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Large-scale Integrated Project (IP)



D.22.1.2: FIWARE Lab coordination, operation and support report

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EXECUTIVE SUMMARY

This deliverable provides an overview of the activities and statistics related to FIWARE Lab, to the usage of FIWARE Lab nodes, and of each GEri, during the second year of the project lifetime, from September 2015 to December 2016.

At the end of September 2015, the FIWARE Lab nodes included: Berlin (Fraunhofer Fokus) Budapest (Wigner); Crete (TUC); Gent (iMinds), Karlskrona (BTH), Lannion (Imaginlab); Mexico (INFOTEC); PiraeusN (Neuropublic), PiraeusU (UPRC); Poznan (PSNC); Prague (Cesnet) ; Sao Paulo (USP); SophiaAntipolis (Com4Innov); Spain (Telefonica); Stockholm (Acreo); Trento (Trentino Network); Volos (UTH); Zurich (ZHAW); and Waterford (TSSG).

During this period, new nodes have been selected to join the FIWARE Lab federation. The selection was done through the “FI-Core - FIWARE Lab Open Call 2015” (official documentation on the open call and its requirements here: <https://www.fiware.org/fiware-lab-open-call-2015/>).

The nodes selected were: Hannover Node (provisioned by Netlink); Budapest Node (provisioned by Winger and already part of FIWARE Lab since XIFI project); Genoa Node (provisioned by UNIGE, CNIT and SEEWEB); Zurich2 Node (provisioned by Switch); Wroclaw Node (provisioned by PWR and MGM); SophiaAntipolis Node (provisioned by Com4Innov and TAS, and already part of FIWARE Lab since XIFI project).

In addition to these nodes, some partners already part of the FI-Core Consortium committed to provision three new nodes as part of the FIWARE Lab federation: Vicenza Node (provisioned by Engineering), SpainTenerife Node (provisioned by Atos) and Brittany Node (provisioned by Orange).

The following nodes, during the time frame considered and in comparison to the previous version of this report (D.22.1.1), discontinued their service provisioning: Berlin node (December 2015), Gent node (December 2015), Karlskrona node (December 2015), PiraeusN node (December 2015), Stockholm node (December 2015), Waterford node (December 2015) and Prague node (September 2016).

Thus, considering the previous existing nodes and the new ones federated after September 2015, the nodes covered within this deliverable are:

Brittany (Orange/Com4Innov); Budapest (Wigner); Crete (TUC); Genoa (UNIGE-CNIT-SEEWEB); Hannover (Netlink); Lannion (Imaginlab); Mexico (INFOTEC); PiraeusU (UPRC); Poznan (PSNC); Prague (Cesnet) ; Sao Paulo (USP); SophiaAntipolis (Com4Innov - TAS); Spain (Telefonica); SpainTenerife (Atos); Trento (Trentino Network - CREATE-NET); Vicenza (Engineering); Volos (UTH); Wroclaw (PWR-MGM); Zurich (ZHAW); ZurichS (SWITCH).

The amount of available resources provided by FIWARE Lab has grown accordingly to the growth of its nodes, and today it hosts a total of 7500 Users and provides them with 4480 Cores, 20461 GB of RAM, 1073 TB of Disk Space, 900 Public IP.

A whole summary of available nodes and resources can be found here: <http://infographic.lab.fiware.org>. The Infographic is the main tool used to monitor the status of

FIWARE Lab Nodes. It displays a map that shows the geographic position and available resources for each node.

Beside the Infographic, there is the Health Status (available at <http://status.lab.fiware.org>) which shows the “health” of each node by testing a series of core services. Moreover, the Sanity Check (available at <https://fi-health.lab.fiware.org>) performs a set of automatic test to check nodes status and end-users services availability.

Based on the experience gained during the past years and the ever growing usage of FIWARE Lab, all activities are ruled by Agile dynamic and weekly phone calls. Weekly phone calls, plus a daily exchange of opinion through the dedicated mailing-list (fiware-lab-federation-nodes [at] lists [dot] fiware [dot] org) is the key to keep always updated Nodes and FIWARE Lab experts. Agile sprints are very useful to fix targets and keep trace of them month by month.

Another very important aspect of the activities carried out in FIWARE Lab is the Help Desk. In order to support all external users requests, a first level of Help Desk support is on duty 5 days a week with a team shifts rotation among 7 partners. All requests arriving to the Help Desk queue are taken in charge by a member of the team that is responsible to:

- Tagging all tickets with the correct informations useful to collect reliable statistics.
- Solve the issue described within the ticket (whether possible).
- Assign the ticket to the proper owner as second level of support (whether not possible to solve by the level 1 team).

The tools used to handle Help Desk tickets and Agile dynamics are JIRA (available at <https://jira.fiware.org/>) and Backlog (available at <http://backlog.fiware.org/>).

Within this deliverable, will be also described data and statistics for each Node, Help Desk channel and Generic Enablers. Finally a set of conclusions and lessons learnt will close the document.

Table of Contents

EXECUTIVE SUMMARY	3
Table of Contents	5
1. INTRODUCTION	9
1.1 Intended audience	9
1.2 Reading recommendation	9
2. OVERVIEW OF FIWARE LAB COORDINATION AND SUPPORT	10
2.1. Coordination and support procedures	10
2.1.1 Coordination Approach	10
2.1.2 Community Account Requests	11
2.1.3 Help Desk Support	12
2.1.4 Support Tools	14
2.2. FIWARE Lab Statistics	17
2.2.1. Available Resources	17
2.2.2. Hosted Users	18
2.2.3. Level 1 Support	18
2.3. Commercial nodes Open Call management	19
2.3.1 Open Call Targets and Requirements	19
2.3.2 Open Call results and management	20
2.4. General Events log (1/09/2015 - 1/12/2016)	22
3. FIWARE LAB NODES OPERATION AND SUPPORT	23
3.1 Brittany Node	23
3.1.1 Factsheet	23
3.1.2 Usage statistics (1/03/2016 - 1/12/2016)	24
3.1.3 Events log (1/03/2016 - 1/12/2016)	24
3.2 Budapest Node	24
3.2.1 Factsheet	24
D.22.1.2: FIWARE Lab coordination, operation and support report	4

3.2.2 Usage statistics (1/09/2015 - 1/12/2016)	25
3.2.3 Events log (1/09/2015 - 1/12/2016)	25
3.3 Crete Node	26
3.3.1 Factsheet	26
3.3.2 Usage statistics (1/09/2015 - 1/12/2016)	26
3.3.3 Events log (1/09/2015 - 1/12/2016)	27
3.4 Genoa Node	27
3.4.1 Factsheet	27
3.4.2 Usage statistics (1/03/2016 - 1/12/2016)	27
3.4.3 Events log (1/03/2016 - 1/12/2016)	28
3.5 Hannover Node	28
3.5.1 Factsheet	28
3.5.2 Usage statistics (1/03/2016 - 1/12/2016)	28
3.5.3 Events log (1/03/2016 - 1/12/2016)	29
3.6 Lannion Node	29
3.6.1 Factsheet	29
3.6.2 Usage statistics (1/09/2015 - 1/12/2016)	30
3.6.3 Events log (1/09/2015 - 1/12/2016)	30
3.7 Mexico Node	30
3.7.1 Factsheet	30
3.7.2 Usage statistics (1/09/2015 - 1/12/2016)	31
3.7.3 Events log (1/09/2015 - 1/12/2016)	31
3.8 PirauesU Node	32
3.8.1 Factsheet	32
3.8.2 Usage statistics (1/09/2015 - 1/12/2016)	32
3.8.3 Events log (1/09/2015 - 1/12/2016)	32
3.9 Poznan Node	33
3.9.1 Factsheet	33
3.9.2 Usage statistics (1/09/2015 - 1/12/2016)	34
3.9.3 Events log (1/09/2015 - 1/12/2016)	34

3.10 Sao Paulo Node	34
3.10.1 Factsheet	34
3.10.2 Usage statistics (1/09/2015 - 1/12/2016)	35
3.10.3 Events log (1/09/2015 - 1/12/2016)	35
3.11 Sophia-Antipolis Node	35
3.11.1 Factsheet	35
3.11.2 Usage statistics (1/03/2016 - 1/12/2016)	36
3.11.3 Events log (1/03/2016 - 1/12/2016)	36
3.12 Spain Node	37
3.12.1 Factsheet	37
3.12.2 Usage statistics (1/09/2015 - 1/12/2016)	37
3.12.3 Events log (1/09/2015 - 1/12/2016)	37
3.13 Spain-Tenerife Node	39
3.13.1 Factsheet	39
3.13.2 Usage statistics (1/03/2016 - 1/12/2016)	40
3.13.3 Events log (1/03/2016 - 1/12/2016)	40
3.14 Trento Node	40
3.14.1 Factsheet	40
3.14.2 Usage statistics (1/09/2015 - 1/12/2016)	41
3.14.3 Events log (1/09/2015 - 1/12/2016)	41
3.15 Vicenza Node	41
3.15.1 Factsheet	41
3.15.2 Usage statistics (1/09/2015 - 1/12/2016)	42
3.15.3 Events log (1/09/2015 - 1/12/2016)	42
3.16 Volos Node	43
3.16.1 Factsheet	43
3.16.2 Usage statistics (1/09/2015 - 1/12/2016)	43
3.16.3 Events log (1/09/2015 - 1/12/2016)	43
3.17 Wroclaw Node	44
3.17.1 Factsheet	44

3.17.2 Usage statistics (1/03/2016 - 1/12/2016)	44
3.17.3 Events log (1/03/2016 - 1/12/2016)	44
3.18 Zurich Node	45
3.18.1 Factsheet	45
3.18.2 Usage statistics (1/09/2015 - 1/12/2016)	45
3.18.3 Events log (1/09/2015 - 1/12/2016)	45
3.19 ZurichS Node	46
3.19.1 Factsheet	46
3.19.2 Usage statistics (1/03/2016 - 1/12/2016)	46
3.19.3 Events log (1/03/2016 - 1/12/2016)	46
3.20 Karma history	47
3.21 Health check history	57
4. FIWARE GErI OPERATION AND SUPPORT	63
4.1 GErI usage statistics (1/09/2015 - 1/12/2016)	63
4.2 GErI support statistics (1/09/2015 - 1/12/2016)	65
4.3 GErI main events log (1/09/2015 - 1/12/2016)	66
5. CONCLUSIONS AND LESSON LEARNT	74

1. INTRODUCTION

This deliverable is the conclusive report on the operations of FIWARE Lab by the FI-Core project. Starting from 2017, the operations of FIWARE Lab will be governed by the FIWARE Foundation in coordination with the FIWARE community. The deliverable covers the reporting period from September 2015 to December 2016, where new nodes joined the FIWARE Lab with the requirement to establish as well commercial offering before the end of the project, and cover different topics related to the coordination and operation of FIWARE Lab:

- Procedures for coordination of FIWARE Lab;
- Procedures for the management of Community Accounts;
- Procedures for the management of support request by users (regarding nodes or GEs);
- Tools adopted to support the operation of FIWARE Lab;
- Statistics on FIWARE Lab resources, usage, support activities;
- Report on the Open Call for inclusion of new node procedure and final results;
- Logs of activities performed on the overall Lab;
- Statistics on single FIWARE Lab node resource and usage;
- Logs of activities performed on the single FIWARE Lab nodes;
- Statistics on FIWARE GEs usage and support activities;
- Logs of activities performed on the single FIWARE GEs;

The content listed above, and included in the deliverable is key to analyse the adoption of FIWARE Lab, its potential future needs, its current limitations and potential suggestions for the future operators of FIWARE Lab (i.e. the FIWARE Foundation in primis).

1.1 Intended audience

The target audience of this deliverable is:

- All nodes that have joined or plan to join the FIWARE Lab federation;
- FIWARE experts and technical personnel providing deployment support and end-user support activities;
- Developers and operators of FIWARE Lab tools (also called FIWARE Ops).
- The FIWARE Lab coordination team, in order to evaluate whether a candidate infrastructure meets the minimum technical and operational requirements
- The FIWARE Foundation as natural new owner and coordinator of FIWARE Lab;
- and, more in general, all the stakeholders of FIWARE community to evaluate status and directions of FIWARE Lab.

1.2 Reading recommendation

This document is divided into 5 sections:

- Section 1: introduction, Intended audience and reading recommendation

- Section 2: offers an overview of the FIWARE Lab coordination tools and activities as well, and provides Help Desk statistics
- Section 3: describes the overall status and statistics of the different FIWARE Lab nodes
- Section 4: provides GErI status and statistics
- Section 5: gives suggestions for the future and lessons learnt from the past

2. OVERVIEW OF FIWARE LAB COORDINATION AND SUPPORT

This section offers an overview of: FIWARE Lab coordination and support procedures (including community accounts management, adopted tools, and Help Desk procedures); statistics related to overall resources and usage of FIWARE Lab; Results of the Open Call for inclusion of commercial FIWARE offering; and a log of General Events (e.g. failures, maintenance) pertaining the overall FIWARE Lab.

2.1. Coordination and support procedures

2.1.1 Coordination Approach

FIWARE Lab activities are basically ruled by weekly scrum meetings and monthly Agile sprints.

Every Tuesday at 10:00, all Nodes Administrators are invited to report and discuss different topics inherent the activities carried out within the Lab.

The main topics covered within the meeting are:

- Status of the node

Each Node Administrator, provides a snapshot about the current status of its node. He/She provides information about the presence within the Infographic page (<http://infographic.lab.fiware.org>), about the Sanity Checks status (<http://status.lab.fiware.org>), as well as useful updates during specific activities like hardware maintenance, users migration or OpenStack upgrade version.

- Issues occurred during the previous week

Each Node Administrator, discuss about all issues encountered during the past week. This is a crucial point in order to identify and solve possible weaknesses or bugs within the FIWARE Lab architecture (e.g common connectivity errors toward the centralized keystone) as well as possible weakness in the FIWARE Lab documentation.

- Karma calculation

This task aims to discuss and clarify any doubts about the weekly calculation of Karma points (see chapter 3.20).

- Instructions from the FIWARE Lab Task Force or Technical Steering Committee

This task is to inform all Nodes Administrators about decisions taken by the FIWARE Lab Task Force or by the Technical Steering Committee and to design a roadmap of the future activities.

- Help Desk pending requests

All Nodes Administrators are asked to verify all own pending (not closed) Help Desk requests, and it is discussed how to resolve them as soon as possible in order to meet agreed SLAs.

- Share suggestions

This task is to share suggestions among all Nodes Administrators and FIWARE Lab technical experts. It is a very relevant step within the meeting because it allows those who have found a solution or workaround for a specific problem to share that experience among the community to facilitate the expansion and stability of FIWARE Lab.

- Topics of the day

This is an open window within the meeting to discuss about topics (even off-topics) not covered during a standard meeting.

- Agile Sprint meeting

Twice a month, in addition to the topics covered above, a Planning Sprint and a Closing Sprint activities is inserted within the meeting. All nodes administrators are asked to create a “work-item” for every single activities they are going to carry out so that to have a trace of the whole FIWARE Lab activities and effort spent.

Beside all points above, a specific mailing list (fiware-lab-federation-nodes@lists.fiware.org) is constantly used from Nodes Administrators and FIWARE Lab experts to exchange each other doubts, information, tips and any kind of communication useful to the growth and stability of FIWARE Lab.

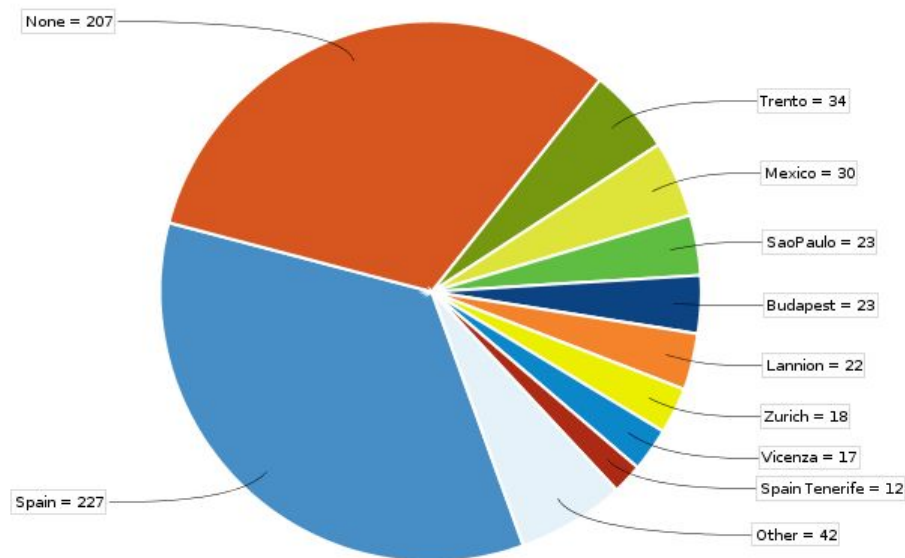
2.1.2 Community Account Requests

A Community Users is allowed to experiment with FIWARE technology during a period of more than 9 month. A typical example are SMEs/startups under the FIWARE Accelerator Programme.

Trial Users can always apply to for upgrading their accounts and become Community Users. This is granted to everybody if it is understood that the application they aim to developing, is considered a relevant reference example for the development of the FIWARE Community.

In order to apply for becoming Community User is needed to compile an application form accessible through the main page of the FIWARE Lab portal (<https://account.lab.fiware.org>) - Request Community Account Upgrade - button.

The following graphs shown statistics about Community Account requests handled in the period: September 2015 - December 2016:



Community Account requests per node (the chart shows the preference expressed by users during the account request, not the actual assignment by FIWARE Lab administrators)

2.1.3 Help Desk Support

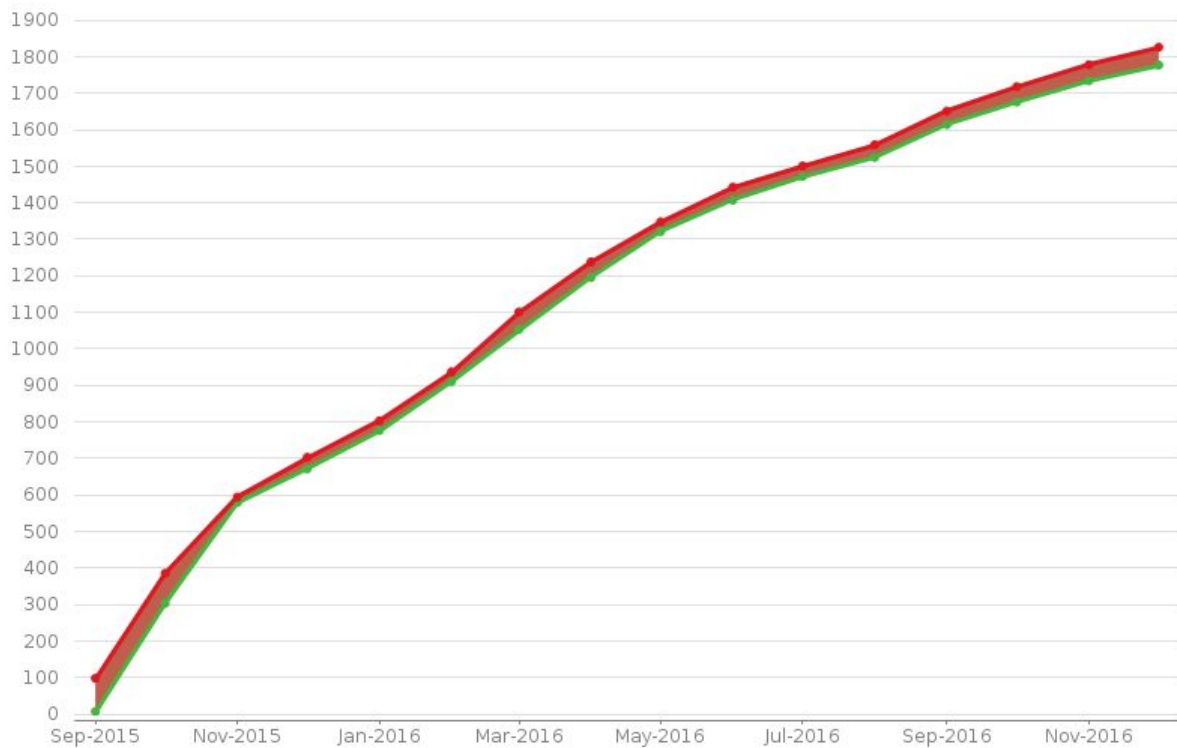
The Help Desk is the support that FIWARE Lab experts, Nodes Administrators and GEs Owners, give to external and internal users. The Help Desk activities are structured in 2 main Level of support in order to guarantee that agreed SLAs are achieved.

The first level of support is composed by a team which is in charge of managing all FIWARE Lab incoming tickets. This team is also responsible of categorize all incoming tickets in order to guarantee that Backlog statistics (<http://backlog.fiware.org/helpdesk/main>) are always properly updated. Whether is not possible for a member of the first level to solve a problem (e.g. a specific Node failure), he/she will assign that ticket to a second level of support composed by Node Administrators and GEs Owners.

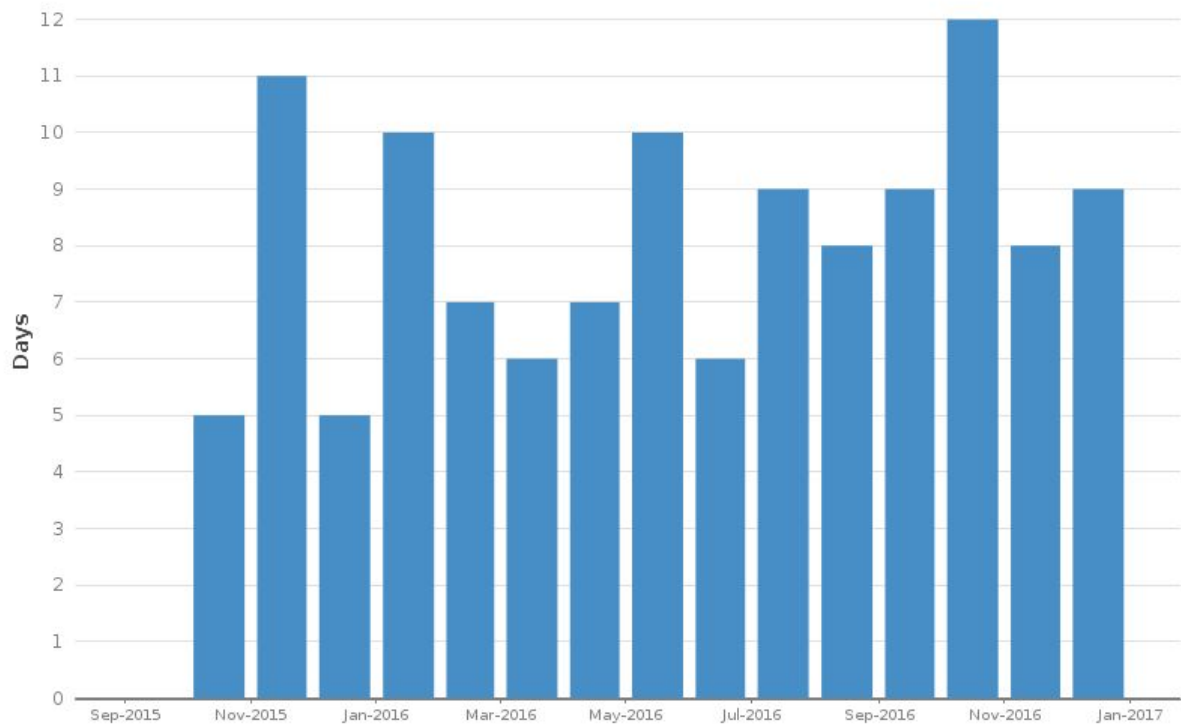
The first level is organized in 8x5 scheduled shifts from 8:00 AM to 17:00 PM Mon-Fri. The calendar of Leve1 Help Desk shifts is available at the following link:

https://docs.google.com/spreadsheets/d/1WkYIWuOlg4TOAd9xenFmnrVn8_ubIRoaXw637TIP9I/edit#gid=1383004526

Hereunder graphs shown the overall FIWARE Lab Help Desk statistics:



Created vs Resolved tickets by the Help Desk support



Average numbers of days took to resolve tickets by the Help Desk support

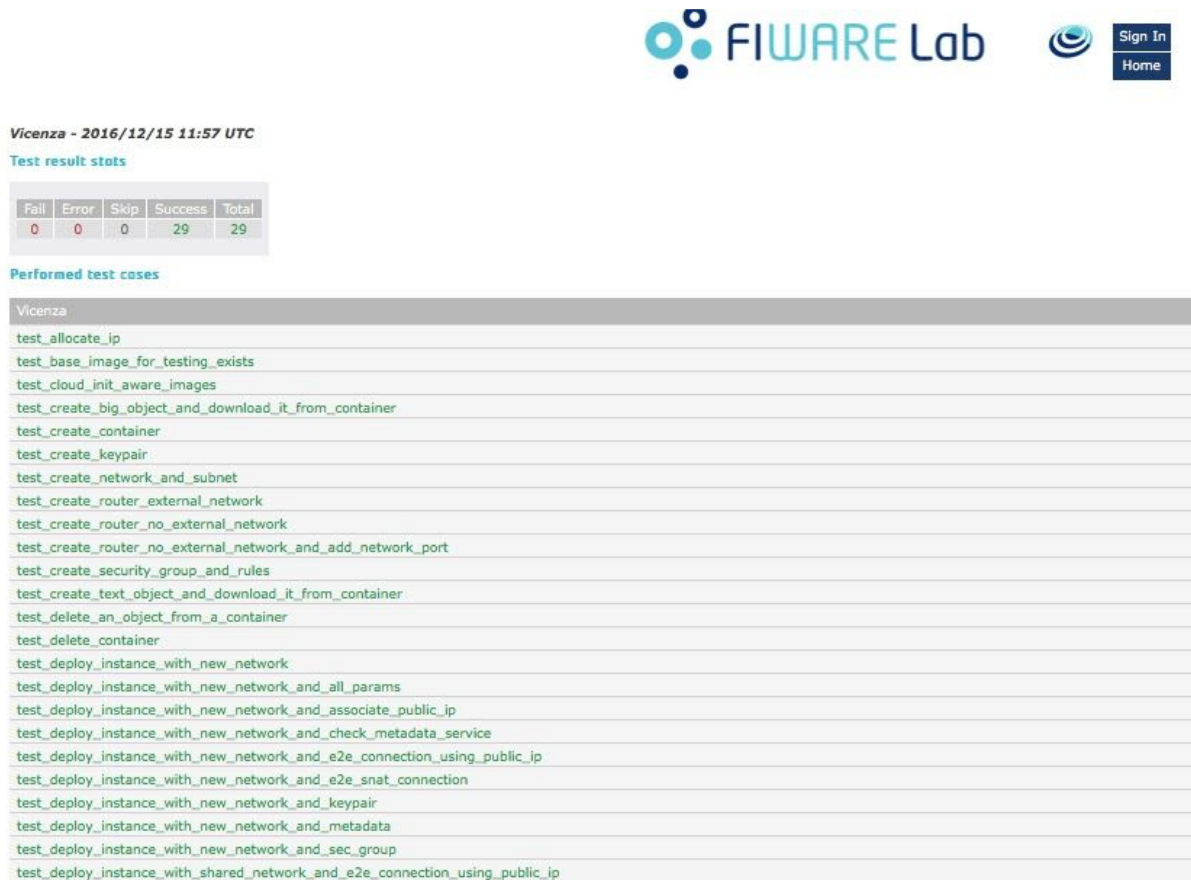
2.1.4 Support Tools

A set of tools are integral part of FIWARE Lab. Those tools are used to monitorize FIWARE Lab usage and availability as well as provide statistics and evidences of FIWARE Lab activities.

- Sanity Check

The Sanity Check tool available at <https://fi-health.lab.fiware.org> aims to give a snapshot of the status of the different FIWARE Lab Nodes. It is the principal tool to check the functionality and availability of a Node. It periodically executes functional test on every single FIWARE Lab Node and sends automatic reports and results.

Hereunder an example of tests executed on the Vicenza Node:

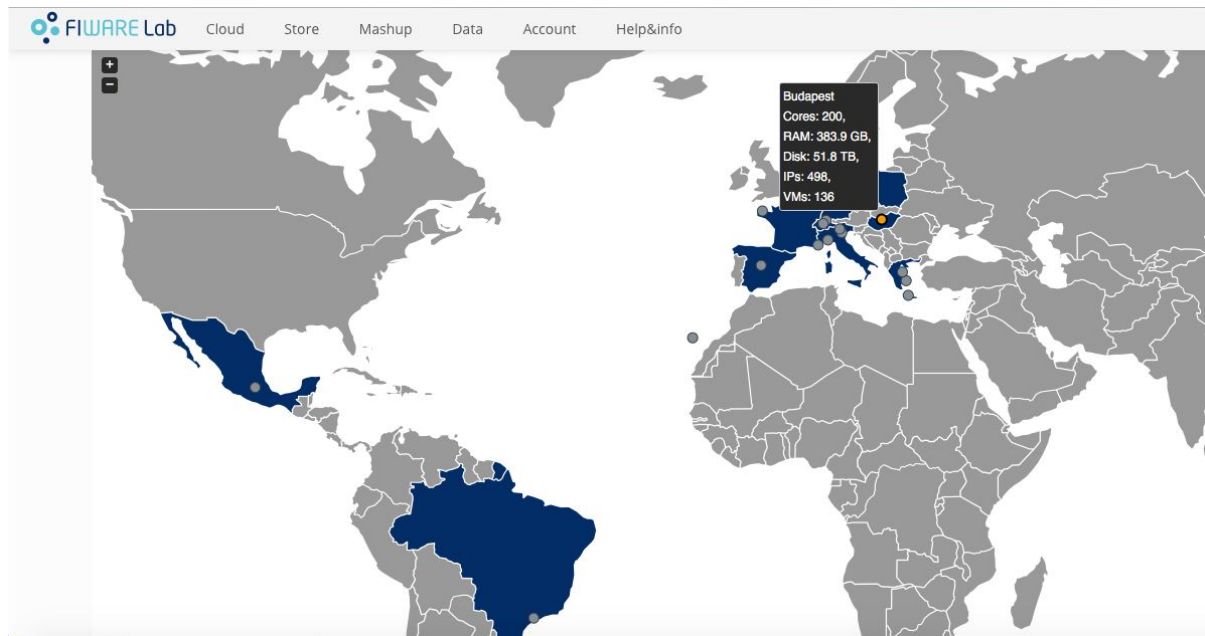


- Infographic

The Infographic tool, aims to provide information and statistics about the usage of hardware resources on each FIWARE Lab Node. It provides as well a whole snapshot of the FIWARE Lab ecosystem providing a map with the location of every single Node. The information collected by the Infographic are very useful at the scope of monitoring the growth of FIWARE.

This tool is available at <http://infographic.lab.fiware.org/>.

Hereunder a picture that shows the Infographic map:

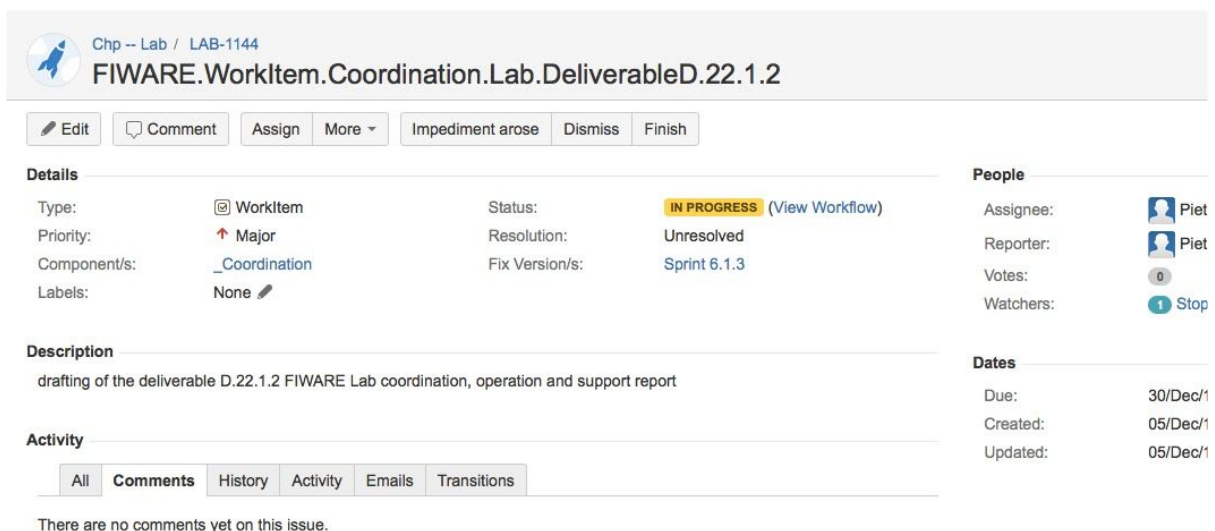


- JIRA

Jira is the ticket manager tool used from internal and external users.

The main internal usage of Jira is to keep track of all activities carried out within FIWARE Lab and to assign specific tasks to the different stakeholders. Jira, combined to Agile dynamics is used to create monthly Sprint useful to plan upcoming tasks as well as to fix and reach targets.

The following is a picture of Jira which is available at <https://jira.fiware.org/>



Chp -- Lab / LAB-1144

FIWARE.WorkItem.Coordination.Lab.DeliverableD.22.1.2

[Edit](#)
[Comment](#)
[Assign](#)
[More](#)
[Impediment arose](#)
[Dismiss](#)
[Finish](#)

Details		Status		People	
Type:	WorkItem	Status:	IN PROGRESS (View Workflow)	Assignee:	Piet
Priority:	Major	Resolution:	Unresolved	Reporter:	Piet
Component/s:	_Coordination	Fix Version/s:	Sprint 6.1.3	Votes:	0
Labels:	None			Watchers:	1 Stop

Description

drafting of the deliverable D.22.1.2 FIWARE Lab coordination, operation and support report

Activity

[All](#)
[Comments](#)
[History](#)
[Activity](#)
[Emails](#)
[Transitions](#)

There are no comments yet on this issue.

Dates

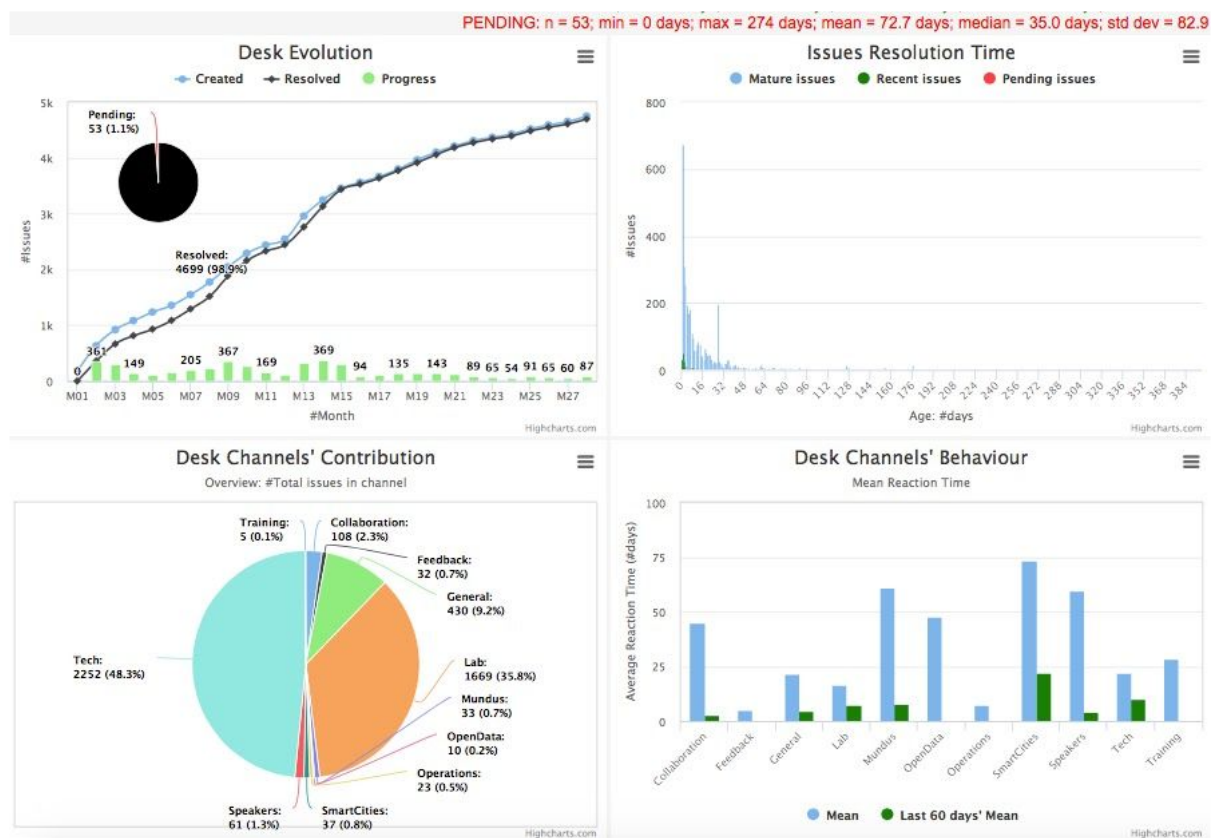
Due: 30/Dec/1
 Created: 05/Dec/1
 Updated: 05/Dec/1

- Backlog

The backlog portal is the JIRA's graphical frontend where people can find statistics, graphs and useful information about all tickets handled in Jira.

The Backlog is available at: <http://backlog.fiware.org/>

Hereunder a Backlog's picture:



2.2. FIWARE Lab Statistics

2.2.1. Available Resources

The following tables shows the amount of resources available on FIWARE Lab by combining the capacity of all FIWARE Lab Nodes:

REGION	CORES	RAM (GB)	DISK (TB)	PUBLIC IP	VMs
19	4480	20461	1073	5000	314

2.2.2. Hosted Users

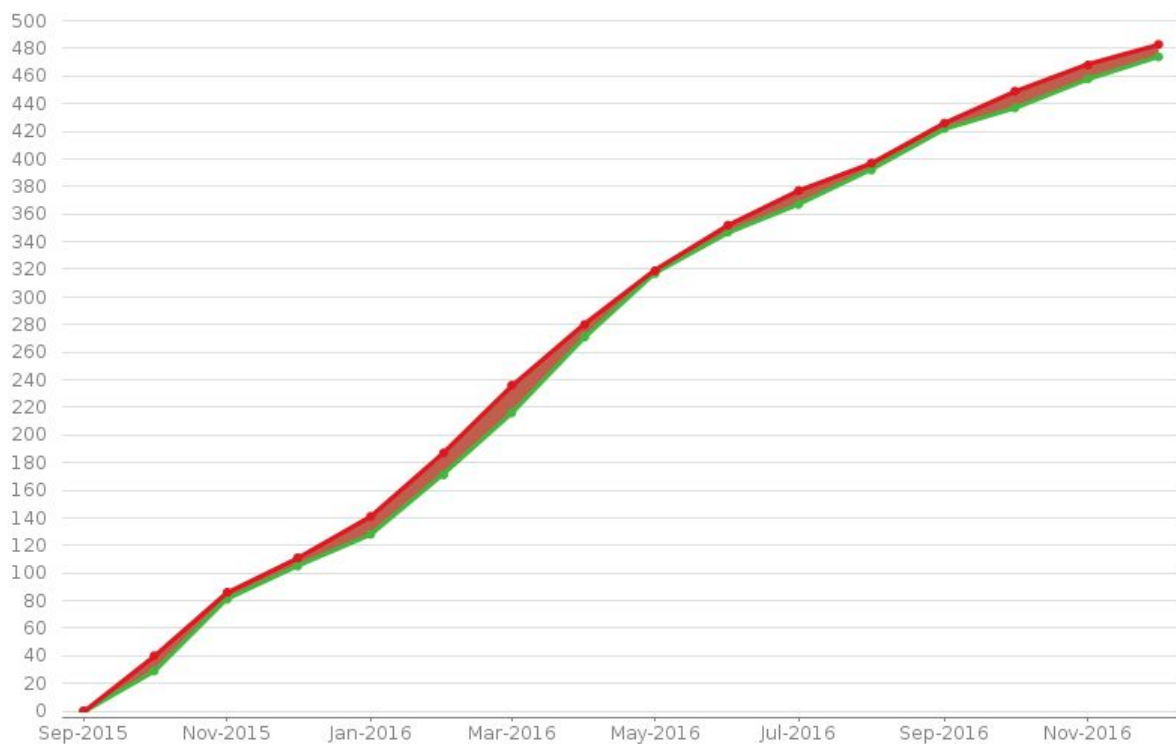
The following table shows the amount of users hosted on FIWARE Lab.

Note that Trial users are periodically cleared due to FIWARE Lab policies. So this is a snapshot of active users taken on December 2016.

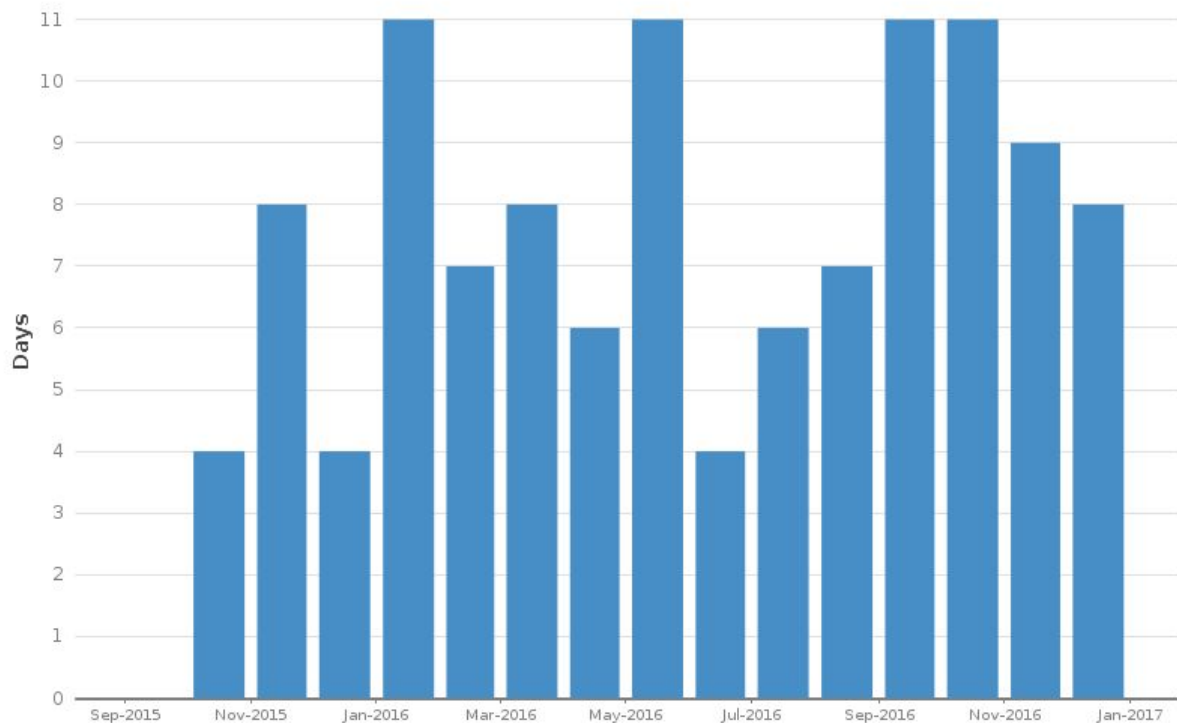
Community Users	Trial Users	Basic Users
1140	573	5693

2.2.3. Level 1 Support

From September 2015 to December 2016 the Level 1 support served more than 450 support request as showed in the graphic. During this time frame the average number of days to close a ticket at level one was 7, it is important to notice that the closure time does not correspond to the resolution time, but to the total time the ticket was open including the 48 hours waiting time for acknowledgment of issue resolution by end users.



Created vs Resolved tickets by the Level 1 support



Average numbers of days took to close tickets by the Level 1 support (this include the wait for acknowledgement from the user after the resolution of the issue).

2.3. Commercial nodes Open Call management

2.3.1 Open Call Targets and Requirements

In September 2015, the FIWARE Lab Open Call called “Competitive call for beneficiaries providing FIWARE Lab nodes support” has been submitted.

The purpose of the Open Call was the creation of a large and long term sustainable FIWARE Lab infrastructure on top of which FIWARE Generic Enablers, Open Data as well as applications using FIWARE Generic Enablers could be hosted and made accessible.

All applicants had to demonstrate in their proposals how they could set up a FIWARE commercial instance in parallel to the FIWARE Lab node, capable to host FIWARE-based applications.

All applicants had to guarantee as a minimum the following activities:

- Configuring the OpenStack instance running on the node so that FIWARE Lab remains as a single website on the Internet supporting a single sign-on for users of FIWARE Lab.
- Support to manual tests of all functionalities provided by the new OpenStack instance in order to keep sure that all the services are working properly. These tests would be done by the FIWARE Lab team and at the end of this testing a report will be send to the OpenStack

instance administrator in order to make the appropriate changes that resolve any detected problems.

- Manual configuration of the OpenStack instance in order to change the local keystone service by the global FIWARE Lab keystone service. This operation should be done by the OpenStack instance administrator. FIWARE Lab team may offer their support on this configuration.
- Inform the operator of the global FIWARE Lab Keystone service about the OpenStack instance service endpoints and the name that we should give to the new FIWARE Lab node in order to incorporate the new region in the FIWARE Lab Cloud Portal.
- Ensuring that certain defined VM images are supported in the FIWARE Lab node (note: this doesn't need to be automated and can be performed manually).
- Provide a contact person for FIWARE Lab support activities. This contact point could be a physical person or a support team but taking into account that it is mandatory to provide an email account for attending support tickets.

Open Call participants should also guarantee level 1 and 2 support of FIWARE services running on each FIWARE Lab node providing, at least, the following SLAs to end-users accessing FIWARE Lab services:

- FIWARE Lab services availability on the node above 95% threshold.
- Level 1 and Level 2 support, Mon to Fri, 9 am to 5 pm CET.
- Ticket response time before EOB of the following work day for 95% of requests.
- Ticket resolution time within 2 work days (EOB of the second one) for 95% of requests. Tickets transferred and accepted by level 3 support as tickets that will require a software patch or workaround to be developed by the level 3 support team will be considered resolved at level 1 and 2 support levels.

2.3.2 Open Call results and management

In February 2016, the assessment performed by the team of independent experts who assisted FI-Core in the evaluation process, has finally resulted in the selection of 6 proposals:

- Netlink (Hannover Node)
- Winger (Budapest Node)
- UNIGE - CNIT - SEEWEB (Genoa Node)
- Switch (Zurich2 Node)
- PWR - MGM (Wroclaw Node)
- Com4Innov - TAS (SophiaAntipolis Node)

All those partners have been invited to a kickoff meeting which took place in Rome the 10th and the 11st of March 2016. The meeting was hosted by Engineering (E-IIS) in its Rome - Ponte Galeria premises.

The agenda of the two days meeting was the following:

Day1.

Topic	Speaker
What to do after the open call in terms of organizational aspects	Stefano De Panfilis (E-IIS)
What does it mean to join fiware lab	Fernando Lopez Aguilar (TID)
Check the installation of an OpenStack instance	Fernando Lopez Aguilar (TID)
Manual check of the OpenStack node, going into the Horizon instance and see the instance is up and running.	Fernando Lopez Aguilar (TID)
Explain how to change the configuration files in order to use the federated Keystone.	Fernando Lopez Aguilar (TID)
Share the starting point: http://wiki.fiware.org/FIWARE_Lab_Nodes_Handbook	Fernando Lopez Aguilar (TID)
Select the corresponding admin user for the keystone and explain the different tools to be used	Fernando Lopez Aguilar (TID)

Day2.

Topic	Speaker
Explain how we usually admin nodes, weekly phone call, nodes obligations, nodes upgrade, help desk	Alfonso Pietropaolo (E-IIS)
Introduce Jira, Backlog, Stackoverflow, QA platform and make some Jira demo	Alfonso Pietropaolo (E-IIS)
Introduce Karma	Alfonso Pietropaolo (E-IIS)/Silvio Cretti (CNET)
Introduce Infographic	Alfonso Pietropaolo (E-IIS)/Silvio Cretti (CNET)
Introduce maintenance calendar	Alfonso

	Pietropaolo (E-IIS)/Silvio Cretti (CNET)
Introduction to Lessons learnt	Silvio Cretti (CNET)
Lesson learnt	Contributions from partners (WIGNER)
Commercial nodes	Stefano De Panfilis (E-IIS)

At the end of the meeting all nodes were ready to start working on the federation process and were informed about all procedures and best practices of FIWARE Lab.

2.4. General Events log (1/09/2015 - 1/12/2016)

- Events affecting the overall lab
- Upgrades of main components (not single nodes)
- New node inclusion
- Node discontinued

Date	Type of event (upgrade, maintenance, fault)	Description
31 December 2015	Node discontinued	Berlin, Gent, Karlskrona, PiraeusN, Stockholm, and Waterford nodes discontinued their provisioning. Active users have been migrated to other nodes.
January 2016 - June 2016	Deploy	Deploy of Ceilometer on each node
April 2016	Installation	Installation of Monasca
April 2016	Upgrade	Upgrade of Monitoring API and Infographic tool
29 April 2016	Node Federation	Federation of ZurichS Node
06 May 2016	Node Federation	Federation of Vicenza Node
08 June 2016	Node Federation	Federation of SophiaAntipolis Node

15 June 2016	Node Federation	Federation of SpainTenerife Node
15 July 2016	Node Federation	Federation of Hannover Node
20 September 2016	Node Federation	Federation of Genoa Node
30 September 2016	Node Federation	Federation of Wroclaw Node
30 September 2016	Node discontinued	Prague node discontinued its provisioning. Active users have been migrated to other nodes.

3. FIWARE LAB NODES OPERATION AND SUPPORT

In the following section will be described the factsheet for each node as well as usage statistics and events log. All these contribution have been provided by the differents partner.

3.1 Brittany Node

3.1.1 Factsheet

Expected federation date	01/06/2016
Actual federation date	Not yet federated
Committed last date of operation	
Cores	320
RAM (GB)	1T
Block Storage (TB)	27TB
Object Storage (TB)	9.7TB
Bandwidth (Gbit)	1Gb/s
Public IPs	/24
OpenStack version	Liberty on Ubuntu 14.04
Infographic status	Expected implementation 30/12/2016

Health status	Expected implementation 30/12/2016
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3.1.2 Usage statistics (1/03/2016 - 1/12/2016)

Number of Community account users	0
Number of hosted users	0
Number of hosted VMs	0

3.1.3 Events log (1/03/2016 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
01/12/2016	installation	Hardware installation and configuration
05/12/2016	installation	Openstack environment installation using Fuel 8.0 (Liberty)
09/12/2016	installation	Testing Openstack environment
15/12/2016	installation	Node federation configuration
30/12/2016	installation	Health status - Sanity check integration
30/12/2016	installation	Monitoring system installation

3.2 Budapest Node

3.2.1 Factsheet

Expected federation date	End of September 2014 (XiFi Project)
Actual federation date	End of September 2014 (XiFi Project)
Committed last date of operation	End of March 2017 (further extension of this date depends on our financial opportunities)
Cores	200 (Budapest2 - available in the federation) 8 (Budapest3 - federated, but still running in test mode)
RAM (GB)	384 GB
Block Storage (TB)	52 TB (shared space from a SAN)
Object Storage (TB)	52 TB (shared space from a SAN)

Bandwidth (Gbit)	<p>2x1 Gbps Ethernet (10 Gbps direct optical connection between the server room of the node and the gateway router of Wigner RCP)</p> <p>From the gateway of Wigner RCP to GÉANT:</p> <ul style="list-style-type: none"> • 1x10 Gbps connection • 1x1 Gbps backup connection
Public IPs	<p>148.6.80.0/23</p> <p>(except 148.6.81.0/25 that is used for the commercial node)</p>
OpenStack version	<p>Budapest2 - OpenStack IceHouse</p> <p>(Budapest3 - OpenStack Liberty - also federated with minimal resources)</p>
Infographic status	GREEN
Health status	GREEN

3.2.2 Usage statistics (1/09/2015 - 1/12/2016)

Number of Community account users	32 (assigned as a result of FLUA tickets)
Number of hosted users	63 (Number of active users including community, basic and trial accounts)
Number of hosted VMs	136

3.2.3 Events log (1/09/2015 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
7/10/2015	installation	Ceilometer was installed and configured
7/12/2015	maintenance	Scheduled maintenance to fix the performance issues of Neutron service and OVS
3/01/2016	maintenance	Unscheduled maintenance. The cooling system of the server room sent alerts and stopped operating. The backup cooling system has not launched automatically. The cluster was temporarily stopped. The problem was solved in 1 working day.
02/06/2016	installation	Hardware and software configuration for Budapest3
28/06/2016	maintenance	The core router of Wigner RCP was repaired.
12/07/2016	installation	OpenStack Kilo has been installed (manually) and locally tested
19/07/2016	installation	Budapest3 federation request is sent
19/09/2016	maintenance	Swift service was overloaded, causing performance issues in

		other services. The storage node had been reconfigured that finally solved the issue.
20/09/2016	installation	Budapest3 is integrated into FI-Health sanity checks - node is under testing
22/09/2016	upgrade	new UPS has been installed
14/11/2016	upgrade	Budapest3 - Upgrade to Liberty (before the migration from Budapest2)

3.3 Crete Node

3.3.1 Factsheet

Expected federation date	31/12/2014
Actual federation date	29/1/2015
Committed last date of operation	31/12/2016 (intention to continue till end of 2017)
Cores	120
RAM (GB)	188.6
Block Storage (TB)	1.6
Object Storage (TB)	-
Bandwidth (Gbit)	1
Public IPs	224
OpenStack version	KILO
Infographic status	Green
Health status	Green

3.3.2 Usage statistics (1/09/2015 - 1/12/2016)

Number of Community account users	3
Number of hosted users	10 (now), (1/09/2015 - 1/12/2016): more than 35
Number of hosted VMs	20 (now), (1/09/2015 - 1/12/2016): more than 70

3.3.3 Events log (1/09/2015 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
28/4/2016	fault	Problem with MD-VPN connection
10/5/2016	upgrade	Start of upgrade from Juno to Kilo
16/5/2016	fault	Problem with MD-VPN connection solved
21/6/2016	upgrade	End of upgrade to Kilo - Node fully operational
29/8/2016	maintenance	FIWARE monitoring upgrade to v5.4.1

3.4 Genoa Node

3.4.1 Factsheet

Expected federation date	01/06/2016
Actual federation date	20/09/2016
Committed last date of operation	31/12/2016
Cores	448
RAM (GB)	1TB
Block Storage (TB)	24TB
Object Storage (TB)	24TB
Bandwidth (Gbit)	1 Gb/s
Public IPs	128
OpenStack version	Kilo on Ubuntu 14.04
Infographic status	Green (fully operative)
Health status	Green (fully operative)

3.4.2 Usage statistics (1/03/2016 - 1/12/2016)

Number of Community account users	0
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Number of hosted users	0
Number of hosted VMs	4

3.4.3 Events log (1/03/2016 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
01/06/2016	initial federation - lot 1	lot 1 initial set-up
20/09/2016	capacity upgrade - lot 2	lot 2 federation (224 cores/512GB RAM, 16TB storage)
07/12/2016	capacity upgrade - lot 3	lot 3 (final) federation (448 cores/1TB RAM, 24TB storage)

3.5 Hannover Node

3.5.1 Factsheet

Expected federation date	01/06/2016
Actual federation date	12/07/2016
Committed last date of operation	30/01/2017
Cores	180
RAM (GB)	960
Block Storage (TB)	21 (dedicated ceph storage backend)
Object Storage (TB)	21 (dedicated ceph storage backend)
Bandwidth (Gbit)	1
Public IPs	220
OpenStack version	Liberty
Infographic status	Green (fully operative)
Health status	Green (fully operative)

3.5.2 Usage statistics (1/03/2016 - 1/12/2016)

Number of Community account users	5
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Number of hosted users	5
Number of hosted VMs	15

3.5.3 Events log (1/03/2016 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
02/16/2016	Projekt start	Hardware configuration for Hannover Lab Node
03/15/2016	installation	Start Hardware Installation and Installation of OpenStack environment
03/31/2016	installation	Testing Openstack environment
05/02/2016	installation	Node federation configuration
07/01/2016	installation	Health status - Sanity check integration
07/12/2016	installation	Finished installation and federation of node.
07/13/2016	installation	Installation of the new monitoring system.
07/13/2016	maintenance	Organisation First Level Support 3-4. Quarter of 2016
10/25/2016	maintenance	Installation of the new monitoring system.
11/01/2016	maintenance	Start Node Hardware Upgrade (Compute Node)

3.6 Lannion Node

3.6.1 Factsheet

Expected federation date	September 2014
Actual federation date	20/05/2016 - Lannion3 node federation
Committed last date of operation	31/12/2016
Cores	352
RAM (GB)	1.1T
Block Storage (TB)	29.7T
Object Storage (TB)	7.1T
Bandwidth (Gbit)	1Gbps
Public IPs	256
OpenStack version	Kilo on Ubuntu 14.04

Infographic status	Green (fully operative)
Health status	Green (fully operative)

3.6.2 Usage statistics (1/09/2015 - 1/12/2016)

Number of Community account users	158 totally registered users for Lannion node, 29 active on Lannion3 Node
Number of hosted users	29
Number of hosted VMs	59

3.6.3 Events log (1/09/2015 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
02/02/2016	installation	Hardware configuration for Lannion3 node
16/02/2016	installation	Installation of OpenStack environment using Fuel 7.0 (Kilo)
22/02/2016	installation	Testing Openstack environment
08/03/2016	installation	Node federation configuration
22/03/2016	installation	Health status - Sanity check integration
01/05/2016	installation	Finished installation and federation of Lannion3 (Kilo) node.
09/09/2016	installation	Installation of the new monitoring system.
30/09/2016	maintenance	Projects migration from Lannion2 (Juno) to Lannion3.
17/10/2016	maintenance	Hardware migration and configuration - Migration of all Compute servers from Lannion2 to Lannion3
16/11/2016	upgrade	Memory upgrade - Total memory capacity 1.1TB from 610GB last year.

3.7 Mexico Node

3.7.1 Factsheet

Expected federation date	Starting node
Actual federation date	Starting node

Committed last date of operation	-
Cores	704
RAM (GB)	5541.8
Block Storage (TB)	44.4 TB
Object Storage (TB)	82.1 TB
Bandwidth (Gbit)	10 Gbit
Public IPs	216
OpenStack version	Kilo
Infographic status	Green (fully operative)
Health status	Green (fully operative)

3.7.2 Usage statistics (1/09/2015 - 1/12/2016)

Number of Community account users	29
Number of hosted users	46
Number of hosted VMs	72

3.7.3 Events log (1/09/2015 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
16/07/2016	Upgrade	Migration of infrastructure to the new Kilo environment
14/10/2016	Installation	Installation and deployment of aiakos services
26/10/2016	Installation	Installation of monitoring tool in the node (ceilometer)
26/10/2016	Installation	The Mexican node was added in the infographic portal
19/12/2016	Maintenance	Maintenance of neutron services (dhcp, l3 and metadata agent).

3.8 PiraeusU Node

3.8.1 Factsheet

Expected federation date	end of September 2014 (XiFi Project)
Actual federation date	end of October 2014 (XiFi Project)
Committed last date of operation	30/06/2017
Cores	112
RAM (GB)	224
Block Storage (TB)	3.6
Object Storage (TB)	0
Bandwidth (Gbit)	1Gbps
Public IPs	62
OpenStack version	Mitaka 9.0
Infographic status	Green (until 30/10/2016) & N/A (by 30/10 to 01/12 the node is visible due to migration period from Icehouse to Mitaka)
Health status	Green (until 30/10/2016) & N/A (by 30/10 to 01/12 the node is visible due to migration period from Icehouse to Mitaka)

3.8.2 Usage statistics (1/09/2015 - 1/12/2016)

Number of Community account users	9 (considering the Tenant IDs of the VMs we have on the node)
Number of hosted users	9 (considering the Tenant IDs of the VMs we have on the node)
Number of hosted VMs	14

3.8.3 Events log (1/09/2015 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
01/10/2016	Preparation for node s/w upgrade Phase#1: Inform node users	Node users that had VMs hosted on the node informed by the FIWARE notification system that the node will be switched to maintenance mode for the openstack software upgrade and they were explicitly asked to inform the node administrators in case they want to move their VMs to another node while the PiraeusU node would be offline for

		some time.
10/10/2016	Preparation for node s/w upgrade Phase#2: Filter node users responses and list backup requirements	Having received the response from the node user we filtered the VMs that should be backed up and inform the users that their VMs will be go offline by 15/10 and they will be backed up as snapshots in the current status they would have.
30/10/2016	Preparation for node s/w upgrade Phase#3: VMs backup	Creation of VMs snapshots and move them to third party independent server in the PiraeusU so as to be safe during the upgrade process
01/11/2016	Installation of Mitaka Openstack release 9.0 Phase#1: Install and setup the real network	Work on the real network installation so as to ensure the functionality of the real switches and routers operation, in the context of VLAN trunks, external access, etc.
07/11/2016	Installation of Mitaka Openstack release 9.0 Phase#2: Install the environment of the bare-metal servers	Start the installation on the environment for the setup of the Openstack Mitaka software on the actual servers.
25/11/2016	Installation of Mitaka Openstack release 9.0 Phase#3: Completion of the installation.	The installation of the Openstack release 9.0 is completed and the PiraeusU node has a fully operational Mitaka installation in local level. Next step, to start the reconfiguration of the node for the federation to the public Fiware keystone.
30/11/2016	Federation Phase#1: Openstack services reconfiguration to be federated on public Fiware Keystone	Perform reconfiguration on Controllers and Compute nodes so as to proceed with the node federation on the public Fiware keystone.
01/12/2016	Federation Phase#2: Registration of node services endpoints on the Fiware Keystone	Start the registration process of the node endpoints on the Idm Fiware online administrator tool.

3.9 Poznan Node

3.9.1 Factsheet

Expected federation date	end of September 2014 (XiFi Project)
Actual federation date	middle of October 2014 (XiFi Project)
Committed last date of operation	Under evaluation
Cores	120

RAM (GB)	152.4
Block Storage (TB)	29,5
Object Storage (TB)	0
Bandwidth (Gbit)	10
Public IPs	20
OpenStack version	IceHouse
Infographic status	Green
Health status	Green

3.9.2 Usage statistics (1/09/2015 - 1/12/2016)

Number of Community account users	
Number of hosted users	44
Number of hosted VMs	73

3.9.3 Events log (1/09/2015 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description

3.10 Sao Paulo Node

No data provided from the partner

3.10.1 Factsheet

Expected federation date	
Actual federation date	
Committed last date of operation	

Cores	
RAM (GB)	
Block Storage (TB)	
Object Storage (TB)	
Bandwidth (Gbit)	
Public IPs	
OpenStack version	
Infographic status	
Health status	

3.10.2 Usage statistics (1/09/2015 - 1/12/2016)

Number of Community account users	
Number of hosted users	
Number of hosted VMs	

3.10.3 Events log (1/09/2015 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description

3.11 Sophia-Antipolis Node

3.11.1 Factsheet

Expected federation date	
Actual federation date	08/06/2016
Committed last date of operation	31/12/2016

Cores	576
RAM (GB)	1024
Block Storage (TB)	16
Object Storage (TB)	1.2
Bandwidth (Gbit)	1
Public IPs	185.52.32.0/25
OpenStack version	Kilo
Infographic status	Green (fully operative)
Health status	Green (fully operative)

3.11.2 Usage statistics (1/03/2016 - 1/12/2016)

Number of Community account users	8
Number of hosted users	11
Number of hosted VMs	22

3.11.3 Events log (1/03/2016 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
01/05/2016	installation	Finished installation of the hardware for the new SophiaAntipolis2 (Kilo) node
28/05/2016	installation	Installation of the Mirantis Fuel orchestrator for the new SophiaAntipolis2 node infrastructure
08/06/2016	installation	Federation of SophiaAntipolis2 (Kilo) node
07/06/2016	installation	Deployment of 3 compute and 2 controller servers on the new SophiaAntipolis2 node
30/06/2016	installation	Installation of the new monitoring system.
06/07/2016	installation	Installation of a new ceilometer plugin
13/07/2016	maintenance	VMs migration from SophiaAntipolis to SophiaAntipolis2
08/09/2016	installation	Installation of a new monitoring system release v5.4.2
21/09/2016	maintenance	Hardware migration - Migration of all compute and controller servers from SophiaAntipolis to SophiaAntipolis2

14/10/2016	maintenance	migration of current network infrastructure to a redundant network infrastructure into SophiaAntipolis node
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3.12 Spain Node

3.12.1 Factsheet

Expected federation date	Starting node
Actual federation date	Starting node
Committed last date of operation	-
Cores	1440
RAM (GB)	5994 GB
Block Storage (TB)	10 Tb + 30 Tb Ephemeral
Object Storage (TB)	5 Tb
Bandwidth (Gbit)	10 Gbit
Public IPs	4080 IPv4 + /64 in IPv6
OpenStack version	Kilo
Infographic status	Green (fully operative)
Health status	Green (fully operative)

3.12.2 Usage statistics (1/09/2015 - 1/12/2016)

Number of Community account users	512
Number of hosted users	1176
Number of hosted VMs	2030

3.12.3 Events log (1/09/2015 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
September 2015 / October 2015	Upgrade OpenStack version	Migration from Juno to Kilo (Except Swift)
November 2015	Maintenance	Memory extensions in some physical hosts in Malaga and

		Las Palmas DataCenters.
November 2015	Maintenance	Forge / partition extension.
December 2015	Upgrade Keystone component	Migration of Keystone from Juno to Kilo.
December 2015	Installation and configuration	Added load balancer and nginx for https in Keystone component.
December 2015	Upgrade Swift component	Migrate Swift from Juno to Kilo versions.
December 2015	Upgrade	Upgrade IdM component in the platform.
December 2015 / January 2016	Installation and configuration	Monasca Installation
January 2016	Installation and configuration	HAProxy replication in order to offer HA in management of frontends.
February 2016	Upgrade Neutron components.	Update Neutron nodes to the same version in every host.
February 2016	Maintenance	Fan cooling system replacement in 1 Physical host in Sevilla DataCenter.
March 2016	Installation	Swift moved from a Single LXC Container to a single VM.
March 2016	Maintenance	Dismiss old development testbeds and give away physical servers.
March 2016	Configuration	Physical Firewall/Router Reconfiguration for HTTP/30X problems.
March 2016	Maintenance	Fan cooling system replacement in 2 Physical hosts in Sevilla DataCenter.
March 2016	Installation and configuration	New Course Builder VM installation
April 2016	Maintenance	Switch off old IdM security component.
May 2016	Maintenance	Create new version of base images for OpenStack, increasing security of them.
June 2016	Installation and configuration	IPv6 installation and configuration in Neutron component.
June 2016	Maintenance	Fan cooling system replacement in 2 Physical hosts in Sevilla

		DataCenter.
July 2016	Maintenance	Fan cooling system replacement in 1 Physical hosts in Madrid DataCenter.
July 2016	Installation and configuration	Redundancy in DNS servers.
July 2016	Maintenance	Migration of Builder.edu.fiware.org
August 2016	Configuration	Swift replicated from 1 VMs to 3 VMs.
August 2016	Installation and configuration	OpenStack database moved from a single MySQL instance to a Galera Cluster using 5 LXC containers.
August 2016	Installation and configuration	RabbitMQ replication in order to be able to change from one to another with little effort and effort HA of it.
September 2016	Installation and configuration	Virtualization router for old Spain node.
October 2016	Maintenance	Switch off old FIWARE GE's testbed.
November 2016	Maintenance	Switch off old Cosmos infrastructure components.
November 2016	Installation and configuration	Implementation for Backups Politics.
November 2016	Installation and configuration	Virtualize router for fiware.org infrastructure.

3.13 Spain-Tenerife Node

3.13.1 Factsheet

Expected federation date	01/06/2016
Actual federation date	15/06/2016
Committed last date of operation	01/09/2017
Cores	96 (expandable as needed)
RAM (GB)	200 (expandable as needed)
Block Storage (TB)	1 (expandable as needed)

Object Storage (TB)	10
Bandwidth (Gbit)	10
Public IPs	128 (expandable as needed)
OpenStack version	Kilo
Infographic status	Green (Fully Operative)
Health status	Green (Full Operative)

3.13.2 Usage statistics (1/03/2016 - 1/12/2016)

Number of Community account users	
Number of hosted users	
Number of hosted VMs	25

3.13.3 Events log (1/03/2016 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
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01/12/2016	Installation	Initial HW and platform deployment
01/02/2016	Installation	Federation process
01/05/2016	Installation	New monitoring deployment

3.14 Trento Node

3.14.1 Factsheet

Expected federation date	Late 2013
Actual federation date	Early 2014
Committed last date of operation	31/12/2016

Cores	256
RAM (GB)	503.1 GB
Block Storage (TB)	5 TB
Object Storage (TB)	1.2 TB
Bandwidth (Gbit)	1 Gbps
Public IPs	164
OpenStack version	Kilo
Infographic status	GREEN
Health status	OPERATIONAL

3.14.2 Usage statistics (1/09/2015 - 1/12/2016)

Number of Community account users	95
Number of hosted users	37
Number of hosted VMs	84

3.14.3 Events log (1/09/2015 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
21/06/2016	upgrade	Migration of 2 compute nodes to the new Kilo environment
26/09/2016	installation	Installation of a new compute node
	maintenance	48 support tickets were solved from 01/09/2015 to 01/12/2016

3.15 Vicenza Node

3.15.1 Factsheet

Expected federation date	2016/05/06
Actual federation date	2016/05/06

Committed last date of operation	2018/09/30
Cores	240
RAM (GB)	1888.4 Gb
Block Storage (TB)	32.7 Tb (using ceph the storage size is the same for block and object storage)
Object Storage (TB)	32.7 Tb (using ceph the storage size is the same for block and object storage)
Bandwidth (Gbit)	0.1
Public IPs	113
OpenStack version	Kilo
Infographic status	GREEN
Health status	OPERATIONAL

3.15.2 Usage statistics (1/09/2015 - 1/12/2016)

Number of Community account users	25
Number of hosted users	25
Number of hosted VMs	64

3.15.3 Events log (1/09/2015 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
01/02/2016	Openstack installation	Start openstack installation with Fuel Mirantis deploying Tool
07/03/2016	Federation process	Start federation process: faced many issues with the federated keystone (wrong parameters within OpenStack services configuration files and credentials not well configured in the federated keystone).
05/04/2016	Installation monitoring system	Start installation and configuration of the new monitoring system: faced many issues during the installation (revisioning of the installation guide documentation) and configuration of the new monitoring architecture.

3.16 Volos Node

3.16.1 Factsheet

Expected federation date	September 2014
Actual federation date	December 2014
Committed last date of operation	December 2017 (Could be extended)
Cores	96(Compute), 120 Total
RAM (GB)	288(Compute), 384 Total
Block Storage (TB)	1
Ephemeral Storage (TB)	9
Object Storage (TB)	-
Bandwidth (Gbit)	1
Public IPs	64
OpenStack version	Kilo
Infographic status	Green
Health status	Green

3.16.2 Usage statistics (1/09/2015 - 1/12/2016)

Number of Community account users	15
Number of hosted users	3
Number of hosted VMs	3

3.16.3 Events log (1/09/2015 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description

3.17 Wroclaw Node

3.17.1 Factsheet

Expected federation date	01/06/2016
Actual federation date	30/09/2016
Committed last date of operation	31/12/2016
Cores	320
RAM (GB)	1280GB
Block Storage (TB)	5 TB
Object Storage (TB)	3 TB
Bandwidth (Gbit)	1 Gbps
Public IPs	128
OpenStack version	Kilo (Ubuntu 14.04)
Infographic status	Not yet implemented
Health status	Not yet implemented

3.17.2 Usage statistics (1/03/2016 - 1/12/2016)

Number of Community account users	0
Number of hosted users	0
Number of hosted VMs	2

3.17.3 Events log (1/03/2016 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
11/04/2016	installation	Installing and configuring Openstack
04/05/2016	installation	Starting federation process
30/09/2016	installation	Finished federation process

3.18 Zurich Node

3.18.1 Factsheet

Expected federation date	Jun 2014
Actual federation date	Sept 2014
Committed last date of operation	December 2017
Cores	288
RAM (GB)	2304 GB
Block Storage (TB)	18TB
Object Storage (TB)	18TB
Bandwidth (Gbit)	1Gb/s
Public IPs	211
OpenStack version	Kilo
Infographic status	Generally healthy
Health status	Generally healthy

3.18.2 Usage statistics (1/09/2015 - 1/12/2016)

Number of Community account users	~30
Number of hosted users	~10
Number of hosted VMs	32

3.18.3 Events log (1/09/2015 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
Jun 2016	Combined migration, upgrade and move servers to alternative data center	This was a complex project which took quite a bit of effort involving physically moving the servers, doing an upgrade of the Openstack version and migrating active VMs and volumes to the new system. It required co-ordination with the users of the system to ensure their VMs and volumes

		came back up properly.
Oct 2016	Power failure	There was a power failure to the DC

3.19 ZurichS Node

3.19.1 Factsheet

Expected federation date	01/05/2016
Actual federation date	29/04/2016
Committed last date of operation	31/12/2016
Cores	672
RAM (GB)	3584
Block Storage (TB)	1500 total (shared with object storage)
Object Storage (TB)	1500 total (shared with block storage)
Bandwidth (Gbit)	10
Public IPs	256
OpenStack version	Kilo
Infographic status	Green (fully operational)
Health status	Green (fully operational)

3.19.2 Usage statistics (1/03/2016 - 1/12/2016)

Number of Community account users	3
Number of hosted users	3
Number of hosted VMs	32

3.19.3 Events log (1/03/2016 - 1/12/2016)

Date	Type of event (installation, upgrade, maintenance, fault)	Description
6.10.2016	fault	A problem on our central storage cluster led to slow disk

		access for all VMs on the FIWARE lab cluster. The issue lasted for around 20 hours

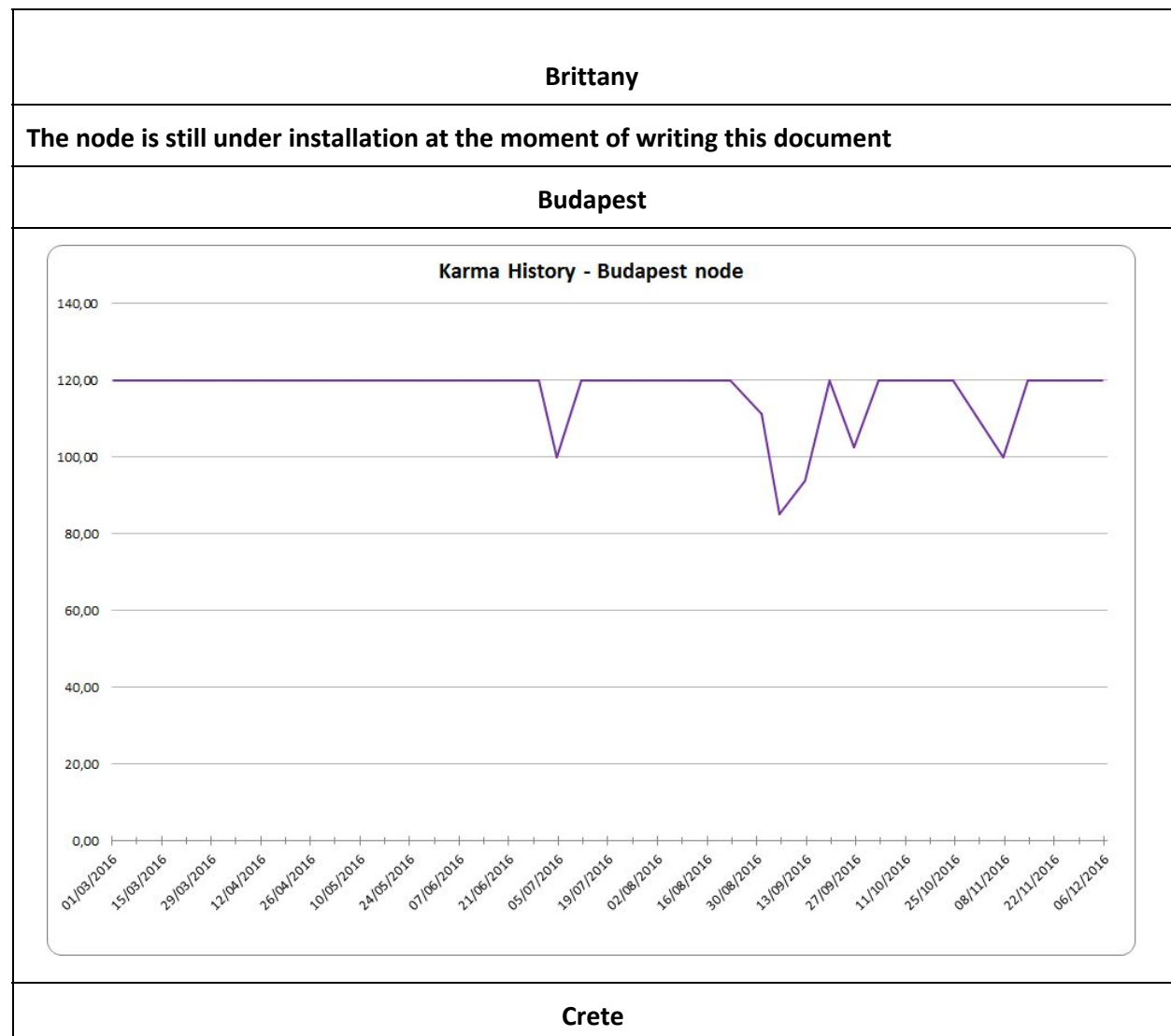
3.20 Karma history

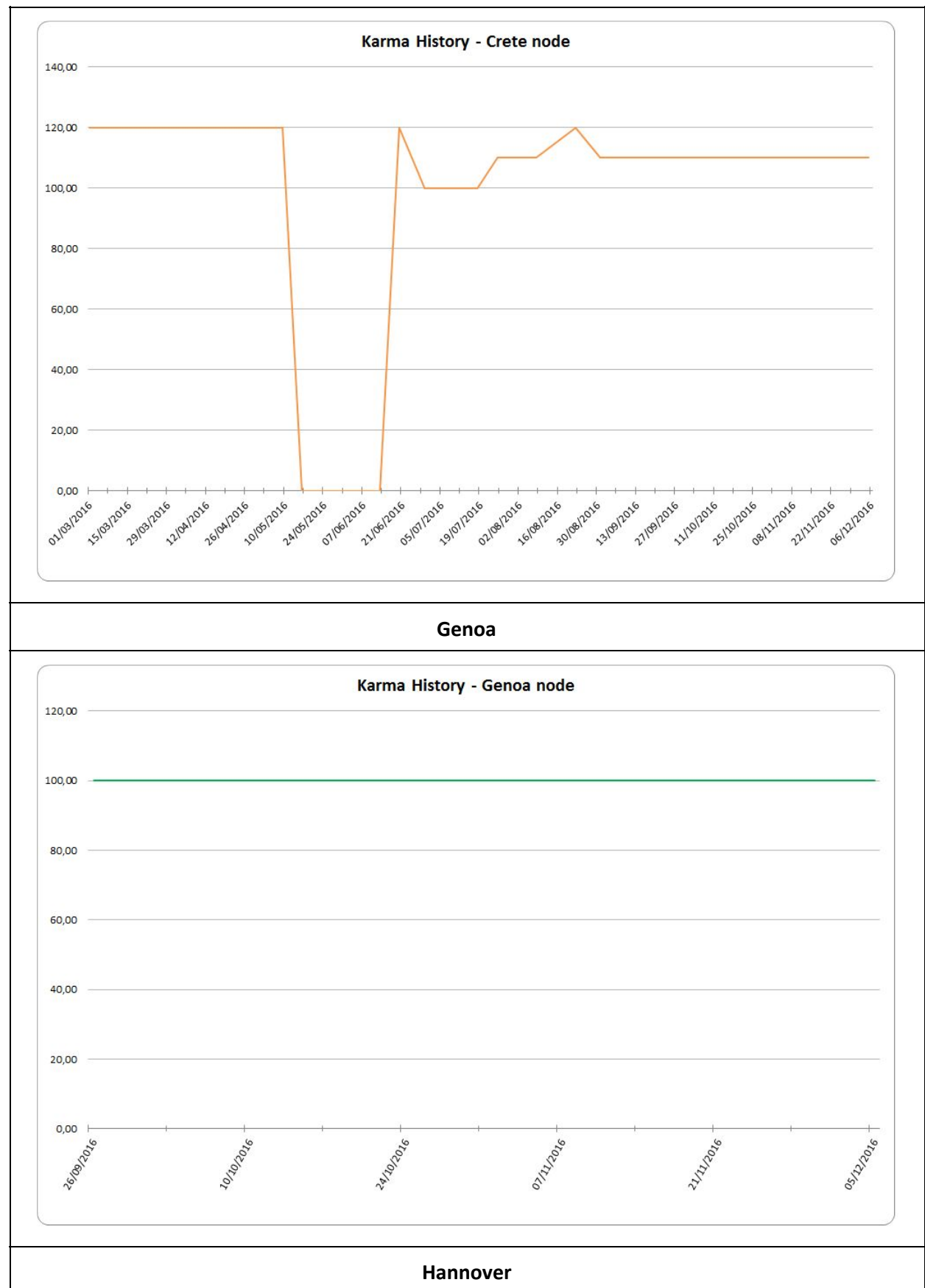
Karma score is a best practise already introduced in XIFI to measure performance of Nodes team activities. The purpose of Karma is to provide an accurate and objective evaluation of node performances and provide a positive feedback mechanism to encourage better performances by FIWARE Lab nodes. The Karma point computation is based around three main criteria:

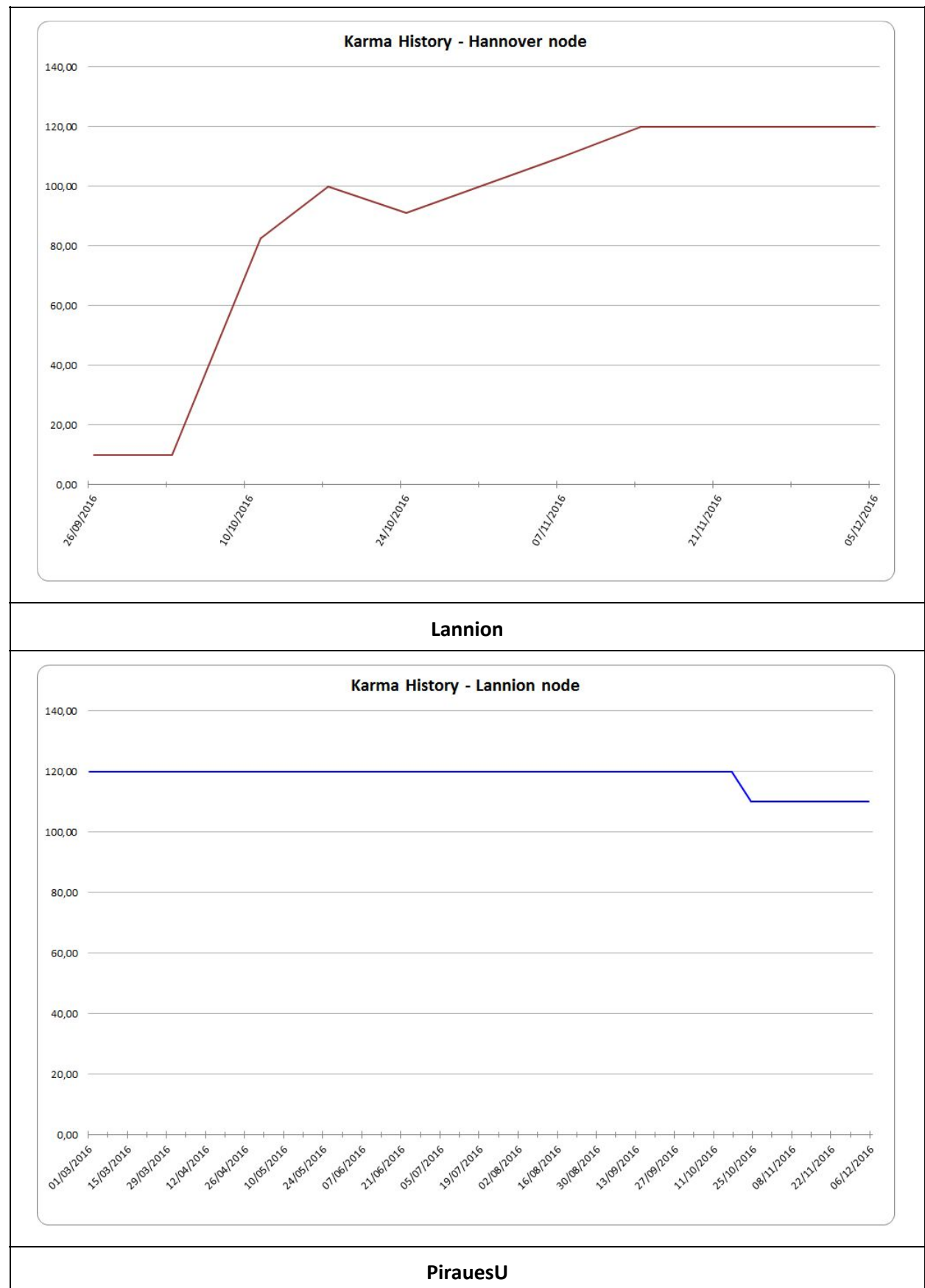
- Sanity check performed by FI-Health tools (e.g. number of successful functional test versus failed ones)
- Node compliancy with FIWARE Lab requirements (e.g. complete support of monitoring stack)
- Resources availability and usage (e.g. number of resources availables and usage ratio)

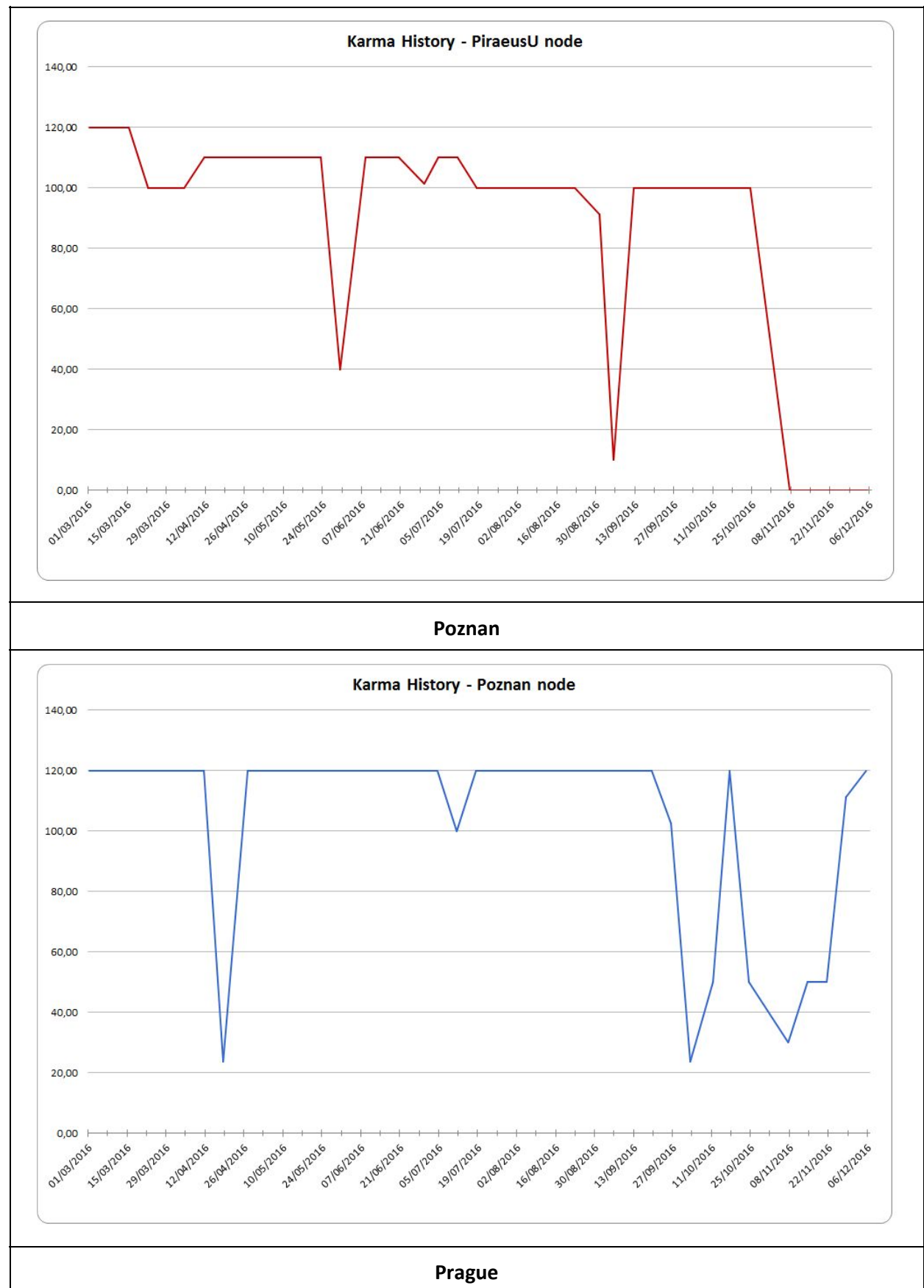
This section gives the evolution of historical data based on the Karma point for each node from March 2016 to December 2016 (for those node already presents before the Open Call) and from September 2016 to December 2016 (for all the others nodes).

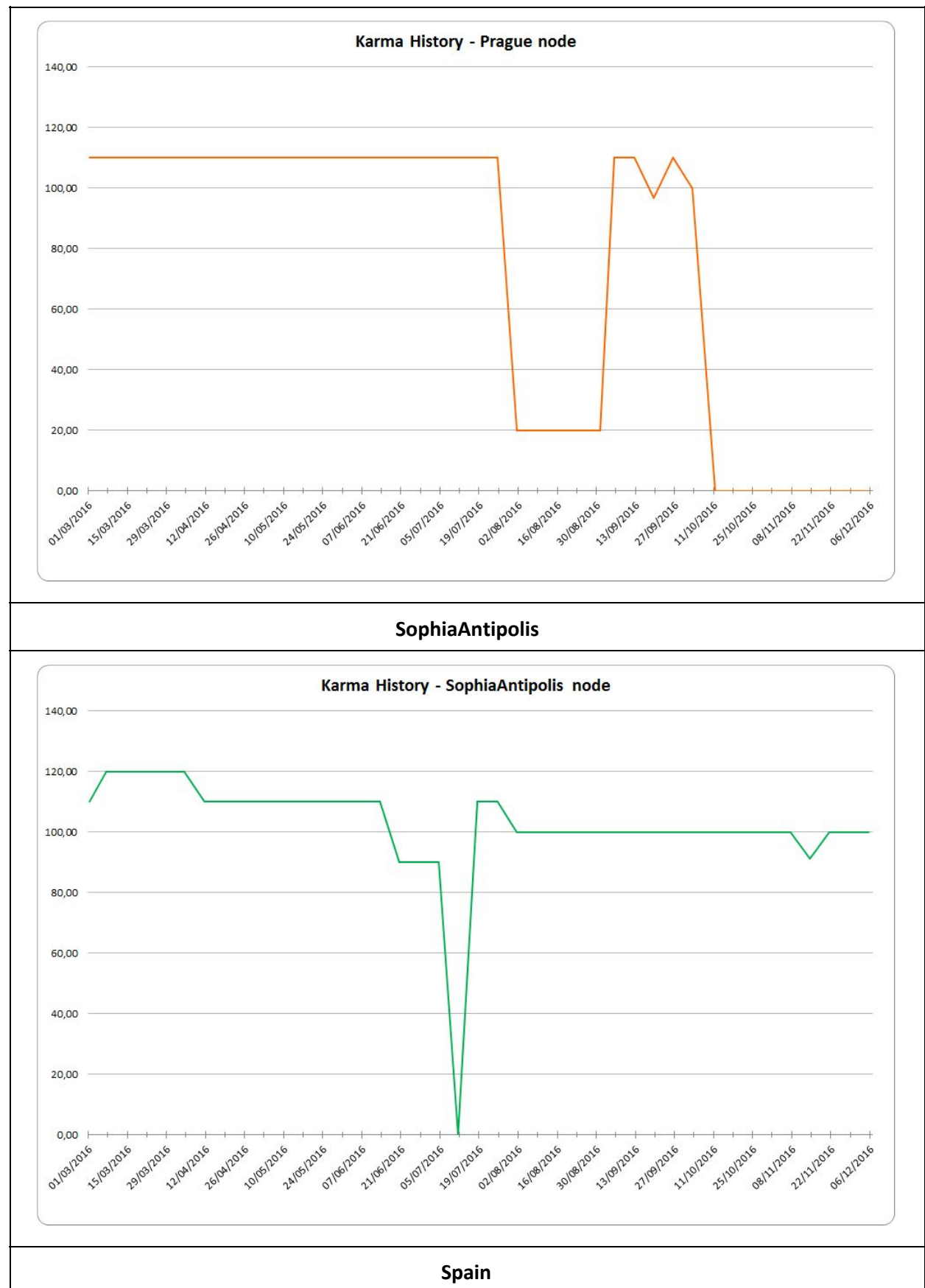
This time range has been chosen to standardize the historical data among all nodes (those coming from the Open Call and those already in FIWARE Lab).

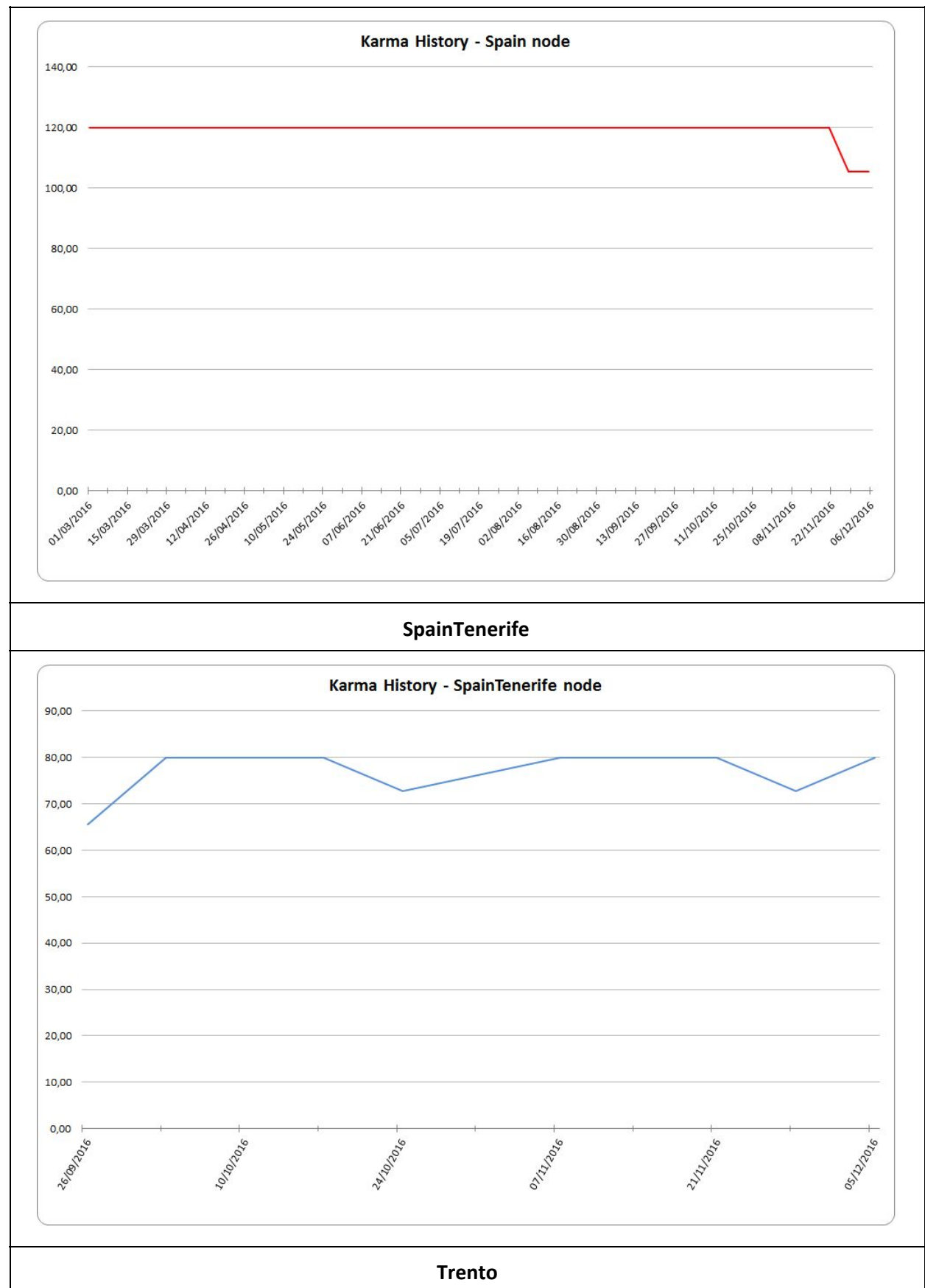


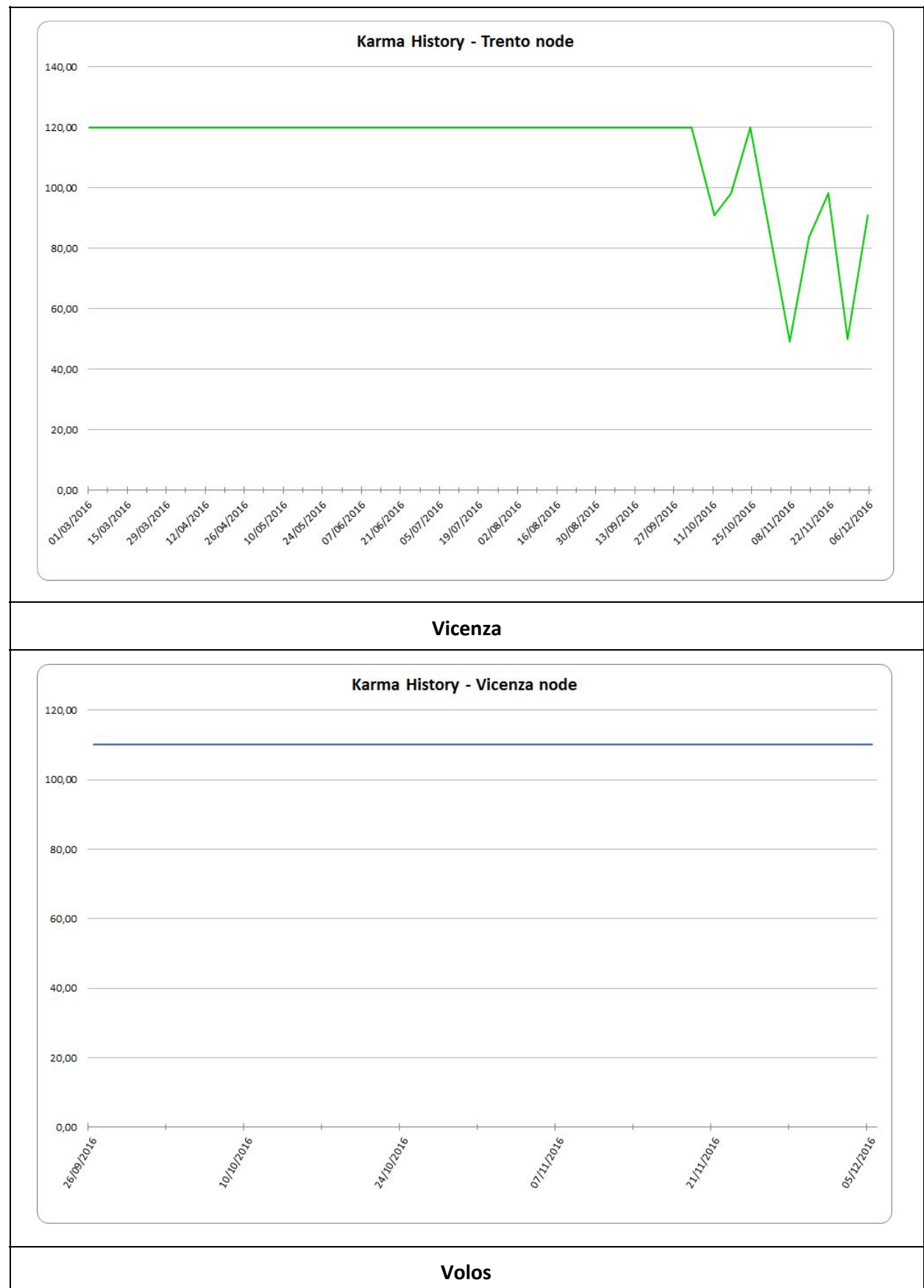


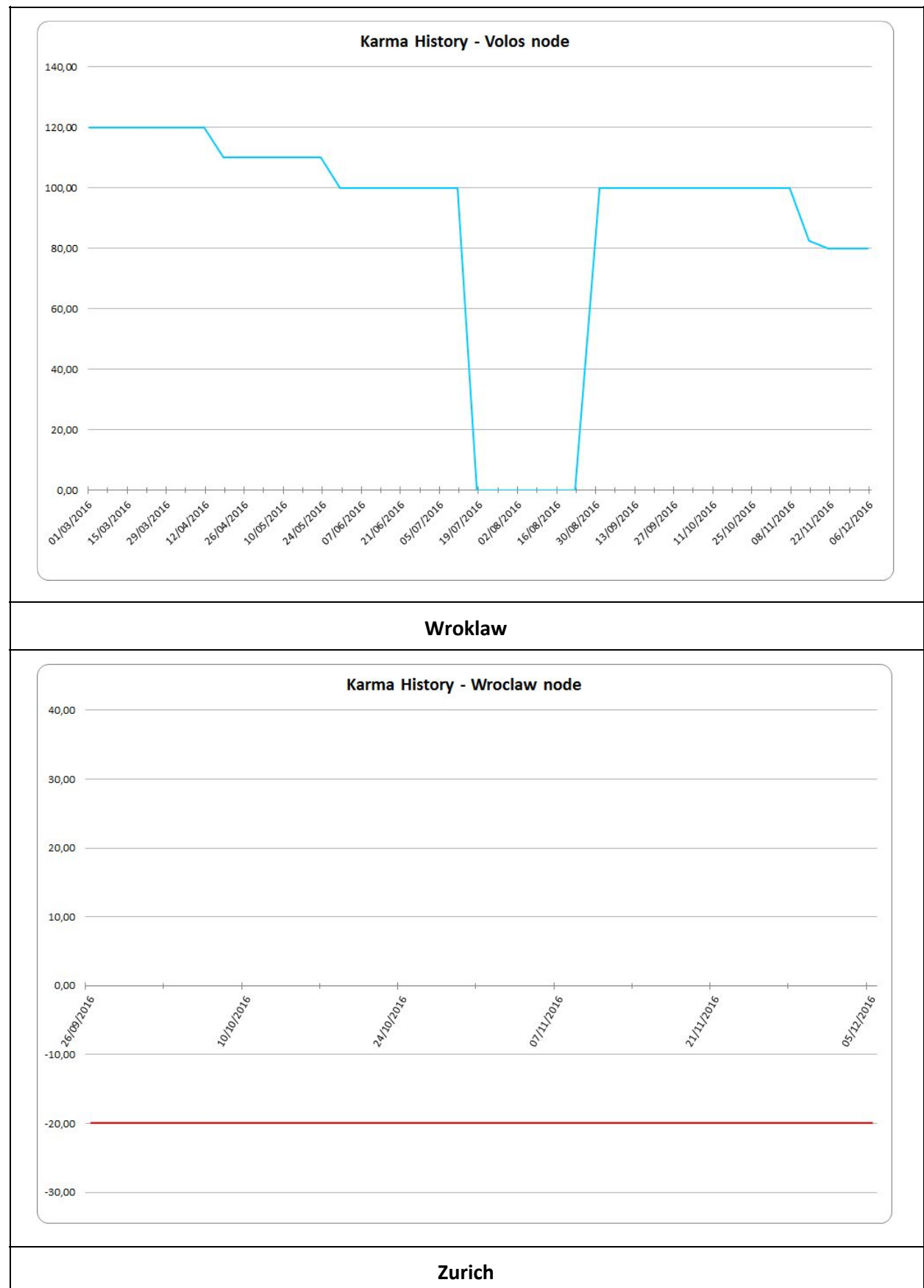


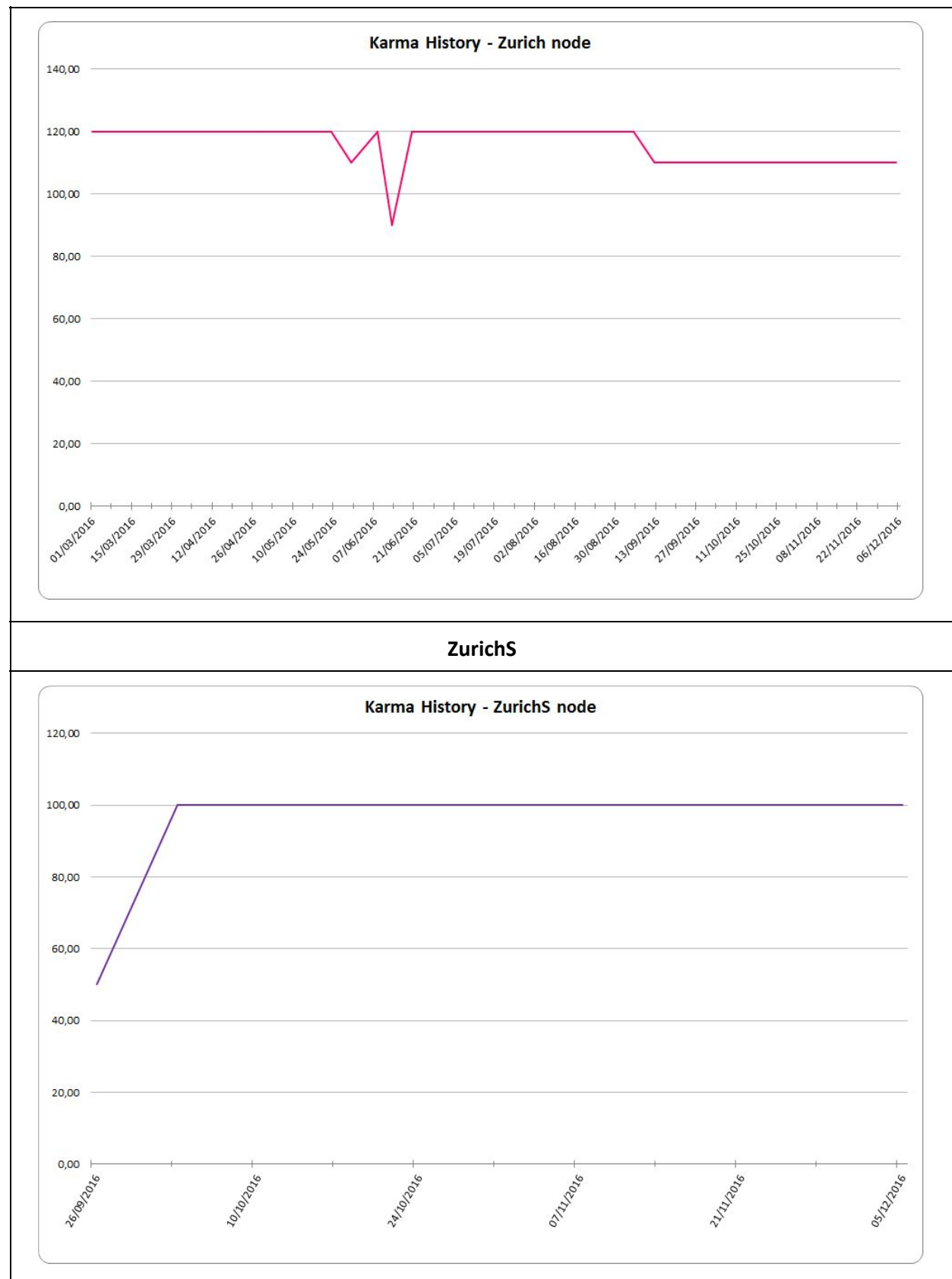










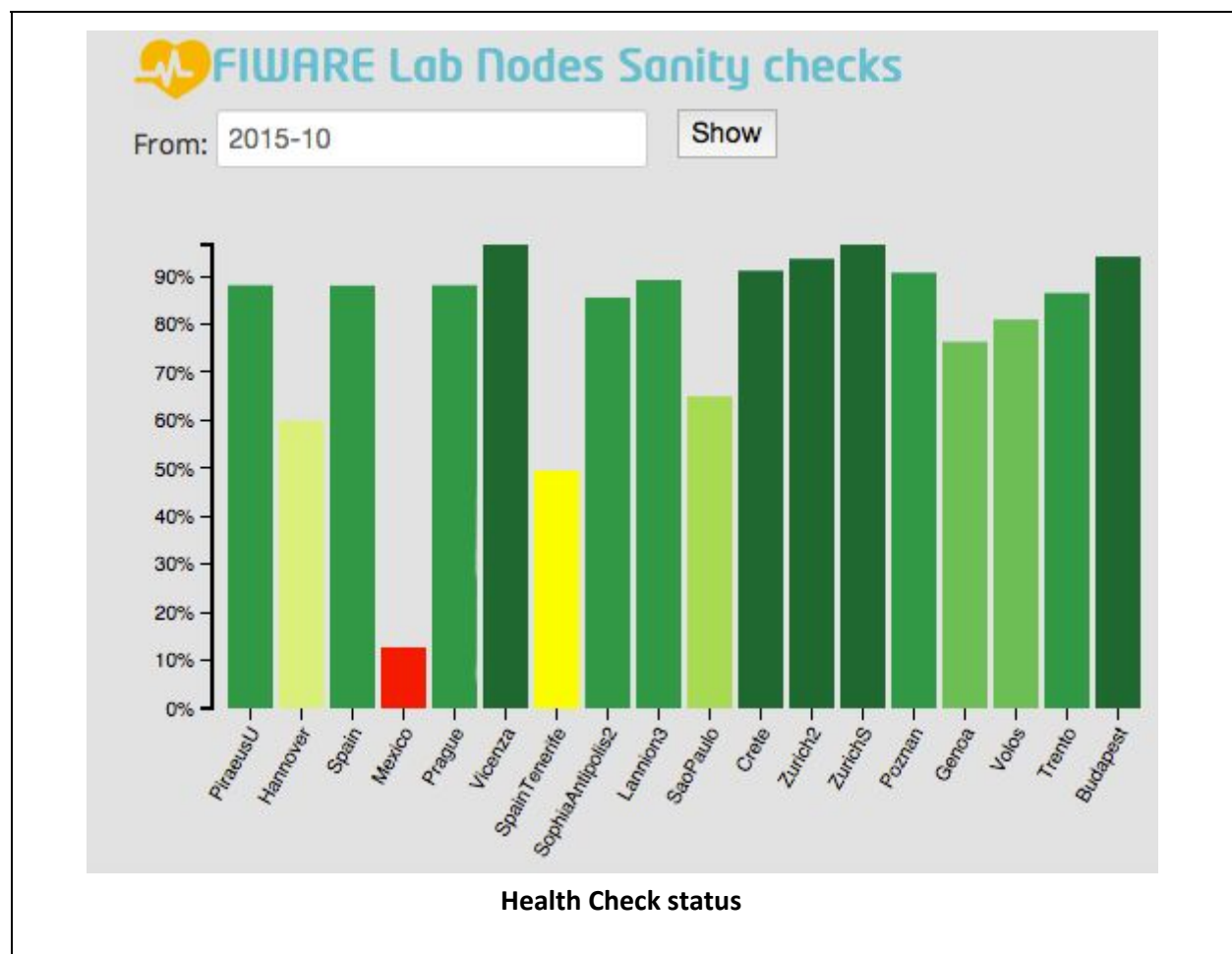


3.21 Health check history

Health Check status is a tool to measure the functionality of the core OpenStack services running on the nodes. The purpose of Health Check history is to provide an overview of nodes services availability during the past months. The Health Check status checks 5 main services:

- Nova
- Neutron
- Cinder
- Glance
- Keystone

This graph gives the evolution of historical data based on the Health Check status for each node from October 2015 to December 2016.



(The nodes coming from the Open Call may have lower percentages because a limited time frame of operation)

4. FIWARE GErI OPERATION AND SUPPORT

This section provides an overview of GErI operation and support statistics. In particular, it provides information related to each GErI usage (based on number of Docker pulls), it reports on each GErI support statistics (number of tickets, solved tickets, average response time) and, finally, it provides an overview of global releases of each GErI on FIWARE Lab.

Data provided from the different partners:

4.1 GErI usage statistics (1/09/2015 - 1/12/2016)

GErI	Number of instances on FIWARE Lab ¹	Number of downloads
CKAN	1	x
AuthzForce	2	997 Docker pulls
Orion Context Broker	Unknown, probably large. At least 1 (global instance)	5000 Docker pulls
Keyrock	1	833 Docker pulls
Wilma	1	174 Docker pulls
Cloud Portal	1	157 Docker pulls
IoT Broker	1	247 Docker pulls
Big Data / Cosmos	1 (global instance)	Cosmos = Hadoop + other things that allow deploying Hadoop in FIWARE Lab with multitenancy support; these things are not dockerized since only have sense for the global instance
Big Data / Cygnus	Unknown, probably large	602 Docker pulls
Big Data / Sinfonier	0	0
IoT Agent UL	4	1465 Docker pulls (for images in FIWARE and Telefonica repositories)
IoT Agent JSON	0	710 Docker pulls (for images in FIWARE and Telefonica repositories)
IoT Agent Lightweight M2M	0	139 Docker pulls (for images)

¹ With the switch from virtual machines to containers, it is not possible to currently count the number of single instances of GEs running in the lab.

		in FIWARE and Telefonica repositories)
IoT Manager	0	163 Docker pulls
IoT Agent Node.js Framework	-	530/month (last figures)
Bosun - Facts	1	6702 pypi downloads (last crawled 2016-05-18) 47 Docker pulls
Bosun - Cloto	1	5410 pypi downloads (last crawled 2016-05-19) 57 Docker pulls
FIWARE Murano	1	76 Docker pulls
Stream Oriented Kurento	Unknown, probably large. At least (global instance)f	712 Docker pulls from Fiware 7900 Docker pulls from Kurento
IoT Discovery	1 (global)	241 Docker pulls from FIWARE
PROTON Complex Event Processing	1	112 Docker pulls from FIWARE
Docker	1	28 Docker pulls for FIWARE Docker Container Service (FDCS) from FIWARE
Wirecloud	Unknown, probably large. At least 1 (global instance)	2900 Docker pulls from FIWARE
Business API Ecosystem	1 (Global instance)	15 Docker pulls
Cepheus	1	670 Docker pulls
OFNIC	0	33 Docker pulls
SpagoBI	Unknown. At least 1 (global instance)	2k Docker pulls
GIS data provider	1	97 docker pulls

4.2 GErI support statistics (1/09/2015 - 1/12/2016)

GErI	Number of solved tickets	Number of unsolved tickets	Average resolution time
CKAN	25	2	23
AuthzForce	16	0	20
Orion Context Broker (JIRA HELP DESK)	136	~136	90% tickets in 1-2 working days
Orion Context Broker (StackOverflow)	190	~190	90% questions in 1-2 working days
Keyrock (Help Desk)	315	0	9,9 days
Wilma (Help Desk)	41	0	2,3 days
Cloud Portal (Help Desk)	134	0	2 days
IoT Broker (Help Desk)	17	0	11 days (median)
Big Data / Cosmos + Cygnus (Help Desk)	88	0	90% tickets in 1-2 working days
Big Data / Cosmos (StackOverflow)	24	0	90% questions in 1-2 working days
Big Data / Cygnus (StackOverflow)	66	0	90% questions in 1-2 working days
Big Data / Sinfonier	0	0	-
IoT Agent Framework Node.js	68	1	n/a
IoT Agent Ultralight 2.0	27	1	n/a
IoT Agent JSON	24	1	n/a
IoT Agent Lightweight M2M	7	14	n/a
Bosun - Cloto	10	0	90% questions in 1-2 working days
Bosun - Facts	10	0	90% questions in 1-2 working days
FIWARE Murano	11	0	90% questions in 1-2 working days
Stream Oriented Kurento	35	0	90% questions in 9,5 days
IoT Discovery	13	0	10 days
PROTON Complex Event Processing	102	1	about 10 days.

Docker	18	0	about 10 days
Wirecloud	198	0	about 10 days
Business API Ecosystem	1	0	2 days
Cepheus	24 (JIRA) 3 (Github)	0	n/a
OFNIC	1	0	n/a
SpagoBI	36	2	about 10 days.
GIS data provider	20	0	90% questions resolved in 11 days

4.3 GErI main events log (1/09/2015 - 1/12/2016)

GErI	Date	Type of event (new release, maintenance, fault)	Description
CKAN	08/03/2016	New release	Upgrade CKAN instance to version 2.5
CKAN	30/09/2016	New release	Upgrade CKAN instance to version 2.6
CKAN	05/11/2015	New release	Lab instance is updated and proven to compatible for CKAN version 2.3 with all FIWARE specific extensions implemented and tested (oauth2, private datasets, store publisher, fiware_header, data requests, ngsiview)
AuthzForce	14/01/2016	New release	v4.4.1: hotfixes to v4.4.0
AuthzForce	04/05/2016	New release	v5.1.2
AuthzForce	27/05/2016	New release	v5.2.0
AuthzForce	01/06/2016	New release	v5.3.0
AuthzForce	15/07/2016	New release	v5.4.0
AuthzForce	04/09/2016	New release	v5.4.1
Orion	14/09/2015	New release	v0.24.0
Orion	02/11/2015	New release	v0.25.0
Orion	01/12/2015	New release	v0.26.0
Orion	09/12/2015	New release	v0.26.1

Orion	01/02/2016	New release	v0.27.0
Orion	29/02/2016	New release	v0.28.0
Orion	29/03/2016	New release	v1.0.0
Orion	03/05/2016	New release	v1.1.0
Orion	02/06/2016	New release	v1.2.0
Orion	16/06/2016	New release	v1.2.1
Orion	02/09/2016	New release	v1.3.0
Orion	14/09/2016	New release	v1.2.2
Orion	22/09/2016	New release	v1.2.3
Orion	30/09/2016	New release	v1.4.0
Orion	10/10/2016	New release	v1.4.1
Orion	21/10/2016	New release	v1.2.4
Orion	31/10/2016	New release	v1.5.0
Orion	4/11/2016	New release	v1.4.2
Orion	24/11/2016	New release	v1.4.3
Orion	24/11/2016	New release	v1.4.4
Orion	25/11/2016	New release	v1.4.5
Keyrock	2/10/2015	New release	v4.4.0
Keyrock	5/2/2016	New release	v5.1.0
Keyrock	3/3/2016	New release	v5.1.1
Keyrock	14/4/2016	New release	v5.2.0
Keyrock	11/7/2016	New release	v5.3.0
Keyrock	24/10/2016	New release	v5.4.0
Cloud Portal	10/9/2015	New release	v4.4
Cloud Portal	16/12/2015	New release	v4.4.1
Cloud Portal	19/1/2016	New release	v5.1
Cloud Portal	11/4/2016	New release	v5.2
Cloud Portal	29/6/2016	New release	v5.3
Cloud Portal	27/9/2016	New release	v5.4

Wilma	17/9/2015	New release	v4.4
Wilma	16/12/2015	New release	v5.1
Wilma	28/3/2016	New release	v5.2
Wilma	27/6/2016	New release	v5.3
Wilma	27/9/2016	New release	v5.4
IoT Broker	28/9/2015	New release	v4.4
IoT Broker	23/12/2015	New release	v5.1
IoT Broker	06/7/2016	New release	v5.3.3
IoT Broker	27/9/2016	New release	v5.4.3
Big Data / Cosmos	29/06/2016	New Release	v0.2.0
Big Data / Cosmos	09/06/2016	New Release	v0.3.0
Big Data / Cosmos	30/09/2016	New Release	v1.0.0
Big Data / Cygnus	01/02/2016	New Release	v0.12.0
Big Data / Cygnus	16/02/2016	New Release	v0.12.1
Big Data / Cygnus	01/03/2016	New Release	v0.13.0
Big Data / Cygnus	06/05/2016	New Release	v1.0.0
Big Data / Cygnus	01/06/2016	New Release	v1.1.0
Big Data / Cygnus	01/07/2016	New Release	v1.2.0
Big Data / Cygnus	07/09/2016	New Release	v1.2.1
Big Data / Cygnus	09/09/2016	New Release	v1.3.0
Big Data / Cygnus	07/10/2016	New Release	v1.4.0
Big Data / Cygnus	11/10/2016	New Release	v1.2.2
Big Data /	02/11/2016	New Release	v1.5.0

Cygnus			
Big Data / Cygnus	02/12/2016	New Release	v1.6.0
Big Data / Sinfonier	17/10/2016	New Release	v1.0.0
IoT Agent Framework Node.js	New release	5/8/2015	0.6.0
IoT Agent Framework Node.js	New release	5/8/2015	0.6.1
IoT Agent Framework Node.js	New release	2/8/2015	0.7.0
IoT Agent Framework Node.js	New release	5/8/2015	0.8.0
IoT Agent Framework Node.js	New release	5/8/2015	0.8.1
IoT Agent Framework Node.js	New release	5/9/2015	0.8.2
IoT Agent Framework Node.js	New release	4/9/2015	0.8.3
IoT Agent Framework Node.js	New release	2/10/2015	0.8.4
IoT Agent Framework Node.js	New release	2/11/2015	0.9.0
IoT Agent Framework Node.js	New release	3/11/2015	0.9.1
IoT Agent Framework Node.js	New release	3/11/2015	0.9.2
IoT Agent Framework Node.js	New release	3/0/2016	0.9.3
IoT Agent Framework	New release	2/0/2016	0.9.4

Node.js			
IoT Agent Framework Node.js	New release	3/0/2016	0.9.5
IoT Agent Framework Node.js	New release	4/0/2016	0.9.6
IoT Agent Framework Node.js	New release	3/1/2016	0.9.7
IoT Agent Framework Node.js	New release	5/1/2016	0.9.8
IoT Agent Framework Node.js	New release	1/1/2016	0.10.0
IoT Agent Framework Node.js	New release	2/4/2016	1.0.0
IoT Agent Framework Node.js	New release	3/5/2016	2.0.0
IoT Agent Framework Node.js	New release	1/5/2016	2.1.0
IoT Agent Framework Node.js	New release	5/5/2016	2.1.1
IoT Agent Framework Node.js	New release	1/5/2016	2.1.2
IoT Agent Framework Node.js	New release	3/8/2016	2.1.3
IoT Agent Framework Node.js	New release	4/8/2016	2.1.4
IoT Agent Framework Node.js	New release	5/8/2016	2.2.0
IoT Agent Framework Node.js	New release	3/9/2016	2.3.0

IoT Agent Framework Node.js	New release	4/10/2016	2.4.0
IoT Agent Framework Node.js	New release	1/10/2016	2.4.1
IoT Agent UL	New release	2/4/2016	1.0.0
IoT Agent UL	New release	3/5/2016	1.1.0
IoT Agent UL	New release	2/5/2016	1.1.1
IoT Agent UL	New release	3/5/2016	1.1.2
IoT Agent UL	New release	5/5/2016	1.1.3
IoT Agent UL	New release	1/5/2016	1.1.4
IoT Agent UL	New release	3/5/2016	1.1.5
IoT Agent UL	New release	1/6/2016	1.1.6
IoT Agent UL	New release	2/6/2016	1.1.7
IoT Agent UL	New release	3/8/2016	1.1.8
IoT Agent UL	New release	4/8/2016	1.1.9
IoT Agent UL	New release	5/8/2016	1.2.0
IoT Agent UL	New release	3/9/2016	1.3.0
IoT Agent UL	New release	5/10/2016	1.4.0
IoT Agent JSON	New release	3/11/2015	0.1.0
IoT Agent JSON	New release	1/0/2016	0.1.2
IoT Agent JSON	New release	2/0/2016	0.1.3
IoT Agent JSON	New release	2/0/2016	0.1.4
IoT Agent JSON	New release	3/0/2016	0.1.5
IoT Agent JSON	New release	5/1/2016	0.1.6
IoT Agent JSON	New release	2/4/2016	1.0.0
IoT Agent	New release	3/5/2016	1.1.0

JSON			
IoT Agent JSON	New release	3/5/2016	1.2.0
IoT Agent JSON	New release	5/5/2016	1.3.0
IoT Agent JSON	New release	1/5/2016	1.3.1
IoT Agent JSON	New release	3/8/2016	1.3.2
IoT Agent JSON	New release	4/8/2016	1.3.3
IoT Agent JSON	New release	5/8/2016	1.4.0
IoT Agent JSON	New release	4/10/2016	1.5.0
IoT Agent Lightweight M2M	New release	4/1/2016	0.3.0
Bosun - Cloto	New release	28/09/2016	2.8.0
Bosun - Cloto	New release	12/08/2016	2.7.0
Bosun - Cloto	New release	27/06/2016	2.6.0
Bosun - Cloto	New release	01/04/2016	2.5.0
Bosun - Cloto	New release	10/02/2016	2.4.0
Bosun - Cloto	New release	29/12/2015	2.3.0
Bosun - Cloto	New release	23/12/2015	2.2.0
Bosun - Cloto	New release	11/11/2015	2.1.0
Bosun - Cloto	New release	10/10/2015	2.0.0
Bosun - Cloto	New release	29/09/2015	1.8.0
Bosun - Cloto	New release	08/09/2015	1.7.1
Bosun - Cloto	New release	01/09/2015	1.7.0
Bosun - Facts	New release	28/09/2016	2.8.0
Bosun - Facts	New release	12/08/2016	2.7.0
Bosun - Facts	New release	28/06/2016	2.6.0
Bosun - Facts	New release	01/04/2016	2.5.0

Bosun - Facts	New release	10/02/2016	2.4.0
Bosun - Facts	New release	26/01/2016	2.3.0
Bosun - Facts	New release	10/12/2015	2.2.0
Bosun - Facts	New release	23/11/2015	2.1.0
Bosun - Facts	New release	20/10/2015	2.0.0
Bosun - Facts	New release	29/09/2015	1.8.0
FIWARE Murano	New release	15/09/2016	5.4.3
FIWARE Murano	New release	11/08/2016	5.4.1
SO Kurento	New release	23/09/2015	6.0.6
SO Kurento	New release	14/03/2016	6.4.0
SO Kurento	New release	06/06/2016	6.5.0
SO Kurento	New release	19/09/2016	6.6.0
IoT Discovery	New Release	21/01/2016	0.4.0
IoT Discovery	New Release	24/10/2016	0.5.0
PROTON CEP	New Release	12/01/2016	4.4.1
PROTON CEP	New Release	12/07/2016	4.4.2
PROTON CEP	New Release	07/08/2016	5.4.1
Wirecloud	21/10/2015	New Release	v0.8.1
Wirecloud	03/12/2015	New Release	v0.8.2
Wirecloud	15/01/2016	New Release	v0.8.4
Wirecloud	31/03/2016	New Release	v0.9.0
Wirecloud	04/05/2016	New Release	v0.9.1
Wirecloud	30/06/2016	New Release	v0.9.2
Wirecloud	21/09/2016	New Release	v1.0.0
Business API Ecosystem	15/09/2016	First Release	5.4.0
Cepheus	New Release	24/09/2015	0.1.0
Cepheus	New Release	29/10/2015	0.1.1
Cepheus	New Release	27/11/2015	0.1.2

Cepheus	New Release	22/12/2015	0.1.3
Cepheus	New Release	27/01/2016	0.1.4
Cepheus	New Release	22/02/2016	0.1.5
Cepheus	Maintenance	25/03/2016	0.1.6
Cepheus	New Release	19/05/2016	0.1.7
Cepheus	New Release	23/11/2016	0.1.8
OFNIC	New Release	26/7/2016	2.1
OFNIC	New Release	21/7/2016	2.0
SpagoBI	25/09/2015	New Release	v5.1.1
SpagoBI	08/04/2016	New Release	v5.2.0
SpagoBI	08/09/2016	New Release	v5.2.1
GIS data provider	7/1/2016	New release	v4.4.0
GIS data provider	26/5/2016	New release	v5.4.3

5. CONCLUSIONS AND LESSON LEARNT

The experience of managing FIWARE Lab in the last 2 years evidences two key aspects:

- Currently the amount of available resources is far larger than the ones actually used. This is largely due to: i) the introduction of containers - that allows to flexibly run a large amount of services on a single virtual machine - for the provisioning of GEs, reduced the need for resources compared to the previous vm based provisioning mechanism; ii) the end of the accelerator programme reduced the number of account requests; iii) the current FIWARE Lab infrastructure cannot be used for commercial purposes - from a legal and SLA point of view; iv) the community account policies may be too strict for facilitating the access to more users (e.g. users are requested to have a clear idea and plan for FIWARE usage); v) the infrastructure is not advertised enough.
- A free-to-use federation of FIWARE Lab size is hardly sustainable unless of leveraging on public funding (e.g. for public infrastructure) and as conceived today there are several limitations that needs to be removed to allow for a commercial exploitation. Limitations includes: large adoption of NREN connectivity that in most EU countries does not allow for commercial usage of their resources; centralised management of user identities that does not allow for easy commercial exploitation by single FIWARE Lab nodes; high maintenance costs - both by nodes and central management - due to the strongly coupled federation approach adopted.

In light of the above considerations, the FI-Core consortium recommends for the handover to FI-NEXT and FIWARE Foundation:

- Reduce the number of resources available free-to-use;
- Simplify the GE deployment to a single model based on current state of the art solutions, i.e. Containers.
- Simplify the federation infrastructure and software stack to reduce maintenance and federation costs: for example convert the current federation in to a pure marketplace where users simply pick from commercial and free infrastructures where to deploy GE;
- Introduce fees for parties interested using resources for longer time frame and in larger size;
- Revise usage policies to allow for a broader audience;
- Better advertise the infrastructure.