOPE meeting, VC	VC	1/4	17
4	June 29th - July 2nd 2016	RENATER	CERT Games 2016	Strasbourg, France	2	45
5	September 28th - 29th 2016	UNINETT	eCampus "program closing" conference	Tromsø, Norway	2	120
6	October 18th - 19th 2016	UNINETT	Audio/Video infrastructure and equipment workshop autumn 2016	Trondheim, Norway	2	55
7	November 14th - 15th 2016	UNINETT	Uninett technical workshop - Wireless, Federation, security, cloud computing	Trondheim, Norway	2	200
8	December 8th 2016	RENAM	NREN services - eduroam, eduGAIN, GCS promotional workshop	Chisinau, Rep. of Moldova	1	25
9	March 29th 2017	UNINETT	Digital assessment - knowledge sharing workshop	Oslo, Norway	1	95
10	May 2nd - 5th 2017	UNINETT	Uninett technical workshop - Security, Federation, SIP -VoIP, Cloud computing, Network infrastructure.	Trondheim, Norway	4	300
11	June 6th 2016	CSC/Funet	National AccessFunet and MobileFunet workshop - campus networking, wireless	Espoo, Finland	1	38 + 22 remote

No.	Date	NREN	Topic	Country	#days	Partici-pants
12	September 19th 2016	CSC/Funet	National AccessFunet and MobileFunet workshop - campus networking, wireless	Helsinki, Finland	1/2	16 + 23 remote
13	January 20th 2017	CSC/Funet	National AccessFunet workshop: physical infrastructure, campus networking	Espoo, Finland	1/2	11 + 17 remote
14	June 15th 2017	CSC/Funet	National AccessFunet and MobileFunet workshop - campus networking, wireless	Helsinki, Finland	1	35 + 15 remote

Table C.1: SCOPE SIG events, national events, trainings and meetings during the reported year

Appendix D SIG SCOPE Manifesto

The research and education networking community in Europe has existed for decades. It has achieved many milestones, one of the most important being the GÉANT network. The human networking and cross-border collaboration has made the advances possible. The work is far from over as new challenges emerge because of continuous technological development and the impact that has on society. Therefore, the NREN community under the auspices of GÉANT is establishing a new special interest group for transforming the research and education service development and the service delivery chain.

New services are established at an accelerating rate because of the evolution and development IT technology. Therefore, the service interoperability and the cohesion of the research and education services are in jeopardy. In general, we and society as a whole find it more difficult to understand the impact all these changes have. Combine this with the societal pressure of operating carbon neutral in the near future and it becomes essential to understand the impact ICT technology has on various levels and to know how to best use it. In terms of environmental sustainability, ICT can even be used to reduce our footprint if we use it right.

The GÉANT community must therefore raise the awareness of the environmental impacts and issues. Support has to be provided to build sustainable infrastructures for the higher education community. We are obliged to provide practical guidelines, which can be easily applied and deployed. The existing experience should be shared in order to develop and perfect the knowledge for mutual benefit.

Therefore, the GÉANT community will initiate collaboration and establish a special interest group, which will:
- Facilitate knowledge exchange and collaboration between IT staff, with a focus on campus issues and green IT technologies.
- Enable the continued production of documentation regarding campus best practices and environmental sustainability.
- Foster face-to-face and online meetings, providing a breeding ground to discuss, elaborate and disseminate early thoughts, brought in by members of the research and education community that can evolve into best practice documents.
- Co-organize trainings (jointly with organizations requesting them), liaising at the same time with GÉANT training activities.
- Coordinate the revision of existing campus best practice and green team documents, on a need basis, encouraging document re-use.

The general awareness of the situation and the possible solutions can be raised by collaborative efforts, where the key messages and information is delivered to the community. The work can be done by using the existing co-operation networks, groups and partners.

The building of sustainable infrastructures can be supported by sharing the practices, by providing the tools to create realistic metrics and by benchmarking the activity between comparable entities. The possibility to see the work of the peers and to learn together is the best lesson, which will be remembered.

The continuous discussion in the community is essential. The challenging debate will clarify the meaning and sharpen the expression. The intentions of the authors are clear at the time, but the future adopters and generations need an explanation to see the reason.

The work of the engineers is based on facts. Therefore, guidelines are needed, which are on a suitable level to recreate a compatible system. A document repository will be created and maintained, which serves as safe for the technical blueprints. Special attention is paid to the general availability and easy accessibility of the content.

We see that these actions will open a route to more sustainable and compatible research and education IT infrastructures, and a green future.

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Glossary

BPD	Best-Practice Documentation
CISS	Cloudy Interoperable Software Stacks
CO2	Carbon Dioxide
CPU	Central Processing Unit
DFVS	Dynamic Voltage Frequency ScalingGHG Green House Gas
SCOPE	Sustainable Community Practice Exchange
SIG	Special Interest Group
TF-RED	Task Force on Research Engagement Development
TNE	TransNational Education