**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1
Plans for standardization,
dissemination and exploitation
activities**

# Deliverable D5.1
# Plans for standardization, dissemination and exploitation activities

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**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

## Abstract

The purpose of work package 5 of the STRAUSS project is to structure and to coordinate the dissemination, standardisation and exploitation activities of the project.

In this document a detailed overview over the planned activities is given. This includes plans for dissemination per partner, the specific standardisation activities of partners and the exploitation plans. To attract a broad audience for the results of the project the usage different communications channels – like the project website, social media, a newsletter and the organisation of workshops – will be explained.

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

# Executive summary

This document includes the plans of the STRAUSS partners for dissemination, standardisation and exploitation.

All partners of the project are committed to disseminate the results of the project in papers and with the participation to conferences and workshops.

A website (http://www.ict-strauss.eu) was established and is used for internal and external communication. In addition to that a biannual newsletter will be issued and a twitter account was created to use the benefits of social media.

Two workshops (one before 24 month and one at the end of the project) will be organized to give a comprehensive view over the results of the project.

The first STRAUSS publications are listed in section 2.4.

Industry partners will actively support the development of standards in the standardisation organisations IETF, ITU-T, IEEE, ONF and OIF.

The detailed exploitation plans are explained in section 4 in this document.

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization, dissemination and exploitation activities**

# Table of Contents

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

# 1    Introduction

All partners of the STRAUSS consortium are intended to deliver high quality dissemination and standardisation outcomes. For this a variety of tools will be used. Most important are the publications in high quality journals, conferences and workshops. To make it easy to get information about the STRAUSS project a website, a newsletter and a twitter account will complement the other publications.

The industrial partners of the project will be active in several standardisation organisations and bring new ideas and concepts into the standardisation processes. This will support the further exploitation and commercial usage of the results.

# 2    Strategy for Dissemination

## 2.1    Overview

The strategy for dissemination is based on three pillars. These pillars are publications and presentations in major journals and conferences, online dissemination and the organisation of workshops.

The first pillar for the dissemination effort is the publishing of scientific results stemming from project activities in high-impact international journals and major conferences. The participation of STRAUSS partner members in major conferences, exhibitions and international events will facilitate the timely announcement of project results and achievements and will accelerate the project's impact to the scientific and industrial community.

The second pillar for dissemination is the online dissemination activity. Therefore a project website was set up promoting the activities of the project. The website has a public part to facilitate dissemination to parties outside the consortium and a private part to facilitate the integration of the consortium. A biannual newsletter was set up and will be distributed to a wide list of interested parties and will be generated to provide visibility of the STRAUSS project and its activities.

The third pillar for dissemination will be the organisation of two workshops and participation in events relevant to the project focus. The workshops will be organized, addressing the scientific and technical challenges and presenting solutions for end-to-end service capability over a high-capacity optical networks etc. Special effort will be put into interacting with European and Japanese industry through these workshops, with emphasis to new business areas that could benefit from SDN approaches. The final workshop is planned at the end of the project.

## 2.2    Activities and Objectives

### 2.2.1    Project Leaflet

The project leaflet (Figure 1) provides a brief introduction to the STRAUSS project. The leaflet contents are aligned with the contents in the STRAUSS factsheet. The leaflet is available for all partners in EU and JP consortium, and will be distributed when a brief but effective introduction to the STRAUSS project is required, for instance during exhibitions, workshops and conferences.

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

**Figure 1 The STRAUSS leaflet**

### 2.2.2   Project Website

Three main function areas comprise the STRAUSS project website. Four access levels have been granted, to satisfy the different requirements of the website (public, user, editor, and administrator).

- Public area: As the name indicates, it is the main area for the STRAUSS website, and it is available for any Internet user. Later a description of the contents of this area is provided.
- STRAUSS members' area: This is a working area for each STRAUSS member and includes all the necessary tools for collaborating within the project.
- Administrator area: In this area the website administrator can create new users and editor accounts and modify all the parameters and structure of the website.

The website is based on Joomla with some components and extensions, such as projectfork, which includes a repository and several specific needed functionalities. The website is also integrated with social media, including a twitter subscription component.

**The STRAUSS website public area**

The public area is divided in 7 sections.

- STRAUSS Overview. This is the home page (Figure 2). It includes the project abstract and the project proposed architecture.
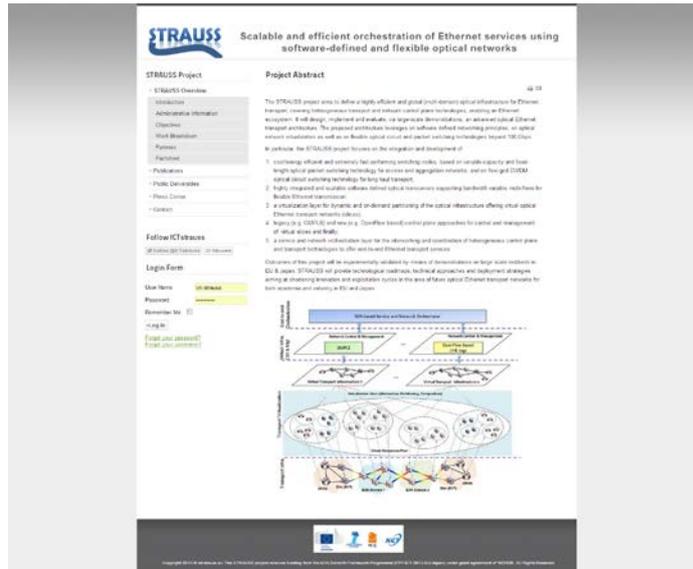
**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

**Figure 2 STRAUSS website: Home page**

- o Introduction. Expands the STRAUSS Overview with more information about the project.
- o Administrative information. Provides the main administrative information, such as Call identifier, EU and Japan project coordinators and total cost of STRAUSS project, and EU and Japan contributions.
- o Objectives. The main objective of STRAUSS is introduced in this section, and the 10 more detailed objectives are also discussed.
- o Work breakdown. STRAUSS organization is based on four technical Work Packages (WPs) addressing the described objectives. This section describes them and shows their interdependencies.
- o Partners. The 5 European and 3 Japanese partners are described, including a distinction between Industrial partners, Research Centres and Universities.
- o Factsheet. The EU Factsheet describing STRAUSS project is also available from the STRAUSS website.
- o Publications. In this section, the STRAUSS acknowledged journals, conferences and other research results are listed, per year, including: Year 2013(Figure 3, left), Year 2014, Year 2015 and Year 2016. The publications are only available for authenticated users.
- Public Deliverables (Figure 3, right). In this section, the STRAUSS public deliverables will be available.
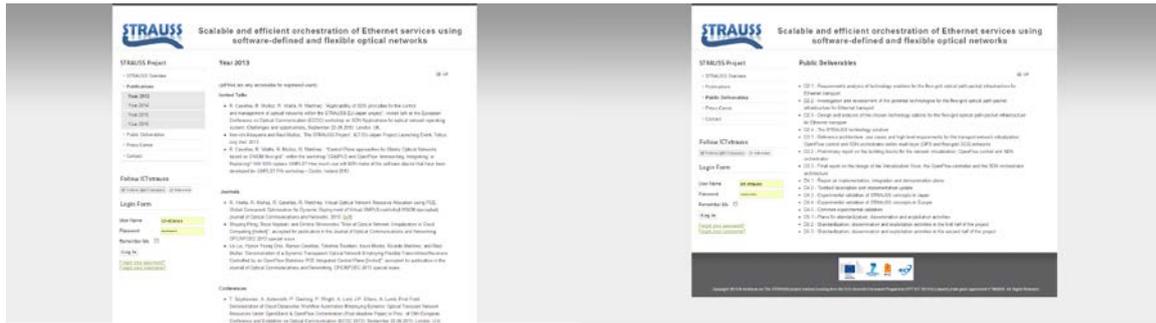
**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

**Figure 3 STRAUSS website: Publications (left), STRAUSS website: Public Deliverables (right)**

- Press Corner (Figure 4, left). The Press Corner redirects to Latest news.
  - Latest news. All Project news can be accessed in this area. Each news article is listed from the newest to the oldest, and a short abstract for each news article is provided. Each news article can be expanded for more information. Any of the editors are able to provide news articles.
  - Newsletters. In this area, Internet users can subscribe to the biannual newsletter, or browse all the previous issues.
  - Media Coverage. STRAUSS project has had some media coverage. In this section, some of the news impacts are listed.
  - STRAUSS Leaflet. The STRAUSS leaflet has been issued and provides a brief introduction to the STRAUSS project. In this section the pdf version of the leaflet can be found.
- Contact (Figure 4, right). A web form has been setup to receive questions and other project related issues. The enquiries are received by the website administrator, who is responsible for the correct addressing of the enquiries.
- Follow ICTstrauss. The objective of this section is to foster STRAUSS project presence in social media such as Twitter. This area allows following STRAUSS Twitter account and displays the number of followers of the STRAUSS project twitter account.
- Login Form. This form is the entry point to STRAUSS members' area. Login accounts have been issued for project members.
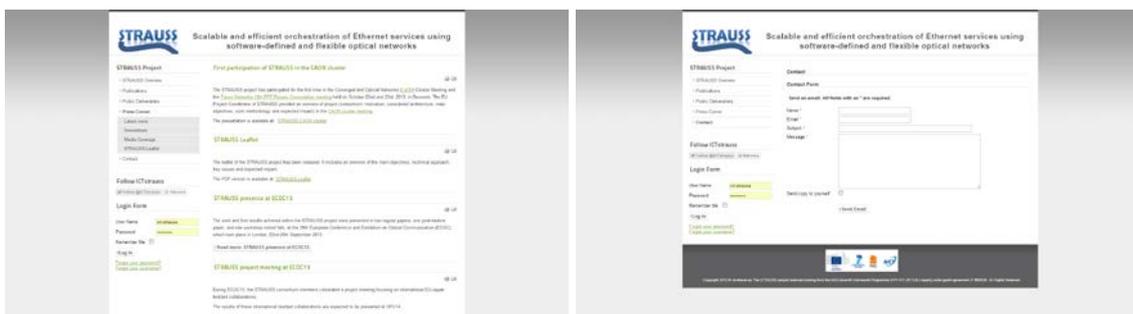


**Figure 4 STRAUSS website: Press Corner (left), STRAUSS website: Contact (right)**

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

**The STRAUSS member's area**

The STRAUSS member's area includes 12 sections, which are dedicated to achieve STRAUSS objectives.

- Deliverables (Figure 5, left). In this section all required STRAUSS deliverables are listed. Each deliverable has its own description, the lead beneficiary, its due date and its repository working area. This allows the collaboration of the project members.
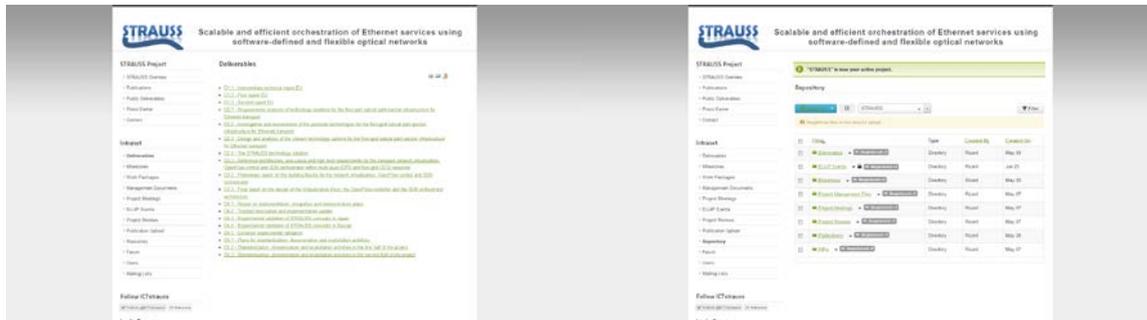


**Figure 5 STRAUSS website: Deliverables (left), STRAUSS website: Repository (right)**

- Milestones. A full list of milestones is provided. In each milestone the lead beneficiary is identified and the delivery date is provided. A working area in the repository is addressed to foster collaboration among project members.
- Work Packages. A full list of work packages is provided. In each work package, a brief intro is provided, as well as WP leaders. All WP-related tasks, deliverables and milestones can be accessed in order to keep track of WP status.
- Management Documents. In this section, all management related documents can be accessed. It includes:
  - o Grant Agreement and Annexes
  - o Consortium Agreement
  - o Quarterly Management Report
  - o Templates
- Project Meetings. In this section each project meeting is listed, and includes meeting related information and a presentation repository.
- EU-JP Events. In this section each attended event on behalf of STRAUSS project is listed, and includes meeting related information and a presentation repository.
- Project Reviews. This section will include all the necessary documents and information for the project reviews.
- Publication Upload. This section links to STRAUSS public website in order to upload STRAUSS publications for project members.
- Repository (Figure 5, right). The repository is where all data is stored in the STRAUSS member area. All deliverables, milestones, work packages, management documents, project meetings, EU-JP events, project reviews and publications upload rely on the different working areas that have been setup inside the repository. All repository contents are private and they are only accessible to STRAUSS project members.
- Forum (Figure 6, left). This area is a forum for all project members to discuss STRAUSS related issues. Discussions are grouped in threads.
- Users. User list of STRAUSS project members.

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

- Mailing Lists (Figure 6, right). This section includes direct links to the different mailing list that have been setup in the STRAUSS project. These mailing lists are internal to STRAUSS project members and help and foster collaboration between project members.
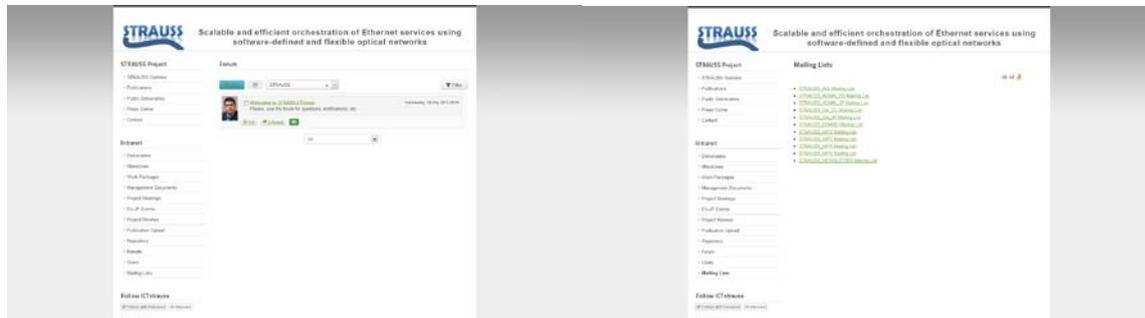


**Figure 6 STRAUSS website: Forum (left), STRAUSS website: Mailing Lists (right)**

### 2.2.3   Newsletter

The STRAUSS newsletter is a biannual newsletter to inform the industrial and scientific community of the latest advances within the STRAUSS project. It includes several sections:

- STRAUSS project progress.
- STRAUSS latest results.
- STRAUSS related activities.
- STRAUSS technical contributions.

Each issue is available in the STRAUSS public website to all Internet users. The public website has also incorporated a subscription mechanism in order to receive the latest issue, as soon it is available. The subscription mechanism is powered by a newsletter mailing list, where only the project coordinator can send the newsletters. The mailing list address is: newsletter@ict-strauss.eu

Figure 7 shows the first page of the first issue of the STRAUSS newsletter, expected to be distributed during November 2013.

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization, dissemination and exploitation activities**

**Figure 7 STRAUSS Newsletter – Issue 1 Page 1**

### 2.2.4 Social Media

In recent years, social media have been incorporated as research dissemination tools. Social research networks have appeared and social media for general public, such as Twitter, have been successfully used for research activities.

With the aim to benefit from this trend, and have a stronger impact towards scientific and industrial community, the STRAUSS project has created a Twitter account to disseminate all relevant STRAUSS news, as well as to retweet significant advances in STRAUSS related research topics.

Figure 8 shows current STRAUSS Twitter profile.



**Figure 8 STRAUSS twitter account**

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

## 2.3    Workshops

Two workshops are planned during the project. The workshops will be organized, addressing the scientific and technical challenges and presenting solutions for end-to-end service capability over a high-capacity optical network. Special effort will be put into interacting with European and Japanese industry through these workshops, with emphasis to new business areas that could benefit from SDN approaches. The first workshop is planned before month 24. The final workshop is planned at the end of the project. The workshop will be organized in conjunction with relevant conferences.

## 2.4    First STRAUSS publications

The following STRAUSS talks and publications were given and published:

**Invited Talks**

R. Casellas, R. Muñoz, R. Vilalta, R. Martínez, "Applicability of SDN principles for the control and management of optical networks within the STRAUSS EU-Japan project", invited talk at the European Conference on Optical Communication (ECOC) workshop on SDN Applications for optical network operating system: Challenges and opportunities, September 22-26 2013, London, UK.

Ken-ichi Kitayama and Raul Muñoz, "The STRAUSS Project", ICT EU-Japan Project Launching Event, Tokyo, July 2nd, 2013.

R. Casellas, R. Vilalta, R. Muñoz, R. Martínez , "Control Plane approaches for Elastic Optical Networks based on DWDM flexi-grid", within the workshop "(G)MPLS and OpenFlow: Interworking, Integrating, or Replacing? Will SDN replace GMPLS? How much use will SDN make of the software stacks that have been developed for GMPLS? FIA workshop – Dublin, Ireland 2013.

**Journals**

R. Vilalta, R. Muñoz, R. Casellas, R. Martínez, Virtual Optical Network Resource Allocation using PCE Global Concurrent Optimization for Dynamic Deployment of Virtual GMPLS-controlled WSON (accepted), Journal of Optical Communications and Networks, Vol. 5, Issue 12, pp. 1373-1381, December 2013.

Shuping Peng, Reza Nejabati, and Dimitra Simeonidou "Role of Optical Network Virtualization in Cloud Computing [Invited]", Journal of Optical Communications and Networking, vol. 5, no. 10, pp. A162-A170, October 2013.

Lei Liu, Hyeon Yeong Choi, Ramon Casellas, Takehiro Tsuritani, Itsuro Morita, Ricardo Martínez, and Raül Muñoz "Demonstration of a Dynamic Transparent Optical Network Employing Flexible Transmitters/Receivers Controlled by an OpenFlow-Stateless PCE Integrated Control Plane [Invited]", Journal of Optical Communications and Networking, OFC/NFOEC 2013 special issue, Vol. 5, Issue 10, pp. A66-A75, October 2013.

**Conferences**

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization, dissemination and exploitation activities**

T. Szyrkowiec, A. Autenrieth, P. Gunning, P. Wright, A. Lord, J-P. Elbers, A. Lumb, First Field Demonstration of Cloud Datacenter Workflow Automation Employing Dynamic Optical Transport Network Resources Under OpenStack & OpenFlow Orchestration (Post-deadline Paper) in Proc. of 39th European Conference and Exhibition on Optical Communication (ECOC 2013), September 22-26 2013, London, U.K.

Shuping Peng, Reza Nejabati, Mayur Channegowda, and Dimitra Simeonidou, Application-aware and Adaptive Virtual Data Centre Infrastructure Provisioning over Elastic Optical OFDM Networks, in Proc. of 39th European Conference and Exhibition on Optical Communication (ECOC 2013), September 22-26 2013, London, U.K.

R. Vilalta, R. Muñoz, R. Casellas, R. Martínez, Data Center Interconnection Orchestration with Virtual GMPLS-controlled MPLS-TP Networks over a Shared Wavelength Switched Optical Network, in Proc. of 39th European Conference and Exhibition on Optical Communication (ECOC 2013), September 22-26 2013, London, U.K.

R. Vilalta, R. Muñoz, R. Casellas, R. Martínez, Dynamic deployment of virtual GMPLS-controlled elastic optical networks using a virtual network resource broker on the ADRENALINE testbed (Invited), in Proc. of 15th International Conference on Transparent Optical Networks (ICTON), June 23-27, 2013, Cartagena (Spain).

## 2.5 Partners' dissemination plans

In the following the dissemination plans per partner will be explained:

### 2.5.1 CTTC

CTTC plans for project results dissemination will comprise the following activities:

- Contribution to scientific publications: the goal is to publish the original results in journals/magazines of high impact factor in the areas of optical communications and networking (e.g., JOCN and JLT), and in highly recognized international conferences (e.g., OFC/NFOEC, ECOC and ONDM).
- Invited and tutorial speeches: CTTC will give invited talks on STRAUSS project's results at the main conferences in the field.
- Design, content edition and publishing of STRAUSS' promotional material (newsletters, flyer, posters, etc.).
- Hosting, maintenance and content editors of the STRAUSS website.
- CTTC, as STRAUSS-EU project leader, will actively participate in selected dissemination activities related to the ICT Future Networks area (e.g. FUNEMS) involving STRAUSS project's results.
- Community Management of STRAUSS presence in social networks (e.g., twitter).
- Internal dissemination activities: CTTC will use project results to internally disseminate the achievements of the STRAUSS project within the CTTC's weekly seminars.

### 2.5.2 ADVA

ADVA Optical Networking plans for project results dissemination will comprise the following activities:

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

- Publications of key projects results in international scientific conferences, workshops and journals. The most relevant events are OFC (Optical Fiber Communication Conference) and ECOC (European Conference on Optical Communications), where employees of ADVA Optical Networking are TPC members.
- ADVA Optical Networking plans to give invited talks at major conferences as well at partner and customer events presenting the overall project and key achievements.
- ADVA Optical Networking will disseminate the project results to customers and the optical communications R&D community. Workshops with various customers, including the major network and data center operators in the world will be used to present project achievements and to gather feedback on the technical approach, use cases and the market potential.
- ADVA Optical Networking will provide internal dissemination and training toward various departments inside ADVA such as product line management, system specification, engineering, marketing, and sales.
- ADVA Optical Networking plans to issues company press releases on major STRAUSS achievements or referencing the STRAUSS project in press releases related to SDN.

### 2.5.3 TID

Telefonica, as an industrial partner in the STRAUSS' consortium, is suitable partner to reach impact on industry in exhibitions, conferences and workshops (like ADVA from the EU side). To participate in such events it is important to present the results from an industrial point of view. Moreover Telefonica I+D will contribute to disseminate the results of the project within the Telefonica group. Moreover, Telefonica will participate in EU activities to show the contributions of the solutions defined in STRAUSS.

The most challenging and innovative results of the project will be directed to the research community. The STRAUSS consortium has partners that are greatly involved in the research community like UBristol, HHI and CTTC. Telefonica will collaborate with them mainly in the dissemination activities through high-quality journal publications, article in conferences and magazines. Telefonica will contribute to create collaborations with other EU projects, which can multiply the impact of our achievements, since they work in other forums. Therefore, the collaboration with them is one of the most important targets of our dissemination activities.

### 2.5.4 UNIVBRIS

UNIVBRIS plans to disseminate the results obtained from STRAUSS through publishing in top refereed journals, magazines, conferences in the field and presenting in prestigious international conferences and workshops. UNIVBRIS targets the following journals: IEEE/OSA Journal of Lightwave Technology, special issues in IEEE Communications Magazine, IEEE/OSA Journal of Optical Communications and Networking, OSA Optics Express and Elsevier Optics Communications, and the following leading conferences: European Conference on Optical Communications, Optical Fiber Communication conference, International Conference on Transparent Optical Networks, Optical Networking Design and Modeling, Asia Communications and Photonics Conference, etc.. As a university, UNIVBRIS will also organize training and teaching activities for young researchers, Master and Ph.D. students in future optical networking technologies. UNIVBRIS is planning to Join ONF, NFV and OpenDaylight in 2014, which gives a great opportunity to work with world leading experts in the relative fields and industrial collaborators, and will be able to reflect the STRAUSS point of view, positions and achievements in these communities.

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

### 2.5.5 Fraunhofer HHI

Frauhofer HHI plans to disseminate the results through publishing in journals, magazines and conferences. It will organize the planned workshops and organize training and teaching activities for young researchers, Master and Ph.D. students.

### 2.5.6 OSAKAU

Osaka University plan to disseminate the results through publishing in journals with the best circulation and major conferences. It will also organize training and teaching activities for young researchers, Master and Ph.D. students in future optical networking technologies. It will plan to have internship for the Master and Ph.D students in collaboration with other partners.

### 2.5.7 FUJITSU

FUJITSU plans to disseminate the results obtained from STRAUSS through publishing in top refereed journals in the field and presenting in prestigious international conferences and exhibitions.

### 2.5.8 KDDI

KDDI R&D Laboratories Inc. plans for project results dissemination,which will comprise the following activities:

- KDDI R&D Laboratories Inc. will contribute to dissemination of the project results in academic international conferences and domestic (Japanese) research conferences. In addition, KDDI R&D Laboratories Inc. will publish the results in journals/magazines in the areas of optical communications with EU partners.
- KDDI R&D Laboratories Inc. will give invited talks at major conferences and at workshops in standardization bodies to present the overall project and key achievements related to Transport SDN.

## 3 Strategy for Standardization

STRAUSS has clearly defined plans for standardization of the technologies, architectures and protocols studied and defined in the project. This will generate a measurable output from the project, and allows verifying the acceptance of the project results in a wider community, ensuring technology interoperability, and providing input and value to the technology community. This interaction will help to secure future compatibility and will further ensure potential technology and products are successful, as well as facilitating the continued evolution of the Internet. The standardization bodies and foundations under consideration include (but are not limited to) IETF, OIF, ONF, IEEE, and ITU-T.

These are the main reasons why the STRAUSS consortium counts on industrial partners with both market impact and driving roles at the relevant standardization bodies. These partners (FUJITSU, ADVA SE, KDDI and TID) have commercial interest in promoting standards in the subjects addressed by the STRAUSS project..

STRAUSS plans to monitor the main standardization bodies and take ongoing progress into consideration for architecture definition and protocol specification. Based on the architecture defined in the project, and on experienced gained in development of prototypes and demonstrators,

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1
Plans for standardization,
dissemination and exploitation
activities**

STRAUSS plans to actively provide feedback to the standardization bodies and to provide at least one official contribution via the partners who are members of the respective standardization group.

In the following table the partners, who are involved in specific standardisation activities, are listed:

|         | IETF | ITU-T | IEEE | ONF | OIF |
|---------|------|-------|------|-----|-----|
| ADVA    | X    | X     | X    | X   | X   |
| TID     | X    |       |      | X   |     |
| FUJITSU |      |       | X    |     |     |
| KDDI    | X    |       |      | X   | X   |

**Table 1: Partners involved in specific standardisation activities**

## 3.1    IETF

The IETF is a large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. It is open to any interested individual. Its majority of standards are concerned with OSI layer 3 and above. The details can be found on http://www.ietf.org/. For STRAUSS the Path Computation Element (PCE) working group, the Common Control and Measurement Plane (CCAMP) working group are the key points of interest.

Among the STRAUSS partners,  TID, ADVA SE and KDDI are active in the IETF:

**TID**

Telefonica contributions on standardization are focus on IETF, traditionally. Telefonica is willing to contribute to IETF WG, but mainly in PCE and CCAMP WG.

**ADVA**

ADVA will monitor and contribute to the IETF CCAMP working group, specifically in the area of PCE and GMPLS-ENNI.

**KDDI**

KDDI R&D Laboratories Inc. will monitor standardization activities carried out within the Common control and measurement plane (ccamp) working group and the Path computation element (pce) working group related to the flexible grid networking in STRAUSS, and will eventually contribute to them with the project results as needed basis with EU partners.

## 3.2    ITU-T

The ITU is the United Nations specialized agency for information and communication technologies (ICTs) and the creator of the world's most universally-recognized info & communications standards,

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization, dissemination and exploitation activities**

since 1865. ITU-T is the ITU's Telecommunication Standardization Sector, which develops standards (ITU-T Recommendations) defining elements in ICTs infrastructure for the various fields of international telecommunications. Standardization work is carried out by the technical Study Groups (SGs). The details can be found on http://www.itu.int/. For STRAUSS the study group SG15: Networks, Technologies and Infrastructures for Transport, Access and Home and the study group SG11: Protocols and test specifications are the key points of interest.

ADVA SE as members of ITU-T, will monitor standardisation activities and actively feed the project results to ITU-T. Although the project is mainly focused on Ethernet transport, STRAUSS will monitor the activities of ITU-T within SG15 on transport and access, consisting of the lead study groups on optical technology, optical transport networks and access network transport.

ADVA will also monitor the recently started SDN standardization activities in ITU-T in SG 11.

## 3.3  IEEE

The IEEE is the world's largest professional association dedicated to advancing technological innovation and excellence. IEEE publishes highly cited journals, conferences, and technology standards. For these last, IEEE is the entity responsible for the IEEE 802.3 Ethernet standard. The details can be found on http://www.ieee802.org/3/. For STRAUSS the 400 Gb/s Ethernet Study Group is one key points of interest.

ADVA SE and FUJITSU, as members of IEEE, will monitor standardisation activities and actively feed the project results to IEEE.

**ADVA**

ADVA will monitor related Ethernet transport and transmission activities in IEEE. As ADVA is not active in WP2, the main focus will be on the impact of the defined transmission standardization on control plane.

**FUJITSU**

Fujitsu plans to promote the results obtained from STRAUSS for 400GbE standardization at IEEE802.3.

## 3.4  ONF

Founded in 2011 by Deutsche Telekom, Facebook, Google, Microsoft, Verizon and Yahoo!, the Open Networking Foundation (ONF) is a non-profit organization whose goal is to rethink networking and bring to market standards and solutions in a quickly and collaboratively way. The ONF is the official maintainer of the OpenFlow protocol and related standards. The most relevant contributions identified are those related to OpenFlow control for data centers. Details can be found on https://www.opennetworking.org/.

ADVA SE, Telefonica, and KDDI are members of the ONF and plan the following activities.

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

**ADVA**

ADVA is an active member in the Optical Transport Working Group (OTWG). STRAUSS partners can share their findings through partners that are members of ONF – such as ADVA and Telefonica – with the ONF but immediate feedback may be limited due to the nature of this closed community. ADVA plan to promote STRAUSS University partners and research institutes as Associated Research partners.

**TID**

Telefonica will work on collaborative standardization activities in ONF with other industrial members (ADVA and KDDI). Therefore, the participation of TID in these ONF events will be important during the project.

**KDDI**

KDDI R&D Laboratories Inc. will monitor standardization activities carried out within the optical transport working group (OTWG) related to STRAUSS, and will attempt to promote interoperability techniques related to CDPI (Control data plane interface) and CVNI (Control virtual network interface) such as OpenFlow for Transport SDN.

## 3.5 OIF

The Optical Internetworking Forum (OIF) promotes the development and deployment of interoperable networking solutions and services through the creation of Implementation Agreements (IAs) for optical networking products, network processing elements, and component technologies. Details can be found on http://www.oiforum.com/.

ADVA and KDDI are active members of OIF and plan the following activities:

**ADVA**

ADVA will monitor standardization activities carried out within the workgroups related to STRAUSS, either on the data plane or on the control and management plane, and eventually contribute to them with the project results.

**KDDI**

KDDI R&D Laboratories Inc., as an active member of OIF, will eventually contribute to requirements and specifications for interoperability related to Transport SDN in the events (eg. Workshop) and standardization meetings of OIF.

## 4 Exploitation activities

## 4.1 CTTC

CTTC is a non-profit R&D institution, therefore CTTC cannot have industrial exploitation plans of its own, but through transferring the knowledge gained. CTTC's Technology Transfer Area (TTA) oversees CTTC system-wide efforts to encourage the use of the centre's research results for the public benefit. TTA focuses on patenting and licensing inventions and in working with industry in

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization, dissemination and exploitation activities**

support of CTTC's research, training and public service mission. Technology and know-how transfers are established on case-by-case basis, developed in the framework of (bilateral) agreements given a customer specific needs and requirements.

The CTTC's exploitation plans are also focused on enhancing its Ph.D. training program using the foreseen results to improve Ph.D. students' knowledge and expertise in the field of Ethernet transport and all-optical networks. The enhanced knowledge obtained by diploma and Ph.D. students through the STRAUSS project will be transferred to the industry, after the completion of their degree.

## 4.2 ADVA

ADVA Optical Networking will commercially exploit the SDN and Ethernet service orchestration approaches of STRAUSS by subsequently adopting them for its FSP software suite. ADVA's exploitation plans as described in Part B, section 3.2.2 are amended below by tangible expected results.

ADVA will drive the exploitation of STRAUSS by sharing the results of research with product line management and business development departments, and influence on ADVA control and management plane software products. We will share the results of research with ADVA's system architects impacting current vision and providing new insights on network management for multilayer networks.

- ADVA is member of the OpenDaylight Project, and plans to contribute to the open source project with concepts and software modules developed in STRAUSS.
- ADVA plans to integrate OpenFlow protocol extensions for flexible WDM networks defined in STRAUSS in future releases for FSP3000 platform.
- ADVA plans to apply STRAUSS results to AVDA's FSP150 Ethernet service platform
- ADVA SE's exploitations plans additionally include the internal training, building internal knowledge about SDN amongst PLMs, SDAs, and software engineers.
- ADVA plans to add support for OpenFlow, PCEP, and GMPLS E-NNI protocol extensions specified in STRAUSS to the product roadmap.

## 4.3 TID

TID as a part of the Telefónica Group is in charge of innovation and strategic vision of emerging network technologies. Its main goal centres in applying new ideas, concepts and practices in addition to developing advanced products and services. Telefónica Group is a global network service provider, directly operating networks in around 30 different countries at all infrastructure levels (from mobile and fixed access to core), as well as providing wholesale services worldwide.

Core network division in TID is also affiliated to Telefonica Global Resources. One of the objectives of Telefonica Global Resources is to disseminate and exploit the project's research results in Telefónica, with the goal of promoting the results and ideas inside the Group Strategic roadmap. The practical orientation of this project with several real use cases and validations will foster its application in several trials and test in the relevant Telefónica business units in Europe and the world with perspectives of creating Telefónica commercial services to enforce the deployment of new technologies within the Telefónica network.

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

In its role of global integrated operator, Telefónica sees STRAUSS work as an opportunity to maintain its worldwide network with a lower CAPEX and OPEX and to deploy Ethernet services to end-user customers and companies.

The disposal of SDN-ready controllers within the project will promote the creation of new innovative applications and services of high interest for Telefónica. Telefónica is strongly committed to open innovation, and is promoting technology start-ups through initiatives like Wayra.

TID is interested in possible IPR related to the system and methods derived from the work done in STRAUSS and on the development of new related commercial solutions. TID plans to involve its industrial partners and stakeholders in the design of a technically feasible and scalable commercial product from the above concepts and then cooperate in the transfer process to the industry.

## 4.4 UNIVBRIS

UNIVBRIS plans to spread the knowledge obtained within the STRAUSS project through educational courses and preparation of specialized teaching material (supplements), and also support young PhD students and researchers who will take actively part in the STRAUSS related research activities. Additionally, a few students are expected to get a closer insight by completing small-scale related projects within the framework of Master theses or course projects.

## 4.5 Fraunhofer HHI

Since the Fraunhofer HHI is a non-profit organisation it has no industrial exploitation plans on its own. The knowledge gained in STRAUSS will be used for future public funded projects and projects with industry partners.

## 4.6 OSAKAU

## 4.7 Osaka University cannot have industrial exploitation plans of its own, but through transferring the knowledge gained. FUJITSU

FUJITSU will aim to utilize the outcome of STRAUSS to establish subsequent FUJITSU internal and collaborative projects to develop various technologies and solutions needed for developing appropriate next generation optical products and services.

FUJITSU considers to use the results obtained from STRAUSS for commercialization of products related to 400GbE transmission system.

## 4.8 KDDI

KDDI R&D Laboratories Inc. performs investigations, research, and development and provides consulting and other services on new information and communication technologies based on the research and development in the KDDI Group, and is a subsidiary of KDDI Corporation which is one of network service providers and operators in Japan, directly operating networks from mobile and fixed access to core as well as providing wholesale services and data-centre services worldwide. As a research department of a network operator, KDDI R&D Laboratories Inc. will attempt an exploitation of project results by discussing requirements and possibility of product deployments for next generation sliceable Ethernet services over flexible optical networks with related departments and potential system vendors.

**STRAUSS**
*Scalable and efficient orchestration of Ethernet services
using software-defined and flexible optical networks*

**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

# 5 Acknowledgements

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**STRAUSS**
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**Deliverable D5.1**
**Plans for standardization,
dissemination and exploitation
activities**

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