

NEXOF-RA

*NESSI Open Framework – Reference Architecture*

IST- FP7-216446



## **Deliverable D5.1b**

Open Architecture Specification Process

Definition Document

Frederic Gittler (HP Labs)

With contributions from most NEXOF-RA Partners

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BASELINE	21-Jul-08	NA	Multiple NEXOF-RA partners	Baseline for template in appendix
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A	15-Oct-08	Issued	F. Gittler (HP Labs)	Release of version D5.1a
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## EXECUTIVE SUMMARY

By design, the construction of the NESSI Open Service Framework (NEXOF) Reference Architecture must use a process to promote the active involvement of external parties. This is driven by reasons, which can be summarized as follows:

- Inclusion of external parties to allow the project to leverage the best-of-breed architectures and technologies thereby enhancing the quality and applicability of the overall architecture
- Inclusion of research groups to foster alignment of research initiatives, to address gaps and to enable an effective integration of future innovation
- Inclusion of relevant stakeholders to enhance the level of adoption of the overall architecture

This is implemented through a combination of governing and contributing mechanisms.

- The governing aspects are handled through the Architecture Board
- The contribution aspects are handled through the Open Construction Cycles (OCC) of the Open Architecture Specification Process (OASP)

AB: The Architecture Board has the mission of ensuring the requirements, approaches, topics, and timing of the deliverables are fit for purpose; i.e. that they do support the objectives described in the NESSI Mission and Vision in an efficient manner. One particular focus is the technical coordination with partner research initiatives. The AB is the technical decision making authority of the project and includes architects from the key contributing external initiatives. The AB is organized as a team with regular face-to-face meetings and phone conferences.

OCC: Open Construction Cycles aim at speeding up the process of creating a widely shared open Reference Architecture and of accelerating the adoption of research to complete the state-of-practice in a coherent and consistent open service framework. The construction process is centred on the parallel execution of OCCs, each focused on a specific, well defined topic. Any party can participate in the construction cycles, including academic institutions, industry players of all sizes, and individuals. All contributions must be open to be freely reused. While participation is voluntary and is not be funded by the NEXOF-RA project, the process is driven, managed and supervised by members of the NEXOF-RA project team, under the technical supervision of the NEXOF-RA Architecture Board.

Beyond these two mechanisms, NEXOF-RA implements other collaboration actions, which are also part of normal project activities, but do not have specific governance processes.

This document describes the processes related to the OCC as well as those related to the Architecture Board.

## Document Information

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<b>Authors (Partner)</b>	Frederic Gittler (HP Labs) + many other contributors in the project		
<b>Responsible Author</b>	Frederic Gittler		<b>Email</b> Frederic.gittler@hp.com
	<b>Partner</b>	HP Labs	<b>Phone</b> +33 (0)476 144 289

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## 1 INTRODUCTION

NEXOF-RA is embracing the core values and strategy of the NESSI ETP initiative, described in its vision, mission, and Strategic Research Agenda (SRA). NEXOF-RA has the deliberate intent to interact with the wide community sharing the views defined in the NESSI Vision. This starts with the structures which have the primary and explicit intent of contributing to the agenda of the NESSI ETP, e.g. NESSI Strategic Projects, NESSI Working Groups, and the NESSI Community. The NEXOF-RA project implements a variety of mechanisms to reach its primary objective, the construction of the NEXOF Reference Architecture, with the following groups:

- **Community:** Implementation of an Industrial Advisory Board (described in the Description of Work (DOW) and reported in D5.4a “Industrial Advisory Board Report”), as well as the specific actions of the Dissemination Work Package (WP11)
- **NESSI Working Groups (NWG):** Direct contact between these groups and the Research Work Packages (aka. Problem Work Packages; i.e. WP1 to WP4). This is further described in the DOW and reported (as applicable) in the deliverables of the Research Work Packages. Direct or indirect contribution of these bodies (through their members) to the Open Construction Cycles (OCC) is encouraged.
- **NESSI Strategic Projects<sup>1</sup>:** At the decision-making level, these projects are full members of the NEXOF-RA Architecture Board (further described in this document and reported on in D5.3a “Architecture Board Report”). Day-to-day relationships are handled through direct contacts with the Research Work Packages as described in the DOW and reported in the deliverables of these work packages. These projects are further encouraged to contribute directly or indirectly through their members to the OCC, especially as the topics and timing are selected based on their readiness to contribute.
- **Other External Parties:** The mechanisms applicable to NWG (described above) are applicable, except that no pre-established list has been defined in the DOW.

NEXOF-RA uses an Open Architecture Specification Process (OASP) to support of this objective. To reach an optimal efficiency, this process is based on collaborative relationships, where both NEXOF-RA and the contributing parties go beyond their common vision to adopt common approaches, such as shared principles, definitions, models, architectures, standards, and processes. The Open Architecture Specification Process is designed to drive results within a consensus-based open process. The OASP defines the implementation mechanisms for the OCC.

Through these mechanisms, the project aims to achieve:

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<sup>1</sup> This is formally defined as Strategic Contributors; i.e. contributors which share a common vision with NEXOF-RA and, formalized in a contract or other form of formal commitment, commit resources to contribute to and more generally work with NEXOF-RA.

- Inclusion of external parties to leverage the best-of-breed architectures and technologies, thereby enhancing the quality and applicability of the overall architecture
- Promotion of the Reference Architecture as an attractive baseline for further developments, with the aim of enriching the set of functionalities further over time
- Inclusion of the relevant stakeholders to enhance the level of adoption, and thus relevance, of the overall architecture

The Open Architecture Specification Process is inspired by processes used in standardization bodies such as OASIS, W3C, or OMG. NEXOF-RA and these bodies share a common goal of building through a community to achieve results which are both consensual and very accurate. However, the project could not simply adopt these processes cannot simply be adopted due to the very different objectives of NEXOF-RA and standardization bodies; e.g.:

- NEXOF-RA is required by contract to define the architecture within the timeframe of the project, whereas standardization bodies do not have this requirement
- NEXOF-RA is driving a process of alignment between various contributors to the NESSI Open Framework, whereas standardization bodies play a more passive role for their community
- NEXOF-RA has to integrate technologies which are at various points on the maturity scale (from well established standards to fluid topics still subject of research), whereas standardization bodies do not deal with technologies before they reach a certain level of maturity.

The Open Architecture Specification Process is based on two profiles of external involvement: governing and contributing. The governing roles in the process aim at ensuring the requirements, approaches, topics, and timing of the deliverables are fit for purpose; i.e. that they do support the objectives described in the NESSI Mission and Vision in an efficient manner. The contributing roles in the process aim at speeding up the process of creating a widely shared open Reference Architecture and of accelerating the adoption of research to complete the state-of-practice in a coherent and consistent open service framework.

## 2 PRINCIPLES

### 2.1 Base Principles

An essential aspect of the Open Architecture Specification Process is its operation within the defined mission of the Reference Architecture activities of NEXOF-RA. It is important to stress a few of these elements, which are binding for the whole project:

- NEXOF-RA is not a standardization body. The Reference Architecture activities of NEXOF-RA include the evaluation and selection of consolidated standards based on compatibility and architectural compliance, augmented by contributed specifications committed to be submitted to standardization bodies. NEXOF-RA will furthermore identify gaps and alignment problems in consolidated or proposed standards, and issue recommendations to be presented to standardization bodies through appropriate members of these organizations. Specifications or amendments to standards which have not been approved as standards at time of publication may only be included or referred to on a provisional basis<sup>2</sup>.
- The NEXOF-RA process is biased towards an adoption process, in the following order:
  - Combination of standards submitted by external parties
  - Consolidated standards
  - Specification proposals submitted by external parties
  - Proposals developed within the project.

This order of preference does not override the principles of coherence, consistence, and adaptability (ability to adapt to both evolutionary and revolutionary changes) which remain paramount.

- The NEXOF-RA process shall remain open, which means it must implement proper channels to consider all contributions. The contributions themselves should be open; i.e. they shall not include or imply the use of any proprietary components in the implementation of what is defined by the contribution. However, NEXOF-RA shall not implement a design by committee process.
- The NEXOF Reference Architecture must not be a static specification and must allow for the integration of changes and evolutions which result from research or changes in the state of practice.

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<sup>2</sup> The model adopted for the Reference Specifications, based on the use and combination of patterns, allows for the integration of a wide set of technical solutions with various levels of maturity and stability.



## 2.2 Contributors

Entities contributing to the construction of the Reference Architecture are organised in two groups which differ in the intensity of their participation in the process. Namely:

- **Strategic Contributors:** This group consists of entities which have a formally specified objective of contributing to the NESSI Open Framework and accepted specific conditions to this contribution (including open standards and open software). Admission to this group is by invitation only and requires formal approval by the NEXOF-RA Management Board, and is conditional on the establishment of a binding agreement or contractual clause. This shall be in the form of specific commitment in their Description of Works for the NSPs, and a Letter of Intent for all the others. This group currently includes only the FP7 call 1 projects which are running and have been formally endorsed by the NESSI ETP as Strategic Projects; i.e. EzWeb, MASTER, RESERVOIR, SLA@SOI, and SOA4ALL. Members of this group are core partners in the creation of the Open Reference Architecture, creating the basis of an NEXOF-RA extended team. They are involved in most phases of the Open Architecture Specification Process and are members of the NEXOF-RA project Architecture Board.
- **Contributors:** This group consists of all parties who wish to contribute to the construction of the NESSI Open Framework, regardless of their formal links with NESSI or Europe. This group includes both the horizontal NESSI Working Groups (NWGs) and research projects (including, but not only, wide research programmes such as IST, Eureka, CELTIC and ITEA) which have a stated objective to contribute to the NESSI Open Framework. This group mainly contributes through individual participation in the Open Construction Cycles of the OASP, as well as group-level ties with the Research Work Packages (WP1 through WP4).

### 3 NEXOF-RA ARCHITECTURE BOARD

The governing role of the Open Architecture Specification Process is implemented through the NEXOF-RA Architecture Board (AB), which has authority over all technical decisions in the project.

#### 3.1 AB Membership

This body includes both the key architects of the project as well as the key architects of the major contributing initiatives which have made a formal commitment to work with and contribute to NEXOF-RA (i.e. Strategic Contributors). This external group currently includes only the NESSI Strategic Projects, but if necessary can be extended to include other initiatives.

#### 3.2 AB Role

The Architecture Board is the technical decisional authority of the project.

The project requires a review of all major technical deliverables prior to their release as final documents. As such, this board is much more than just a consultative body. Members of this body are virtually part of the project, and are regarded as project partners, even when they do not account for their time and costs on the project.

#### 3.3 AB Meetings

The Architecture Board meets face-face about every trimester, by default in the NESSI Office in Brussels. These meetings can also be called for other locations, after discussion and approval of the AB. Phone conferences can be organized as required to meet important project milestones, with sufficient notice to the AB.

The AB meetings and phone conferences are organized and run by the Chief Architect. The AB meetings each have a specific agenda and results are recorded in minutes. To ensure an open discussion these documents remain private to the project and are an exception to the blanket project policy of public documentation.

The Architecture Board minutes for the first year of the project are compiled within D5.3a "Architecture Board Report", part of the project deliverables.

## 4 OPEN CONSTRUCTION CYCLES

### 4.1 OCC Concept

The open contribution aspects of the project are handled through the Open Construction Cycles (OCC) of the Open Architecture Specification Process (OASP). The project approaches the construction of the NEXOF Reference Architecture in a modular manner. The Research Work Packages of the project (WP1 through WP4), in coordination with the owners of the model and architecture (WP6 and WP7), identify functionalities which should be investigated using an open process. These topics are identified by also taking in consideration the input of the Strategic Contributors, both in terms of topics and in terms of timing. Further guidelines on selection of topics include:

- State-of-practice and research on a topic
- Level of consensus or complexity (multi-facetted problem) of the topic
- Dependency between topics
- Foundational nature of the topic
- Expertise of the project teams
- Willingness of external parties to contribute

Not all aspects and modules of the architecture are subject to OCCs. The project selects only those topics where the open process is most suitable and needed, taking in consideration both technical and time/effort constraints. There is no expectation on uniformity in the coverage of topics relative to one-another.

Therefore, each OCC starts with the clear definition of a set of requirements and functionalities, which is referred to as a topic<sup>3</sup>. OCC topics are made public through an Invitation to Contribute.

Any party can participate in the construction cycles, including academic institutions, industry players of all sizes, and individuals. There is no limit with respect to organizational structure or geographic origin. The only requirement is a commitment to contribute in a proactive and constructive fashion. All contributions must be compatible with the inclusion of results in an “open” document with derivative rights<sup>4</sup>. While participation is voluntary and is not be funded by the NEXOF-RA project, the process is driven, managed and supervised by members of the NEXOF-RA project team, and is under the technical supervision of the NEXOF-RA Architecture Board.

<sup>3</sup> Legitimate topics for OCCs may also include deliverables which are not designed to enrich the architecture, such as the identification of gaps. These points should however be limited in number and scope due to project imperatives.

<sup>4</sup> The project has selected the Creative Commons Attribution 3.0 License. To view a copy of this license, visit <http://creativecommons.org/licenses/by/3.0/> or send a letter to Creative Commons, 171 Second Street, Suite 300, San Francisco, California, 94105, USA

## 4.2 Publication and Registration

While the original design of the process called for an asynchronous execution of OCCs, the project has opted for a grouping of OCCs in batches, with the primary benefit of pooling up dissemination efforts and thus maximizing efficiency, exposure and return.

A document has been created to present the purpose of the project, encourage participation, list the benefits of participating, introduce the open process, provide instructions on how to contribute, and describe each topic (see appendix).

The document used to issue the invitation to contribute, whether based on the template or not, must include the following text: “The copyright for your contributions must allow the publication of the NEXOF Reference Architecture as an open document with derivative rights (the project is currently using the Creative Commons Attribution 3.0 License)” and “NEXOF-RA will not be able fund your participation to the project”.

Each batch of Invitations to Contribute is distributed to the widest community possible. This community includes:

- The NESSI community (members and parties which have registered interest)
- Partner projects (NSP, S-Cube)
- Framework Programme research projects
- Research mailing lists (dbworld, seworld)
- Specific topic communities (Working Groups, ...)
- Promotion on the project website
- Ad-hoc distribution

The Invitation to Contribute is furthermore advertised on both the project website (<http://www.nexof-ra.eu>) and the NESSI website (<http://www.nessi-europe.eu>) until the registration phase closes.

During the 2 months following the publication of the Invitation to Contribute, prospective contributors are invited to register their interest and formulate a position through a position paper. During this period, the coordinator for each topic answers questions, reviews registrations and submissions. At the end of this phase, the coordinator identifies the members of the Investigation Team, which is the operative body of the next phase.

Registration is performed through the project website (<http://www.nexof-ra.eu>).

## 4.3 Investigation Teams in Action

The coordinator for each topic invites parties which have submitted a relevant position paper to join force in the Investigation Team (IT). The coordinator normally becomes the lead of the IT. Each IT will work together on refining their

topic, build input for the Reference Architecture, and complete the mission set in their agenda.

ITs have an initial meeting (kickoff) where they meet for the first time. This meeting serves as the transition between the expression of interest and the construction of common artefacts. During this meeting, contributors are given the context in which they will collaborate including relevant project information. Each of the ITs (or cluster of ITs<sup>5</sup>) also meets separately to discuss the position papers, confirm the scope of the team, and establish an initial work plan. Due to the (short) duration for the engagement and travel constraints, this is often the only time the Investigation team meets face-to-face and is therefore very important to establish efficient team dynamics.

During the following 2 to 3 months, the Investigation Team meets physically or over the phone, or exchanges email in order to formulate a common position based on the consensual convergence of various proposals and viewpoints. This contribution is normally aimed at enriching the Reference Architecture; however, due to the specific structure of the Reference Model and Reference Specification and the strong internal coupling in the execution of the project, this contribution will often take the form of an input to the Research Work Package associated with the IT. This Work Package will then refine this contribution to become the basis for the relevant fragments of the Reference Architecture. In all cases, where the results of the Investigation Team are input to the NEXOF-RA project there cannot be any guarantee that they will be adopted (with or without amendments). The project will however refrain from arbitrary changes.

The IT leads, which are NEXOF-RA project members, will put in place the mechanisms which are best adapted, in their opinion, to the dynamics of the team. These mechanisms should remain lightweight, and be adapted to the team dynamics and short duration. Experience shows that it is best to appoint editors coming from initiatives where the participation to the IT is a funded activity to ensure the dedication of resources. Thus, the editor is often the IT lead.

The NEXOF-RA project will list the direct contributors to the IT artefacts as co-authors of the documents in which their work has been incorporated, even if adapted or transformed. The project will provide an opportunity for these co-authors to opt-out of this accreditation through an email- or web-based process.

The project website will be used as the primary collection point for the various artefacts and collaterals produced by the IT. Most notably, it will be used to collect and archive, by default in a public page or, by request of an IT member and upon decision of the IT lead<sup>6</sup>, selectively in a private section:

- Position papers

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<sup>5</sup> In some instances, where there is a substantial overlap in contributors and closeness in subject areas, the IT lead(s) may decide to combine the operation of several ITs, which is then referred to as a cluster of ITs.

<sup>6</sup> The decision is left to the discretion of the IT Lead due to the committed public nature of all contributions, including discussions.

- Presentations
- Collateral papers
- Meeting minutes
- Documents and other artefacts produced by the Investigation Team

The IT will cease to exist once the artefacts are produced; the OASP does not envision long-running IT, even though nothing prevents a stable core from contributing to successive topics. Teams may however continue to exist in case they elect to engage in prolonged activities, such as collaboration with standard bodies to standardize some of the results, or publication at a conference or in a technical journal. The project may however not be able to continue its participation or support for the team in these situations since it has a finite duration.

The project reserves the right to exclude any member of an IT or dissolve an IT if, on the opinion of the IT lead, progress cannot be achieved in a serene and constructive atmosphere. The IT lead will however first discuss the issues in a candid manner with the involved parties.

**APPENDIX A – INVITATION TO CONTRIBUTE TEMPLATE**

NEXOF-RA

*NESSI Open Framework – Reference Architecture*



**OPEN ARCHITECTURE SPECIFICATION PROCESS**

**OPEN CONSTRUCTION CYCLE #**

**Invitation to Contribute**

**ACTION REQUIRED BY << date >>**

Date of publication: << date >>

## 1. OVERVIEW

ICT-based services will fuel economic growth and well-being of citizens in the future of our society. In order to speed up this movement, NEXOF-RA, the NESSI flagship Strategic Project within the EU Seventh Framework Programme, is building an Open Reference Architecture for service frameworks through a collaborative process. We invite you to join with leading actors from both industry and academia, and contribute to this important community effort. In doing so, you will influence and build the service architecture of the future and give visibility to the results of your research and development.

### **DEADLINES – to participate, you must:**

- ▶ register your Intent to participate by << date >>
- ▶ submit a position paper by << date >>
- ▶ plan to join us for the kickoff meeting on << date >>

NEXOF-RA is creating an initial set of Investigation Teams, focusing on each of the topics below. Invitations to join us will be issued prior to the kickoff meeting and will be based on the position paper submitted and your motivation. Each Investigation Team is due to finish work on << date >>.

We seek contribution at this time on the following topics (see section 0 for details):

- << topics organized by section (1 line each)>>

To obtain further information or check if there is any updated document, please visit the NEXOF-RA website ([http://www.nexof-ra.eu/open\\_construction\\_process](http://www.nexof-ra.eu/open_construction_process)). You can contact the coordinator of each topic of interest with additional questions you may have.

We will issue Invitations to Contribute on other topics starting late fall 2008 and throughout 2009. A sample set is included in section 0 at the end of this document.



## 2. BACKGROUND AND RATIONALE

Globally, the question is not whether the delivery of software is shifting towards a service-oriented model, but rather *how* and *when* can this evolution be achieved. Leading industry and academic institutions have joined forces to provide a practical answer to this question, forming NESSI, the European initiative for software and services, which now counts 300 member organizations of all sizes, from SME to multinationals, including academics, technology providers and users.

Based on these requirements, NESSI has defined NEXOF, a coherent and consistent open service framework designed to guarantee quality of service, ubiquitous operation and continuous availability. NESSI has also identified the strategy and plan to build this framework, starting with its reference architecture (RA). The NEXOF-RA project implements the initial phase of this plan.

The strategy is based on open contribution mechanisms which will ensure that NEXOF meets the requirements of the user community, incorporates the best open technologies, and triggers research with concrete, applicable results. Ultimately, this process is essential in gaining wide acceptance and building a very dynamic community.

Contributors to this project will join forces in an active community, fostering partnerships with significant industrial and academic participants. The framework will be promoted and used in significant industrial deployments; this will give visibility and impact to your contributions. All contributors will gain expertise on NEXOF, which will be a key asset once the framework is deployed. Significant contributors will be recognized as co-authors.

The mission of NEXOF-RA is to address comprehensive service-oriented software system architectures and specifications. The approach of the project is to use patterns, partitioning the domain in a series of distinct problems and identifying reusable solutions for each. The project has a parallel focus on the composition of these patterns to create coherent, consistent and interoperable instances of service-oriented software systems. The reference architecture will incorporate technology-oriented open specifications through patterns.

The objective of NEXOF-RA is not to replace standards bodies, but rather to leverage their work, and complement it with a strong focus on coherence and interoperability. Results from NEXOF-RA could be used as input for next versions of current standards or for new ones. Further information can be obtained from the NESSI (<http://www.nessi-europe.eu>) and NEXOF-RA (<http://www.nexof-ra.eu>) websites.

### 3. PARTICIPATION

Participation to our open process is easy:

1. **REGISTER before <<date>>**

Register your intent to submit a position paper and participate to the Investigation Team. A specific web page on the project portal is dedicated to this purpose ([http://www.nexof-ra.eu/register in topics](http://www.nexof-ra.eu/register_in_topics)). Once registered, you may be contacted by one of our project members to discuss your participation. Participation is open to all motivated parties, including individuals, organizations and project consortiums.

2. **SUBMIT before <<date>>**

After registration, submit a position paper describing in a few pages your background in the domain as well as a summary of your intended contribution. The position paper can be as long as required, but must contain a summary not exceeding 4 pages in case the document is longer. The papers submitted must not contain any confidential or proprietary information. Instructions on how to submit the position papers will be available on the dedicated section of the project portal ([http://www.nexof-ra.eu/open\\_construction\\_process](http://www.nexof-ra.eu/open_construction_process)).

3. **PARTICIPATE between <<date>> and <<date>>**

After reviewing all the position papers, the project will issue invitations to join the Investigation Teams. The kickoff meeting for the Investigation Teams will be held in Brussels on <<date>>. Effective participation requires the following: attend face-to-face meetings, participate to phone conferences, actively engage in email discussion on the topic, perform off-line investigations or research, and co-author sections of the document. You are requested to keep the same representative through the duration of the activity. The Investigation Teams are expected to complete their work by <<date>>.

The copyright for your contributions must allow the publication of the NEXOF Reference Architecture as an open document with derivative rights (the project

is currently using the Creative Commons Attribution 3.0 License). We encourage you to check eligibility as part of one of your funded activities since NEXOF-RA will not be able fund your participation to the project.

#### 4. SCOPE AND SPECIFIC EXPECTATIONS OF THIS CALL

The following pages provide details for each of the topics for which we invite you to contribute.

##### 4.1 <<Topic>>

**2 pages maximum – DO NOT REDUCE FONT SIZE!**

Contact – <b>Name – email – telephone (optional)</b>
Overview – <b>Describe the topic of the call in 5 lines maximum. This must be self-standing as it will be used in a short executive overview of the program</b>
Problem Statement – <b>describe the problem area and approach. Please include large pieces (e.g. position papers, ...) as appendix</b>
Scope – <b>describe how this area relates to other areas. What is in-scope and out-of-scope</b>
Contributions – <b>describe here the kind of contributions expected from the Investigation Team, e.g. model, patterns, selection of standards, or interface specifications</b>
Baseline – <b>identify the (domain specific) baseline on which the Investigation Team will build its contribution. This includes standards or solutions assumed as a basis</b>
<b>Visit URL for further information</b>

## 5. TOPICS FOR FUTURE CALLS

The following list includes a series of topics which could potentially be the subject of an Invitation to Contribute issued later. Actual topics will be determined and communicated at a later date.

- o <<topics>>