Grant Agreement No.: 644866
Call: H2020-ICT-2014-1
Topic: ICT-07-2014
Type of Action: RIA

D6.2: Quality Assurance Plan

Revision: v.1.0

Workpackage	WP6
Task	Task 6.2
Due date	30.04.2015
Submission date	30.04.2015
Deliverable lead	Martel Consulting
Version	1.0
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Abstract	The Quality Assurance Plan described in this report defines the general approach to quality assurance and the procedures to be followed for the production of outcomes such as deliverables or reports. It documents the co-ordination and follow-up procedures for monitoring progress and responding to changes.
Keywords	Quality Assurance Plan, Monitoring, Reporting, Deliverables, Publications

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Acknowledgment

This report is partially funded under the EC H2020 project SSICLOPS, grant agreement 644866.

Project co-funded by the European Commission in the H2020 Programme		
Nature of the deliverable[1]:	R	
Dissemination Level		
PU	Public	✓
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to bodies determined by the SSICLOPS project	
CO	Confidential to SSICLOPS project and Commission Services	

[1] R: Report, P: Prototype, D: Demonstrator, O: Other

EXECUTIVE SUMMARY

This document represents the Quality Assurance Plan for the project SSICLOPS. The aim of this deliverable is to describe the mechanisms that will be used throughout the project in order to ensure the quality level of the project deliverables and the project outcomes.

This document will also serve as a guide for the project coordinator, in order to ensure that quality reviews will occur at appropriate points in the project, and as a reference for all project partners, in order to understand their responsibilities, regarding the project deliverables and outcomes.

In this context, quality control mechanisms are defined in order to be easy to identify important tasks and dependencies that are critical for the success of the project. This document will also serve as a detailed guide to the SSICLOPS consortium in order to establish effective cooperation within the consortium and ensure the highest level of quality of project documentation. Moreover, the document outlines the success criteria for each deliverable, defines the structure of each deliverable, describes the quality review techniques and also defines configuration management procedures and change control.

This document should be used as a reference by the project coordinator and all project partners.

TABLE OF CONTENTS

ABBREVIATIONS

AB	Advisory Board
DoA	Description of Action
GA	General Assembly
PC	Project Coordinator
PM	Person-Month
PMB	Project Management Board
PPR	Periodic Project Report
QPR	Quarterly Progress Report
SDN	Software Defined Networking
TM	Technical Manager
ToC	Table of Contents
WP	Workpackage

1 INTRODUCTION

1.1 Purpose and Scope

This deliverable facilitates partner cooperation in the project, by defining a set of rules and guidelines for the organisation and delivery of the project outputs.

The plan summarises what has to be achieved by the project regarding procedures related to management and quality control. It is a fundamental working tool that every partner is invited to refer to, when a deliverable or other publication is to be prepared, or progress is to be reported.

1.2 Audience

This deliverable has been created specifically for the SSICLOPS partners, describing the quality procedures to be followed for the duration of the project.

1.3 Deliverable Structure

Some content within this Quality Assurance Plan is derived from the grant agreement and its annexes, while other sections have been defined and written specifically for this document.

The document is structured in the following manner:

Chapter 2: Quality Management. The second chapter outlines the overall progress monitoring and reporting procedures to ensure the project achieves its objectives on schedule and within budget. It presents the control methods that will be applied in order to ensure the high quality outcome of the project as well as the responsibilities of project partners and bodies related to this topic.

Chapter 3: Quality Control for Deliverables. The third chapter presents the control methods that will be applied in order to ensure the high quality outcome of the project as well as the responsibilities of project partners in this area. It describes the deliverable development approach.

Chapter 4: Quality Control for Publications. The fourth chapter presents the general principles and guidelines of creating publications from the project: it describes the main procedures for checking that no confidentiality is breeched and the configuration management and change control to be used in the SSICLOPS project.

Chapter 5: Quality Control for Open Source Code. The fifth chapter describes the way that open source code is handled in the project: it describes the process through which SSICLOPS makes improvements to existing open source software available for others to use, in order to ensure the quality.

2 QUALITY MANAGEMENT

Quality Management is about defining the outputs required by the project, with their respective quality criteria, quality assessment methods and the responsibilities of the involved partners. Quality Assurance provides control to the project direction, ensures that the outputs are of a high quality with respect to the nature of the project and that the project complies with relevant corporate or programme management standards and policies.

The purpose of Quality Management is to provide a secure basis for:

- Project Management Board (PMB) agreements on the overall quality expectations, the products required with their associated quality criteria, the means by which quality will be achieved and assessed, and ultimately, the acceptance criteria by which the project's products will be judged.

- Communicating these agreements unambiguously so all project partners have a common understanding of what the project is setting out to achieve.

- Control i.e. establishing an effective baseline for the project's quality controls and a secure means of achieving deliverables that are fit for purpose.

This plan forms:

- A guide for the Project Coordinator (PC) to follow in order to ensure that the quality reviews occur at appropriate points in the project, and

- A reference for all project partners in order to understand their responsibilities, thus delivering high quality deliverables and outcomes to help SSICLOPS achieve its goals.

2.1 Management Bodies

Whilst everyone on the project has a responsibility to deliver high quality deliverables and project outcomes, the key project roles in this area are the following:
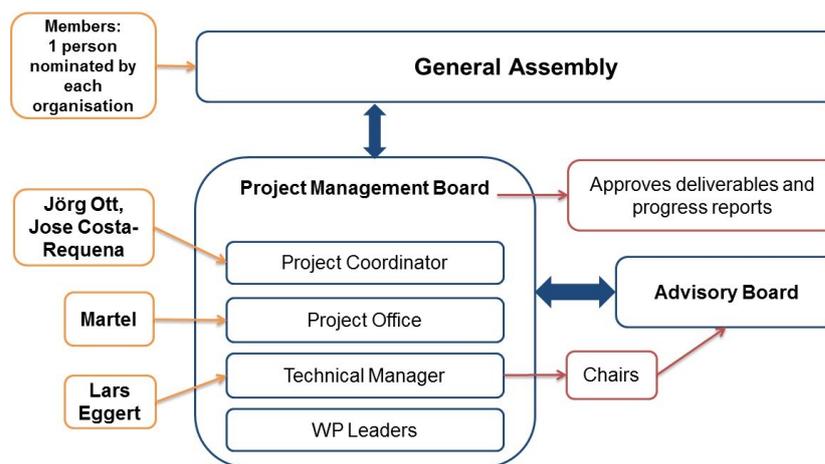
These roles are described below:

2.1.1 General Assembly

The General Assembly (GA) decides on matters related to the overall Work Plan.

The duties of the General Assembly include:

- Following up on the project progress.
- Managing problems that are escalated to the highest level, and
- Taking all decisions that relate to contractual matters.

The General Assembly meets at least once per year.

2.1.2   Project Coordinator

The Project Coordinator:

- Oversees the overall legal, contractual and financial responsibilities.
- Manages the contacts and communication with the Commission (from/to the consortium).
- If necessary, manages with both the Commission and the partners any amendment to the grant agreement.
- Supervises progress in close coordination with the Project Management Board.
- Chairs the General Assembly meetings.
- Detects, evaluates and handles possible risk items for the progress of the project in close collaboration with the rest of the members of the Project Management Board.
- Submits the quarterly reports and Periodic Project Reports to the Commission.
- Submits deliverables to the Commission.

The Project Coordinator is provided by AALTO and is the formal point of contact with the European Commission and specific Project Officer for all contractual matters.

2.1.3   Project Office

The Project Office supports the Project Coordinator, by performing those management tasks which can be delegated to a partner other than the Project Coordinator. These are clearly defined and are those, which are not related to contractual matters between the European Commission and the project, or financial transfers. The Project Office is operated by MARTEL.

The Project Office:

- Oversees the administrative responsibilities, such as the deliverable schedule, meeting organization (agendas, minutes, Action Points).
- If necessary, prepares for the Project Coordinator any amendment to the Description of Action, budget allocations and Consortium Agreement.
- Supervises the quarterly and annual progress reporting process and the collation of the reports for the Project Management Board's approval.
- Makes the pre-final quality check of deliverables for approval by the Project Management Board and submission by the Project Coordinator.

2.1.4   Project Management Board

The Project Management Board comprises the Project Coordinator, the Project Office representative, the Technical Manager and the Work package Leaders. It is responsible for the day-to-day running of the project. This includes ensuring a clear and coherent technical view across the project, evaluating

progress against the milestones according to the project plan, revising the project plan, and taking final responsibility for approving deliverables. It is chaired by the Project Coordinator.

The Project Management Board:

- Monitors the overall technical progress and quality of the project, including soundness of the outcomes in close collaboration with the technical Work package leaders.

- Approves deliverables.

- Approves the progress reports.

- Approves deliverables.

- Oversees the alignment between the project output and the stated objectives.

2.1.5 Technical Manager

The Technical Manager (TM) monitors the progress and excellence of the technical Work packages individually and as a whole, with the ultimate goal of ensuring that proper management of the innovative concepts and artefacts generated by SSICLOPS will become concrete opportunities to implement new technologies and solutions.

The Technical Manager:

- Supervises the management of innovative ideas in close collaboration with the Project Management Board, so as to identify and promote concrete business opportunities out of technical/technological innovation created by the project's work.

- Coordinates with the Project Management Board in case any corrective action or risk is identified.

2.1.6 Work package Leaders

The Work package Leaders are responsible for developing a detailed Work package implementation plan on the basis of the Work Plan, and for the efficient and effective implementation of it, taking into account the timeliness and quality of the deliverables. Therefore, the Work package leaders control and manage the progress achieved on the Work package level.

The Work package leaders:

- Coordinate the cooperation between partners within the Work package.

- Resolve day-to-day administrative, technical and resource problems within his/her Work package.

- Report to the Technical Manager

- Report to the project partners during the periodical plenary meetings (typically every four months).

- Inform the Project Coordinator about the progress of their work through the quarterly progress reports (or more frequently if required). This allows the Project Coordinator to control the project and implement corrections to the plan if needed in concertation with the Project management Board.

- Provide Work package contributions to the Project Periodic Reports and to the Technical Audit presentations.

- Assign tasks to individual members of the Work package teams.

- Monitor the progress of milestones, deliverables and the expected outcomes of their Work packages.
- Organize interim meetings if necessary to ensure the proper execution of their Work package.
- Disseminate information the other Work package leaders for ensuring a smooth coordination of Work package activities.

2.1.7   Advisory Board

The Advisory Board (AB) provides a further layer of quality control; their opinion on the direction in which the project is going is an important input to the project. The role of the Advisory Board is to periodically review the progress and results of the project from a variety of angles and provide advice on ongoing and future work. The Advisory Board members will be invited approximately once per year to attend one of the regular project meetings. They are expected to inform the consortium about research, technology, market or regulatory trends (among others) that are of relevance to the project work, increase the impact of the project by creating visibility of SSICLOPS in other geographic regions (e.g., US, China, etc.), and provide an external view of the project, in order to allow the project leadership to better position and articulate the public profile of the project. Advisory Board members may also participate in some of the planned dissemination activities of the project, such as training activities, thematic academic workshops, etc.

The SSICLOPS Advisory Board consists of selected experts in the field, from a diverse set of backgrounds (academia, industry, open source, etc.) and geographies, who have technical expertise in a subset of the topics that the project is researching and developing. The initial members of the SSICLOPS Architecture Board will be selected from the following list:

- Nick McKeown (Professor of Computer Science and Electrical Engineering, Stanford University)
- Bruce Davie (Principal Engineer, Networking and Security, VMware)
- Hui Deng (Principle Staff, China Mobile Research Institute)
- Dave Ward (Senior Vice President, Chief Architect, and Chief Technology Officer, Cisco Systems)
- Jeff Mogul (Protocol Stylist, Google)
- Mark Allman (Computer Scientist, Networking and Security Group, ICSI)
- Leslie Daigle (Chief Internet Technology Officer, Internet Society)
- Jason Livingood (Vice President, Internet & Communications Engineering, Comcast)
- Raquel Morera (Distinguished Member of Technical Staff, Verizon)
- Jun Murai (Dean of Faculty of Environment and Information Study, Keio University)
- Bruce Maggs (Akamai, Duke University)
- Grenville Armitage
- Albert Greenberg
- Doug Burger
- Jan Schafner (HPI, Berlin)

2.2   Reporting Procedures

In practice, the overall project Quality Management is facilitated through a process of quarterly and

yearly project reporting by all partners.

Quarterly Progress Reports (QPRs) will be produced and sent to the Project Officer, presenting the state of play, the progress achieved in the past quarter starting from M1-M3 of the project, the first one to be submitted in M4. The contents are (per partner):

- Achievements
- Estimated Person-Months (PMs) spent
- Estimated travel costs
- Any major expenditures
- Disseminations

A Periodic Project Report (PPR) will be produced annually, summarizing the quarterly reports and including accurate costs for personnel, travel, equipment expenditures/depreciations, etc. The Periodic Project Report must be produced within 60 days after the end of the corresponding reporting period, or 2 weeks before the subsequent project review (whichever is sooner).

3   QUALITY CONTROL FOR DELIVERABLES

As described in the Description of Action (DoA), The Project Coordinator is ultimately responsible for the quality control of the deliverables to the Commission, coordinating closely on technical quality checks with the Technical Manager and the Project Management Board.

Every contractual deliverable, prior to its submission to the Commission, will be the subject to a review within the respective Work package and a peer review by persons not directly involved in either the subject matter or the creation of that deliverable.

The Project Management Board and the Project Office will make a final check of the deliverable for consistency and readability before sending to the project Coordinator for submission to the EC. Where necessary, the Project Coordinator could request further work of the partners on a deliverable, to ensure that it complies with the project's contractual requirements.

To ensure that this process can be followed through, the following time plan has been agreed:

- A complete Table of Contents (ToC) will be provided by the editor 6 weeks before the deadline.

- A relatively complete draft of the deliverable should be made available by the allocated editor at least 4 weeks before the due date.

- The draft version should be reviewed within the Work package at least 3 weeks before the due date.

- At least 2 weeks before the due date, a pre-final version should be available for peer review by nominated persons outside the Work package.

- Comments should be integrated and the final version be made available to the Project Management Board and the Project Office in the week before the deliverable is due, for a final check.

- It is up to the partner responsible for the deliverable to ensure that this schedule is maintained

4   QUALITY CONTROL FOR PUBLICATIONS

Due to the significance of the dissemination and exploitation activities in achieving the ultimate goal of the project – delivering substantial, concrete performance and security improvements for private and hybrid clouds – SSICLOPS manages and coordinates its diverse dissemination activities through a dedicated Work package (WP6). A coordinated dissemination and exploitation of the project results is a key objective for all partners during all phases of the SSICLOPS project. In order to maximize the impact of its results, SSICLOPS will engage in a diverse set of dissemination and exploitation activities throughout and after the duration of the project. These activities encompass open source contributions, standardization contributions and leadership, knowledge transfer and training activities, as well as scientific publications, public demonstrations, commercial evaluations and others.

Dissemination quality control focuses on the operational techniques and activities used by those involved in the project to:

- Establish publication rules for the duration of the project.
- Fulfil the requirements for quality.
- Fulfil the rules for acknowledging the EC funding.
- Fulfil the rules for Open Access.

For those disseminations where (part of) the costs for the preparation and presentation are claimed under SSICLOPS, the following rules apply **during the duration of the project and 3 months afterwards**. Disseminations comprise of making any project material available to others outside the project, e.g., in the form of presentations, paper submissions or code (see section 5). There is further information in the Consortium Agreement.

4.1   Rules for Publication and Presentation

The following rules have been established for ensuring that publications are of a high quality and do not infringe the IPR held by another partner:

1. The authors must send sufficient information at least 14 days in advance of a publication submission or presentation to the General Assembly by email to ga@ssiclops.eu. For a publication, submitting the paper into a review process counts as a dissemination. Submit as much information as is available, but at least:
   - planned authors
   - title
   - abstract
   - planned dissemination venue

2. The Project Office tracks the progress of each such dissemination request on GitHub as an issue/milestone under the management repository: https://github.com/SSICLOPS/management/issues and assign it to the main author of the dissemination. The Project Office will also indicate in the tickets when the review period started and ended, and any objections that were raised.

3. The main author is responsible to keep this issue updated as the dissemination is worked on, e.g., by updating the information in the issue, by uploading draft versions for the General Assembly to review, etc.

4. The General Assembly reviews the material in the GitHub issue during their evaluation time. Any objections must be raised within 7 days based on the grounds described in the CA by email to ga@ssiclops.eu. The Project Office will monitor whether any objections are raised and update the respective issue accordingly. Here is the list of currently active publication requests.

5. The main author is responsible to keep this issue updated after a dissemination is submitted for peer review, especially if it happens to get rejected, changed and resubmitted, etc. For resubmission, the authors should create a new GitHub issue that references the issues of any earlier submission(s).

6. The authors must include the acknowledgement and disclaimer texts in their dissemination exactly as below.

7. For peer-reviewed scientific publications, the authors must comply with the EU's open access policy.

8. After a dissemination has happened, the **authors** must **add their publication to the project bibliography** (ssiclops.bib under SSICLOPS/management/dissemination). This has the canonical list of project output.

4.2   Acknowledgement

Acknowledgement to the EC for its funding must be clearly indicated on every publication and presentation for which project funding will be claimed.

Typical text is as follows:

This [paper/presentation/...] has received funding from the European Union's Horizon 2020 research and innovation programme 2014-2018 under grant agreement No. 644866.

4.3   Disclaimer

It is recommended to include a disclaimer on every publication and presentation.

Typical text is as follows:

This [paper/presentation/...] reflects only the authors' views and the European Commission is not responsible for any use that may be made of the information it contains.
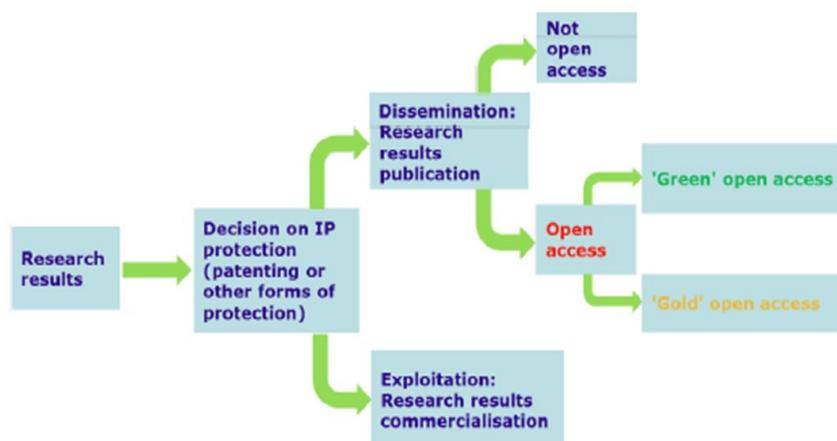
4.4   Open Access

The EU recommends open access publications and the project has committed to follow an open access policy in its Description of Action. Open access to scientific information is expected to bring benefits in terms of:

- Acceleration of the research and discovery process, leading to increased returns on R&D investment.

- Avoidance of the duplication of research efforts, leading to savings in R&D expenditure.

- Enhanced opportunities for multi-disciplinary research, as well as inter-institutional and inter-sectorial collaborations.

- Broader and faster opportunities for the adoption and commercialization of research findings, generating increased returns on public investment in R&D and the potential for the emergence of new industries based on scientific information.

Open access can also increase openness and transparency, thereby contributing to better policymaking, and ultimately benefit society and citizens.

SSICLOPS understands open access as being the practice of providing on-line access to scientific information that is free of charge to the end-user. In the context of R&D, this scientific information' refers to peer-reviewed scientific research articles (published in academic journals) and to scientific research data (data underlying publications, curated data and/or raw data).

The first decision to be taken by the project on whether to publish open access documents will come after the more general decision on whether to go for a publication directly or to seek first protection using Intellectual Property Rights. If the scientific research will not be the subject of IPR, but will rather be published directly, then the project is aware that open access must be granted to all scientific publications resulting from Horizon 2020 actions.

To the extent that this is feasible, given the constraints applied by the publisher of journal articles and conference proceedings, SSICLOPS will use the *"gold"* open access approach to peer-reviewed scientific research articles. This means that an article is immediately provided in open access mode by the scientific publisher. The associated costs are shifted away from readers, and instead to (e.g.) the university or research institute to which the researcher is affiliated, or to the funding agency supporting the research.

To the extent allowed by the publisher, these and other scientific publications will also be made available on the project Website (*"green"* open access approach). This process may be delayed ("embargo" period), as some scientific publishers may wish to recoup their investment by selling subscriptions and charging pay- per-download/view fees during an exclusivity period. In addition, partners themselves may want to delay this open access until they have exploited the findings through conference papers and journal articles.

Most universities provide their own repositories, and require their use, so university or research institute partners will first check their own library services.

For company partners, a number of "public" repositories are available: http://www.opendoar.org/. For example, some partners have previously used arXiv.

In the following link is a list of repositories where partners can post their publications, which *"Unless otherwise noted, they accept relevant deposits regardless of the author's institutional affiliation"*:

http://oad.simmons.edu/oadwiki/Disciplinary_repositories

You can find e.g. the category "Computer science" there.

There is also good information on open access publishing at http://libguides.aalto.fi/oa.

5   QUALITY CONTROL FOR OPEN SOURCE CODE

5.1   Writing and releasing Open-Source Code

Open-source contributions are one main avenue of dissemination. Private clouds are built from commodity computing facilities, networking and storage hardware, and a carefully assembled and integrated collection of software virtualizes this hardware collection and provides functions to efficiently and concurrently execute, monitor and manage the workloads of multiple, isolated tenants. Most if not all of the software used for this purpose is open source. Although some vendors such as Microsoft or VMware offer proprietary, integrated software solutions for cloud infrastructures, the closed-source nature raises significant security concerns, because the security aspects of the systems cannot be independently audited. Substantial licensing costs are also a factor that prevents such deployments from being appropriate for many deployments.

Open source software for cloud infrastructures avoids these issues, and is already able to deliver features and performance that is often on par with proprietary offers. This software includes operating systems used by cloud compute and storage resources (e.g., Linux and FreeBSD), compute hypervisors (e.g., Xen, KVM, BHyVe), network devices (e.g., Open vSwitch), SDN network controllers (e.g., Floodlight, POX), and SDN frameworks (OpenNFV, OpenDaylight). It also encompasses cloud-computing middleware such as OpenStack or CloudStack, frameworks for distributed computation and to support other workloads investigated by Work package S (WP4), such as Hadoop or HYRISE.

The research undertaken in the SSICLOPS project will be prototyped and evaluated in open source federated cloud infrastructures, using synthetic workloads and real-life scenarios. These implementations of SSICLOPS results in open source are not only necessary for evaluation - they themselves form one of the key results of the project, which are required for it to achieve its overall goals.

SSICLOPS will therefore make any improvements to existing open source software available for others to use, and will where possible attempt to push such modifications "upstream" to the various organizations that maintain the respective software, for future inclusion in their main releases.

Open source contributions become much easier to make when the individuals that propose them are known and trusted community members with a track record of solid technical contributions. The SSICLOPS project assembles many such individuals.

For each open source project that SSICLOPS will disseminate open source code back to, we will identify at least one project participant who will act as the main Technical Reviewer for contributions back to that project. Typically, this SSICLOPS participant would be someone who has "commit rights" or is otherwise already engaged with and known by the other contributors to that particular open source project. He or she is familiar with the particular expectations on code quality, coding style, specific technical details that a given open source project has, e.g., [1] for Linux, [2] for FreeBSD, etc.

The Technical Reviewer will provide feedback on the code quality and structure before SSICLOPS code will be disseminated, and the other project participants are expected to take that feedback into account and refactor their code as needed. Project participants are encouraged to contact the Technical Reviewer for a given open source project as soon as possible, in order to structure their code correctly from the beginning and to avoid the need to refactor large amounts of code prior to dissemination, causing delays.

This Technical Review can happen independently of, e.g., in parallel to, the regular open source dissemination review performed by the General Assembly, because it will generally not affect the technical content of the disseminated code, only its shape and quality. In rare cases where the Technical Review does cause changes to code the General Assembly may have already approved for dissemination, the General Assembly will need to re-review.

The intention of this process is to ensure SSICLOPS only disseminates high-quality open source code that can be accepted by the upstream open source projects without major changes, thus allowing the project to optimize its results and impact.

5.2   Publishing Open Source Code

The same process as described above for document publication is also followed for Open Source Code dissemination.

The only difference is that a code dissemination must be announced to the General Assembly **30 days** (instead of 14 days for document publications) before the planned publication date, and the General Assembly has **15 days** (instead of 7 days) to raise objections.

Here is the list of currently active Open Source Code publication requests.

6 REFERENCES

[1] Linux kernel coding style. https://www.kernel.org/doc/Documentation/CodingStyle

[2] FreeBSD Kernel Developer's Manual.
https://www.freebsd.org/cgi/man.cgi?query=style&sektion=9