

D6.2.1

Report on Standardization Activities

Version 1.1



WP 6.2 Coordination of Standardization Dissemination Level: Public

Lead Editor: Julian Gallop, CCLRC

3 October 2006

Status: Final

**SIXTH FRAMEWORK PROGRAMME
PRIORITY IST-2002-2.3.1.18**



Information Society

*Grid for complex problem solving
Proposal/Contract no.: 004293*

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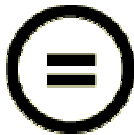
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Context

Activity 6	Dissemination, Liaison, Leadership and Standards
WP 6.2	Coordination of Standardization
Dependencies	This document makes use of work that was done in WP2.2, WP3.1, WP4.1, WP4.2, WP4.3 and WP4.4. It affects future work in WPs 4.1, 4.2, 4.3, 4.4, 5.1, 5.4 and 6.4.

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Acknowledgements for checking previous versions: internal report ID6.2.1 Antonis Litke (ICCS/NTUA), Per-Oddvar Osland (TN) and Aenne Loehden (USTUTT); D6.2.1 v1.1.1 Christian Loos (UHOH) and Victor Villagra (UPM)

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Although reviewers are not normally also authors, in this case the reviewers were appropriate for the task and their contributions to the report were localized.

Version	Date	Authors	Sections Affected
1.0.1	15/2/06	All	ID6.2.1 delivered
1.1.1	13/9/06	All	Restructured part of section to promote 5.1.x sections by one heading level; adding in further detail about standards in focus; revised the standards currently in focus to reflect current commitments; adding in detail about standards (a few standards remain to be completed here); adding in detail about standards organisations;

1.2	27/9/06	All	changes to reflect that the planned EGA and GGF merger has taken place. Dealt with internal review comments and completed the usage and notes on standards.
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Approved by: QM

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Abbreviations

Akogrimo	Access To Knowledge through the Grid in a Mobile World
A4C	authenticating, authorizing, accounting, auditing and charging
GCSG	Grid Standards Co-ordination Group
TC	Technical Committee, a level of hierarchy used in several standardization bodies
VO	Virtual organization
WG	Working Group, a level of hierarchy used in several standardization bodies
WP	In the context of Akogrimo, a work package, usually referring to a specific one, such as WP6.2

This document is inevitably abbreviation heavy. Rather than repeat them all here, the relevant abbreviations are either standards organizations (and so explained in alphabetical order in section 2.2) or standards (listed in Annex A)

1. Summary

This document presents a report on standardization within Akogrimo thus far. The early stage of the project has been characterised by standards understanding and adoption but also in this stage, the EU Grids Standards Collaboration Group has been set up. The Project has now prepared a set of topics on which there will be some standardization focus – this is described in sections 4 and 5. Outlines of relevant standardization bodies (section 2.2) are provided and a list of relevant standards is provided in Annex A.

2. Standardization context

It is important to understand the environment in which standardization takes place. This section outlines a number of general points and some bodies in particular, which are relevant to Akogrimo.

2.1. Scope

Whether in IT or other activities, a prime purpose of standardization is to achieve interworking, enabling a user to rely on a specification or enabling two products to work in conjunction with each other under defined conditions. Although standards in a wider sense may have other purposes such as specifying that a particular minimum safety level be met, we are primarily concerned with interworking here. In complex situations where numerous products are required from multiple sources, a defined strategy is essential. Standardization can provide a publicly available, neutrally sponsored definition which multiple suppliers can agree to use.

Although the common word for the resulting specification is a standard, some organizations use different words for this. For example, W3C uses the term recommendation for its output.

Despite the obvious disadvantage involved, we do include in this document specifications which cannot be described as neutrally sponsored, where they fulfil a currently indispensable function – for example many of the WS-* specifications are produced by a small number of major industrial players.

Standardization output can include not only a standard protocol or API itself, but also use cases, profiles that group standards for the purpose of increased interoperability, non-normative information documents and guidelines for standards.

In this document, we use the spelling standardization – with a z – which is the preferred spelling used in the Oxford English Dictionary and also a number of standards bodies, for instance, ISO, ETSI, BSI and ANSI.

2.2. Organizations

2.2.1. Standardization bodies relevant to Akogrimo

This section provides a summary of standards organizations relevant to Akogrimo, in alphabetical sequence.

2.2.1.1. EGA

The Enterprise Grid Alliance (EGA) (<http://www.gridalliance.org/>) is one of the two organizations recently merging to form the OGF (section 2.2.1.9). It was an open, non-profit, vendor-neutral organization formed to develop enterprise grid solutions and accelerate the deployment of grid computing within enterprises.

By focussing on the needs of enterprise users, the EGA aimed to enable businesses to realize the many benefits of grid computing such as faster response to changing business needs, better utilization and service level performance and lower IT operating costs.

Initial focus areas included reference models, provisioning, security and accounting.

EGA deliverables were developed through its Working Groups.

In practice, Akogrimo was not involved with EGA partly because its main emphasis was on Enterprise Grids, rather than pervasive, open Grids.

2.2.1.2. ETSI

The European Telecommunications Standards Institute (ETSI) is one of the three European Standards Organizations and is officially responsible for standardization of Information and Communication Technologies (ICT). It cooperates with other regional standards bodies in this field. It has 500 industrial members throughout Europe.

Its output includes standards which pass through a wide consultation process and also “New Regime” outputs which follow a fast, restricted approval procedure.

It is an organizational partner in 3GPP (see 2.2.1.12) and adopts its output.

A recent development relevant to Akogrimo is that ETSI has formed a Technical Committee (TC) for Grids and is producing a strategy for Grids standardization. Two meetings have been attended by Akogrimo partners (CCLRC, UHOH and TID) in order to gain an early understanding of the process and implications. It has two work items for Grids: one is for deficiency identification of the current Grids standards landscape and the other is for Grids plug testing. This TC is a possible alternative route for certain submissions that Akogrimo may wish to make.

2.2.1.3. GGF

The Global Grid Forum (GGF) (<http://www.ggf.org/>) is one of the two organizations recently merging to form the OGF (section 2.2.1.9). GGF had research and working groups in the following areas: Applications and programming models and environments, Architecture, Compute, Data, Grid Security, Information Systems and performance, Peer-to-Peer, and Scheduling and resource management.

The GGF was modelled along the lines of the IETF, for example the Birds of a Feather (BOF) meetings of interested parties to determine if a working group (WG) should be established.

Several working and research groups are of interest to Akogrimo including: the several Open Grid Services Architecture (OGSA) groups, Grid Resource Allocation Agreement Protocol (GRAAP), several groups in the Data Area, Grid Economic Services Architecture group and groups on Resource Usage and these continue in OGF.

The GGF also has community groups including the Telecomm Community Group (Telco-CG) – see also section 5.7.

2.2.1.4. IETF

The primary focus of the Internet Engineering Task Force (IETF) (<http://www.ietf.org/>) is to standardize protocols for the Internet.

Outputs are developed by Working Groups and the results are RFCs, which can be Informational, Experimental or Standard, the latter undergoing the most rigorous process. There are now several thousand RFCs.

Many RFCs underly Grids but several are of particular interest to Akogrimo, including those on A4C, policy, session initiation (SIP), presence and Mobile IPv6 (see Annex A). Some of the planned outputs from Akogrimo are expected to be directed towards IETF.

2.2.1.5. ISO

The International Organization for Standardization (ISO) (<http://www.iso.org/>) is concerned with all fields of standardization as diverse as the speed of photographic film and organizational process quality. ICT standards are established by the joint technical committee (JTC1) between ISO and the International Electrotechnical Commission (IEC).

The distinctive aspect of ISO is that its membership consists of national standards bodies. Individuals and organizations join the appropriate national committee, which is generally open. The process is formal, allows time for intra-national consultation and can be long lasting. One way of working is that it approves initiatives taken by subject-specific bodies – an example is that ISO 15000 is a suite of ebXML OASIS standards.

Although standards used in Akogrimo are generally drawn from subject-specific standards bodies such as the other organizations presented here, its all-encompassing nature makes it worth noting here.

2.2.1.6. ITU-T

The International Telecommunications Union (ITU) is concerned with international agreements on telecommunications and the ITU-T sector is concerned with standardization. This replaced the former CCITT.

In general the ITU-T outputs are at a lower level than Akogrimo needs to deal with. The X.509 PKI standard (see Annex A) originated in ITU-T but is now managed by IETF.

2.2.1.7. Liberty Alliance

The Liberty Alliance <http://www.projectliberty.org/> is an alliance of more than 150 companies, non-profit and government organizations from around the globe. The consortium is committed to developing an open standard for federated network identity that supports all current and emerging network devices.

Liberty is an open body working to address the technical, business, and policy challenges surrounding identity and web services. Its output includes: open technology specifications, business guidelines documents, privacy controls built into the specifications, privacy & security best practices, enabled compliance with global privacy legislation and industry regulations, Liberty Interoperable Certifications that validate implementations and drive adoption.

As discussed in the Akogrimo architecture document ([2]), the identity model used takes into account the integration of the network and service layers and many different administrative domains, so the Liberty model is not used.

2.2.1.8. OASIS

The Organization for the Advancement of Structured Information Standards (OASIS) (<http://www.oasis-open.org/>). OASIS is a not-for-profit, international consortium that drives the development, convergence, and adoption of XML-based e-business standards. It is currently a primary forum for the development of higher-level XML specifications into accepted standards.

The consortium produces more Web services standards than any other organization along with standards for security, e-business, and standardization efforts in the public sector and for application-specific markets. Founded in 1993, OASIS has more than 5,000 participants representing over 600 organizations and individual members in 100 countries.

Eligible members may observe running Technical Committee (TC) discussions without joining, but to exert voting rights they have to formally join a TC. Most of these administrative processes are enacted via mail or the OASIS homepage.

Several actual or candidate standards sponsored by OASIS are relevant to Akogrimo. They include the following – and the relevant TC is shown where it does not obviously correspond to the name of the standard: Web Services Security (WS-Security); SAML (Security Assertion Markup Language) - Security Services TC; eXtensible Access Control Markup Language (XACML); Web Services Resource Framework (WSRF); Web Services Business Process Execution Language (BPEL); WS-Context and WS Coordination Framework - Web Services Composite Application Framework (WS-CAF) TC; Web Services Notification (WS Notification); Web Services Distributed Management (WSDM) and Electronic business eXtensible markup language (ebXML).

2.2.1.9. OGF

The Open Grids Forum has been recently formed as a result of a merger between GGF and EGA. The merger has been planned for some months and formally took place on 11 September 2006. “OGF's mission is to accelerate grid adoption to ensure business value and scientific discovery.”

The model of Research Groups, Community Groups and Working Groups is inherited from GGF, but they are now grouped into 3 major functions: eScience, Enterprise, and Standards (http://www.ogf.org/gf/group_info/areagroups.php). The other major functions are Marketing, Regional and Operations.

The areas that were relevant to Akogrimo in GGF continue to be relevant in OGF.

2.2.1.10. W3C

The World Wide Web Consortium (W3C) is an international consortium where Member organizations, a full-time staff, and the public work together to develop Web standards. W3C's mission is: To lead the World Wide Web to its full potential by developing protocols and guidelines that ensure long-term growth for the Web. W3C has around 350 Member organizations from all over the world and has earned international recognition for its contributions to the growth of the Web.

W3C has defined the XML family, which underpins many standards involved in Akogrimo, and has defined the architecture and messaging mechanisms for Web Services (architecture, SOAP, WS-Addressing). W3C is also responsible for semantic web developments such as OWL. All these are relevant to Akogrimo.

More recently W3C has initiated a Mobile Web Initiative. This is mainly concerned with presentation on a mobile device, taking into account limited screen and bandwidth, but less concerned with the interworking of services.

2.2.1.11. WS-I

The Web Services Interoperability (WS-I) organization [<http://www.ws-i.org/>] is an open, industry forum promoting Web services interoperability across platforms, operating systems and programming languages, working across industry and standards organizations.

The WS-I has specified a Basic Profile (Version 1.1) and an Attachments and Simple SOAP Binding Profile for guaranteeing basic web services interoperability. In addition, the WS-I is working on a Basic Security Profile and security token profiles to guide web services security interoperability. In general, WS-I does not define standards as such but rather defines profiles that define groups of existing standards for interoperability purposes.

Akogrimo uses a wide range of standards which go beyond the Basic Profile, but nonetheless it is still useful to be aware of the current state of WS-I.

2.2.1.12. 3GPP

The 3rd Generation Partnership Project (3GPP) was formed by a collaboration agreement by a number of existing organizations including ETSI (see 2.2.1.2), who became organizational partners in 3GPP, and is concerned with 3rd generation mobile technology.

Any Akogrimo interest in 3GPP is likely to be best pursued through ETSI (one of the 3GPP partners).

2.2.2. Ad hoc industrial alliances

The WS-* specification family is an example of agreed specifications being defined by ad hoc industrial alliances. It is an effort mainly driven by IBM and Microsoft, along with a number of other organizations, to create an interoperable set of web service related specifications. These specifications are written by a group of industry partners. The effort is not intended as an alternative standardization initiative, and the specifications should eventually move to the appropriate, existing standardization bodies. Microsoft and IBM are heavily involved in this activity and companies have announced the formation of multiple work-groups to design and demonstrate through proof of concept implementations, the integration of systems with WebSphere and .NET frameworks.

This includes initiatives relevant to Akogrimo such as Web Services Policy Framework (WS-Policy).

2.2.3. Other relevant bodies

Other bodies, while not being standards making, are important groups in the field. An example is UbiComp which runs the UbiComp conference series in the field of ubiquitous computing (in 2006, <http://ubicomp.org/ubicomp2006/>).

3. Progress on standardization in Akogrimo

For Akogrimo, it is important both to adopt standards and to influence them based on the experience gained in the course of the Project. Over the lifetime of the Project, the balance of time spent shifts from adoption and observation to contribution and influence.

3.1. Standards monitoring

The Akogrimo architecture makes heavy use of standards from IETF, 3GPP, OGF, OASIS, OMA, W3C and DMTF. The applicability of these standards was first studied in the Project as part of the State of the Art activity, described in [9] and then developed in the Akogrimo architecture ([1], [2], [3], [4], [5], [6], [7] and [8]). These standards are listed in Annex A.

3.2. Collaboration with other EU Grids Projects - setting up GCSG

The Akogrimo Project, with NextGrid, was responsible for founding the “Grid Standards Coordination Group” (GCSG), a group which aims to coordinate and focus standards making between the EU FP6 Grids Unit Projects. In the first wave of these Projects (mainly starting in 2004), the Coordination Group contained one member from each of these projects. To assist the COPRAS Project (responsible for interfacing, cooperation and exchange between IST research projects and ICT standardization), the GSCG supervised a survey on Grid standardization.

This coordination group has presented its work to 3 EU Grids Concertation Meetings, the most recent being September 2006 [11] and a report was produced [10]. The report covers common requirements and common interests between subsets of the projects, cooperation, dissemination, and consideration of requirements of SMEs. This is a continuing opportunity for identifying collaborations.

At the most recent EU Grid Concertation Meeting (September 2006), representatives of more recently started Projects (mainly starting this year) attended and expressed a wish for advice on standardization based on the experience of the older Projects.

3.3. Preparation of strategy for influencing standards

Complementing other strands such as dissemination and exploitation, a major long term influence can be achieved through making use of standardization. The work needs to take into account the long timescale required, which extends beyond the project lifetime because of standardization cycles, and the significant effort required to achieve effective results. To focus these efforts, Akogrimo has identified a few important topics. These choices have resulted from work in the 1st cycle.

For each topic within the focus, the strategy is being designed to answer questions such as which standards organizations and which partners.

The strategy would also identify groups whom Akogrimo should monitor even if they have currently address no current standardization topic. An example of this is the Telecomm Community Group in OGF, in section 5.7.

3.4. Resources

Standardization is potentially resourced in several Akogrimo WPs.

- Technical work in support of standardization – the 4 WPs which each correspond to specific layers - WP4.1 – WP4.4
- Publishing work on specific topics - Dissemination - WP6.1
- Coordination of standardization in Akogrimo – WP6.2
- Working with EU Grids collaboration bodies, such as GCSG – initially recorded under WP6.2, but subsequently recorded under WP6.4

4. Standardization strategy

4.1. Introduction

The Akogrimo Project aims to have a strong influence beyond the Project's lifetime and a vital pathway for this is through standardization. The number of standards that Akogrimo uses is large (see the list in Annex A). Exerting influence on a standard takes significant effort and the number of standardization topics which Akogrimo can practically influence is small. Therefore it is necessary to focus on a small number of standardization topics, which are summarised in section 5.

For each standardization topic, it is necessary to know why it is important to influence its direction; who Akogrimo should cooperate with and work through; and how and when – plan and timetable. Each of the WP4.x work package groups in Akogrimo were asked to provide proposals for standardization topics to be the subject of Akogrimo influence and to fill in a basic template, which aimed to capture the main issues. This information has been summarised in section 5.

4.2. Criteria and aspects of standards topics within Akogrimo focus

The aspects shown in section 5 for each standardization topic are as follows.

Motivation: firstly a short paragraph on what the topic is and the motivation for focussing on it. Standards influence takes a serious amount of time and thus the choice of focus is important.

Standards organization: the planned target standards organization, for example IETF, OGF, EGA. It is also necessary to identify a subgroup within the overall organization or whether a new one would be required and, where this has been done, this is shown.

Involved partners: identifying who (which partner organization and which individual) is primarily responsible for this standardization topic within Akogrimo and is responsible for seeing that appropriate contacts are made outside Akogrimo to influence the process. This person (in cooperation with others) is responsible for the plan for this standardization topic and for putting it into effect. One could refer to this person as the prime mover or champion for this standards topic. Here (in section 5) we show the partner.

Collaboration: who to collaborate with. Standardization needs significant time and effort and collaboration with other people who have identified overlapping problems would enhance the effort available. It may be possible to identify other institutions, other groups within Akogrimo partners or more specifically other EU Grids Projects, which may be identified through the EU GSCG.

WP: work package. Work allocation and reporting needs to be identified within Akogrimo. Although the coordination work within the Project takes place within WP6.2 and coordination with other EU Grids Projects within WP6.4, the work of standardization and technical preparation takes place within one or more of the work packages WP4.1 – 4.4.

Nature of the work: type of contribution. When thinking about the work involved in standardization, changing the specification is the first thing some people think of. But there are other contributions such as:

- add a profile – many standards have these, which in brief means that, to increase the chances of successful interworking, a subset is defined or some flexibility is removed by (for instance) restricting some parameter values.
- add a use case: Some organizations rely on use cases and relate back to them when defining a specification. So a partner could work on a use case but not be involved in the very detailed and time consuming work of producing a specification.
- define its place in an overall framework
- define a collection of standards which need to be used for a given purpose to be fulfilled

Standardization generally involves a long cycle, within which a number of progression cycles may occur, leading to increasingly formal acceptance.

In each case, having identified that a particular topic is to be the subject of Akogrimo influence, a stage of study within the Project is required in order to prepare the technical inputs. In general this is taking place through the architecture work (both and detailed) in the 2nd cycle and based on experience in the prototype. In some cases the technical work has proceeded to some detail. This can take place in parallel with gaining initial involvement in the appropriate working groups.

After that more serious involvement in the standards body will be required and the later timescales will be dominated by the approval processes of the standards body itself.

The timescales in most cases will therefore extend beyond the lifetime of the Project itself.

5. Specific standardization topics within focus

This section contains only those standards for which there is a strong likelihood that Akogrimo plans to influence to create or improve or is already doing so, i.e. that they are to be the subject of standardization focus within Akogrimo

Additional subsections on involvement in a relevant standards group and potential expansion are at the end of the section.

5.1. Integration of network services into a Grid framework

Motivation: Based on what has been learnt in the 1st cycle of the project, the intention is to investigate the possibility of integrating some network services with the Grid Services concept, using a framework like OGSA. The increased interest in the network layers from the Grids standards organizations and a matching interest in Grids from network and telecommunications organizations allow Akogrimo to provide valuable inputs in these areas.

Standards organization: Although the work will require a knowledge of standards within IETF, the result of the integration is expected to be within a different organization. One possibility is a Grids standards organization, such as OGF. Another which has become possible only recently is the Grids TC within ETSI which was formed within the last few months and which agreed its first work item this month (September 2006).

Involved partners: This was initiated by IT-Aveiro and a commercial partner, TID, are also involved. NTUA will provide Grid expertise and IT-Aveiro and TID will provide support for specialised network aspects.

Collaboration: This work is not already being done by another EU Grids Project and is likely to be mainly within Akogrimo.

WP: The knowledge of the network aspects is within WP4.1 and/or WP4.2 but Grid infrastructure aspects are also involved, which implies some work also within WP4.3.

Nature of the work: Potential aspects of the work include: COPS (Common Open Policy Service) usage for the low layers of interaction with the grid service control; and EMS-QoS Broker signalling using OGSA standards.

The status is that this is being defined as part of the 2nd cycle. As soon as a coherent statement of the requirements can be made and preferred standards organisation can be agreed, the steps for initial submission will be initiated. It is expected that this can be initiated before end of December 2006.

5.2. Using SIP for Grid Sessions Establishment and Management

Motivation: Nowadays, the main usage of the SIP protocol is to establish and manage sessions for multimedia applications. In Akogrimo, we are considering applying this protocol for also

managing sessions in Grid-based applications. This would take advantage of the unification of the signalling framework of the session management functionality and the additional features that this signalling can provide to manage Grid-sessions, like session transference, suspend/resume, and so on.

Standards organization: IETF

Involved partners: UPM, TID

Collaboration: This work is not already being done by another EU Grids Project and is likely to be mainly within Akogrimo.

WP: 4.1

Nature of the work: This contribution will be done when the proposed architecture has been tested in the test beds, having validated all the needed details to be included in the description protocol of the SIP payload.

5.3. Mobile Grid use case

Motivation: In some standards organizations, the idea of a use case is a key prerequisite which guides the standardization process. For example it was relied upon within GGF and now OGF and a previous EU Grids Project (GRASP) was responsible for the Business Services use case that is in OGSA now. There is no reason to expect this to change in the merged organization OGF. The idea of a Mobile Grid Use Case is to encapsulate key issues within Akogrimo in order to guide future standardization. OGSA Use Cases are currently closed, so this would be offered to a different group in OGF or planned in the next OGSA cycle or to a different standards organization altogether.

Standards Organization: OGF.

Involved partners: USTUTT and CCLRC.

Collaboration: This work is not already being done by another EU Grids Project and is likely to be mainly within Akogrimo.

WP: Almost by definition this work would involve collaboration between all the 4.x WPs

Nature of the work: Base this on existing OGF use cases, because that is how the OGF community expects it. The difficult work would be encapsulating the Akogrimo ideas in a single use case. The test bed scenarios could be used as a basis. This should be proposed when OGSA version 2 becomes actively worked on.

5.4. Accounting and usage recording

A mobile grid environment makes potentially complex demands on an accounting system, because of diverse and changing providers, users, aggregators and intermediaries. The work described in this section concerns IETF Diameter AVPs.

It will also be useful to specify changes to OGSA accounting to deal with mobile Grids and it may be very useful to define a transformation function from one into the other.

Motivation: Standard mechanisms for A4C (authenticating, authorizing, accounting, auditing and charging) are crucial in a commercial Grid environment to enable inter-domain service

provisioning and interoperability between these players. A well-defined set of accounting parameters for Grid services is required to be able to exchange usage data between different network components.

Standards Organization: IETF

- Authentication, Authorization and Accounting (AAA) Working Group [28]
- Diameter Maintenance and Extensions (DIME) Working Group [29]

Involved partners: UNIZH, USTUTT, NTUA. Commercial partner within the consortium needs to be agreed.

Collaboration: This can be undertaken by partners within the consortium.

WP: 4.2 and 4.3

Nature of the work: Specification as an IETF RFC. It provides an extension to the Diameter base protocol (RFC3588 [19]) in form of a Diameter application, which is used for AAA support in Grid environments. It specifies authentication and authorization for multi-provider service provisioning. It specifies additional Attribute-Value-Pairs (AVP) used as accounting attributes for Grid services. A draft of the work has produced.

Preparation of an RFC Draft needs to start soon. There are two alternatives as a next step:

- a) If none of the commercial partners is able to commit to the work, UniZH could submit an RFC draft on the IETF website. However, in this case there might not be much feedback on it.
- b) Alternatively it may be possible to build on the interest in the work from commercial partners. If it is possible to agree support, attending and pushing the proposal in an IETF WG meeting (AAA or DIME) would make further progress likely. Input in the form of an RFC draft, however, would still come from UniZH

The timing of the final stages of an RFC is largely determined by the number of proposals waiting for a review.

5.5. Service Level Agreements for mobile Grid services

Motivation: The Akogrimo Mobile Grid environment has implications for service level agreements not likely to have been taken into account already. For example:

- Context changes imply application of policies and even renegotiation of QoS for services (pre-negotiated branches).
- Integration of both network (Bandwidth, packet priority, etc) and grid (CPU, Memory, etc) QoS parameters in SLA contract.
- Users and providers may have some form of contract that potentially limit the services that can be used

Standards Organization: Merged OGF

Involved partners: ATOS, USTUTT

Collaboration: NextGrid are also involved in this. Although outside the realm of the EU Grids Unit, it is relevant to the TRUSTCOM project in which some of the Akogrimo partners (including ATOS and USTUTT and also CCLRC) are involved.

WP: 4.3 and 4.4. Negotiation is more relevant to 4.4.

Nature of the work: There are two relevant specifications being negotiated.

WS-Agreement is already at an advanced stage. The potential contribution here is to give feedback to GRAAP WG (Grid Resource Allocation Agreement Protocol) of OGF about the use of WS-Agreement draft specification (contribution to this necessary validation step towards becoming a full standard).

WS-AgreementNegotiation is still at a very preliminary stage and it is a suitable time to contribute to its definition and aim to influence. There is participation by USTUTT in the GRAAP WG who made a presentation on SLA negotiation based on experiences in Akogrimo and NextGrid at GGF18 (September 2006) and plan to pursue this through the WG.

5.6. Potential expansion

Although it is intended that the number of standardization topics within the focus will not be large, it is not necessary to completely close the door at this stage. At this time, we may envisage the following possibilities: Security; using SIP for Service Discovery; Management of Virtual Organizations; and Business Processing for Grid Services.

In addition, two areas of work that were considered for inclusion in topics within focus are shown here but work has not been able to start on these.

5.6.1. Presence and Context

5.6.1.1. Extending SIP Presence to include Context

Motivation: Context has become significant in Akogrimo and existing standards are insufficient. The current RPID standard (Rich Presence Extensions to the Presence Information Data Format (PIDF) (draft-ietf-simple-rpid-06)) focuses on SIP Presence. There is a need to extend this interpretation to a more general description of user context.

Standards Organization: IETF

Involved partners: Telenor, UPM, TID

Collaboration: No collaborators identified as yet.

WP: 4.2

Nature of the work: (a) Suggest an alternative description of focus for the standard and (b) Investigate and suggest (if necessary) extensions to current presence format (RPID) based on the work within Akogrimo.

5.6.1.2. Interpretation and Mapping of Context in a Grid environment

Motivation: The network layers return context and monitoring events in a raw form., which is not suitable for management by applications or Grid services without some translation. An example of an application requirement is “Where is the nearest hospital?” and some work is needed to identify the level of needed to support this kind of request. There does appear to be a gap in an area of importance to Akogrimo.

Standards Organization: To be identified.

Involved partners: CCLRC, TN

Collaboration: Not being done by other EU Grid Project.

WP: WP4.2 and 4.4

Nature of the work: Work on the business process oriented description and a method of translation.

5.6.2. OGSA resource usage recording in a mobile context

Motivation: As noted in section 5.4, a mobile grid environment makes potentially complex demands on an accounting system, because of diverse and changing stakeholders. Until recently no issues on the standardization of grid accounting were addressed mainly due to the lack of interest in the business aspects of Grids. Given the more recent business orientation of Grids, there is the need for standardization of the accounting parameters. In Akogrimo this need is intensified by the existence of the blueprint in mobile grids for business, whereas telecommunication operators report the need for the standardization of a joint model

Standards Organization: OGF

Involved partners: NTUA. Currently no commercial partner is identified.

Collaboration: This needs to be decided.

WP: 4.3

Nature of the work: The core capabilities and behaviours defined in the Open Grid Service Architecture (OGSA) include some information on parameters for accounting, but these need review and more detail. An enhancement within the Usage Records Working Group (UR-WG) is needed with input that will be consolidated together with the work section 5.4 about accounting.

5.7. Involvement in standards groups independently of a specific topic

Involvement in standards groups will largely be determined by the topics on which Akogrimo is focussing. However it also possible to identify groups to be relevant to Akogrimo, without *a priori* determining the topic.

5.7.1. Telecommunications community group in OGF

At present, we identify the telecommunications community group (telco-cg) in OGF as an appropriate group for Akogrimo members to join, even though its primary focus is not mobility. Members from ATOS, NTUA and CCLRC attended the meeting at GGF16, but it will also be productive for Akogrimo telecommunications operators. A talk on Akogrimo by NTUA at GGF16 was well received, including material on the Akogrimo business value chain, especially applicable to Telecomms operators.

6. Conclusion and outlook

Standardization is one important means by which Akogrimo can have a long term influence. The Project makes use of a large number of standards (see Annex A). Planning how an impact can be made has taken longer to achieve. The Project has identified a small subset of topics where it plans to work on standards contributions and identified standards groups where it can participate. Subsequent work will include: elaboration and agreement of technical contributions in the 2nd cycle of the Project; making best use of collaborations to multiply limited effort; participation in the standardization cycles to achieve recognition of Akogrimo contributions; and identifying continuation of standards work beyond the Project's lifetime.

7. References

- [1] D3.1.1, J. Jahnert et al, “Overall Akogrimo Architecture v1”
<http://www.akogrimo.org/modules.php?name=UpDownload&req=getit&lid=36> , last visited 3.10.2006
- [2] D3.1.2, J. Jahnert et al, “Detailed Overall Architecture” ,
<http://www.akogrimo.org/modules.php?name=UpDownload&req=getit&lid=73> , last visited 3.10.2006
- [3] D4.1.1, N. Inacio et al: “Mobile Network Architecture, Design and Implementation”
<http://www.akogrimo.org/download/Deliverables/D4.1.1.pdf> , last visited 3.10.2006
- [4] D4.1.2, N. Inacio et al, “Consolidated Network Service Provisioning Concept”,
<http://www.akogrimo.org/modules.php?name=UpDownload&req=getit&lid=45> , last visited 3.10.2006
- [5] D4.2.1, J. Wedvik et al: "Overall Network Middleware Requirements Report". Akogrimo Deliverable D4.2.1. 01.09.2005, v 1.1.
<http://www.akogrimo.org/modules.php?name=UpDownload&req=getit&lid=39> , last visited 3.10.2006
- [6] D4.2.2, P-O Osland et al, “Mobile Network Middleware Architecture, Design and Implementation”, <http://www.akogrimo.org/modules.php?name=UpDownload&req=getit&lid=42> , last visited 3.10.2006
- [7] D4.3.1, A. Litke et al, “Architecture of the Infrastructure Services Layer v1”,
<http://www.akogrimo.org/modules.php?name=UpDownload&req=getit&lid=37> , last visited 3.10.2006
- [8] D4.4.1, G. Laria et al, “Architecture of the Application Support Services Layer v1”,
<http://www.akogrimo.org/modules.php?name=UpDownload&req=getit&lid=38> , last visited 3.10.2006
- [9] D2.2.1 Volume 2, J. Gallop, “State of the Art in Grids and Mobility”,
<http://www.akogrimo.org/modules.php?name=UpDownload&req=getit&lid=16> , last visited 3.10.2006
- [10] “Coordination of Standardization efforts”, EU IST Grids Unit Collaboration Deliverable CPC2-T3, delivered by NextGrid – available on request.
- [11] European Grid Technology Days 2006 (EGTD06) Concertation Meeting (September 2006)
<http://www.eu-gridresearch.org/modules.php?op=modload&name=News&file=article&sid=82> , last visited 3.10.2006
- [12] Open Mobile Alliance, Mobile Location Protocol, 3.2 Draft Version 2004-11-02,
http://member.openmobilealliance.org/ftp/public_documents/loc/Permanent_documents/OMA-MLP-Spec-V3_2-20041102-D.zip , , last visited 3.10.2006
- [13] Rosenberg, J.: A Presence Event Package for the Session Initiation Protocol (SIP). IETF Network Working Group, RFC 3856, August 2004.
<http://www.ietf.org/rfc/rfc3856.txt?number=3856> last visited 3.10.2006.
- [14] Sugano, H. et al: “Presence Information Data Format (PIDF)”. IETF Network Working Group, RFC 3863, August 2004.: <http://www.ietf.org/rfc/rfc3863.txt?number=3863> last visited 3.10.2006.
- [15] Schulzrinne, H. et al: “RPID: Rich Presence Extensions to the Presence Information Data Format (PIDF)”. IETF Network Working Group, RFC 4480, July 2006.
<http://www.ietf.org/rfc/rfc4480> last visited 3.10.2006
- [16] Veizades, J. et al: “Service Location Protocol”. IETF Network Working Group, RFC 2165, June 1997. <http://www.ietf.org/rfc/rfc2165> last visited 3.10.2006

- [17] Wireless Application Forum: WAP-248-UAPROF-20011020-a, Version 20 October 2001, <http://www.openmobilealliance.org/tech/affiliates/wap/wap-248-uaprof-20011020-a.pdf> Last visited 3.10.2006
- [18] C. de Laat ,G. Gross, L. Gommans, J. Vollbrecht, D. Spence, „Generic AAA Architecture“ RFC 2903, August 2000. URL: <http://www.ietf.org/rfc/rfc2903> Last visited 3.10.2006
- [19] P. Calhoun, J. Loughney, E. Guttman, G. Zorn, J. Arkko; “Diameter Base Protocol”, RFC 3588, September 2003. <http://www.ietf.org/rfc/rfc3588> Last visited 3.10.2006
- [20] P. Eronen, T. Hiller, G. Zorn; “Diameter Extensible Authentication Protocol (EAP) Application”, RFC 4072, August 2005. URL: <http://www.ietf.org/rfc/rfc4072> Last visited 3.10.2006
- [21] P. Calhoun, G. Zorn, D. Spence, D. Mitton; “Diameter Network Access Server Application”, RFC 4005, August 2005. URL: <http://www.ietf.org/rfc/rfc4005> Last visited 3.10.2006
- [22] D. Forsberg, Y. Ohba, B. Patil, H. Tschofenig, A. Yegin; Protocol for Carrying Authentication for Network Access (PANA), Internet Draft, Work in Progress, August 2006.
- [23] OASIS Standards, Security Assertion Markup Language (SAML) v1.1 [OASIS 200308], <http://www.oasis-open.org/specs/index.php#sam1v1.1> last visited 3.10.2006
- [24] A. Niemi. “RFC 3903 – Session Initiation Protocol (SIP) Extension for Event State Publication”. IETF. October 2004. <http://www.ietf.org/rfc/rfc3903.txt> Last visited 3.10.2006
- [25] A. B. Roach. “RFC 3265 – Session Initiation Protocol (SIP)-Specific Event Notification”. IETF. June 2002. <http://www.ietf.org/rfc/rfc3265.txt> Last visited 3.10.2006
- [26] “OWL Web Ontology Language Overview”. W3C Recommendation 10 February 2004. URL: <http://www.w3.org/TR/owl-features/> Last visited 3.10.2006
- [27] “UDDI Version 3.0.2” Oasis UDDI Spec Technical Committee Draft, Dated 20041019. URL: <http://www.oasis-open.org/committees/uddi-spec/doc/spec/v3/uddi-v3.0.2-20041019.htm> Last visited 3.10.2006
- [28] AAA Working Group (in IETF), <http://www.ietf.org/html.charters/aaa-charter.html> Last visited 3.10.2006
- [29] DIME Working Group (in IETF), <http://www.ietf.org/html.charters/dime-charter.html> Last visited 3.10.2006
- [30] Business Process Execution Language for Web Services version 1.1, 2003, IBM, BEA Systems, Microsoft, SAP AG, Siebel Systems, <http://www-128.ibm.com/developerworks/library/specification/ws-bpel/> Last visited 3.10.2006
- [31] D. Durham, et al, RFC 2748, The COPS (Common Open Policy Service) Protocol, <http://www.ietf.org/rfc/rfc2748> Last visited 3.10.2006
- [32] R. Koodli, RFC 4068, Fast Handovers for Mobile IPv6, <http://www.ietf.org/rfc/rfc4068> Last visited 3.10.2006
- [33] D. Johnson et al, RFC 3775, Mobility Support in IPv6, <http://www.ietf.org/rfc/rfc3775> Last visited 3.10.2006
- [34] I.Foster et al, GFD-I-080, The Open Grid Services Architecture, Version 1.5, <http://www.ogf.org/documents/GFD.80.pdf> Last visited 3.10.2006
- [35] A.Andrieux et al, Web Services Agreement Specification, GGF, 2004

- [36] H.Ludwig et al, Web Service Level Agreement (WSLA) Language Specification Version 1.0, IBM, wsla-2003/01/28, www.research.ibm.com/wsla/WSLASpecV1-20030128.pdf (via <http://www.research.ibm.com/wsla/>) Last visited 3.10.2006
- [37] S.Bajaj et al, Web Services Policy Framework (WS-Policy), (2004) IBM, <http://www-128.ibm.com/developerworks/library/specification/ws-polfram/> Last visited 3.10.2006 (This web link leads to an overview and provides links to the specification cited)
- [38] Web Services Security (WSS), 2006, OASIS, http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=wss Last visited 3.10.2006 (This web link leads to an overview and provides links to the multiple specifications constituting WSS)
- [39] R.Housley et al, RFC 3280, Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile, <http://www.ietf.org/rfc/rfc3280> Last visited 3.10.2006

Annex A. Table of standards usage in Akogrimo

This table contains a list of standards which are explicitly mentioned in Akogrimo architecture and implementation documents. The layer noted is the lowest at which the particular standard is directly used. The columns are:

- Topic: a general brief title of the standard.
- Abbreviation: Recognised abbreviation where this exists.
- Organization: The recognised standards organization responsible.
- Standard: A more formal statement of the standard, including in some cases the standard number and version.
- Layer: The layer within Akogrimo identified by the Work Package responsible for it (4.1 the lowest layer, 4.4 the highest). Where more than one layer has some responsibility, the lowest those is shown.
- General area: an informal grouping of standards.
- Notes on usage: For instance, what problems have been faced and solved (e.g. full compliance, reduced compliance, extended by the consortium, identified gaps). This is given briefly, because there are a lot of standards.

Topic	Abbreviation	Organization	Standard	Layer	General area	Notes on usage
Authentication, Authorisation and Accounting	AAA	IETF	RFC 2903: Generic AAA Architecture [18]	4.2	AAA	Extended by the consortium with charging issues.
Business Process Execution Language	BPEL	OASIS	BPEL4WS Business Process Execution Language for Web Services v1.1 [30]	4.4	Business Processing	The implementation used requires an additional file, the Process Deployment Descriptor file (PDD)
Common Open Policy Service Protocol	COPS	IETF	RFC 2748: COPS (Common Open Policy Service) Protocol [31]	4.1	QoS	Full compliance. Adds own proprietary extensions.
Diameter		IETF	RFC 3588: Diameter Base Protocol [19]	4.2	AAA	Full compliance, extended with Akogrimo Authentication/Accounting/Charging applications
Diameter Extensible Authentication	EAP	IETF	RFC 4072 Diameter Extensible Authentication Protocol (EAP)	4.2	AAA	Full compliance, used during network authentication process

Topic	Abbr ev-iat-ion	Orga niza-tion	Standard	Lay -er	General area	Notes on usage
Protocol			Application [20]			
Diameter Network Access Server Application		IETF	RFC 4005: Diameter Network Access Server Application [21]	4.2	AAA	Partial compliance.
Fast Handovers for MIPv6	FHO	IETF	RFC 4068 Fast Handovers for Mobile Ipv6 [32]	4.1	Mobile IPv6	FHO used was derived from RFC4068, although modified for specific project issues
Mobile IPv6	MIPv6	IETF	RFC 3775 Mobility Support in IPv6 [33]	4.1	Mobile IPv6	full compliance
Mobile Location Protocol	MLP	OMA	Open Mobile Alliance, MLP 3.2 [12]	4.2	Context	Partial compliance. Location used in Akogrimo context description is based on this standard.
Open Grid Services Architecture	OGSA	OGF	Open Grid Services Architecture v 1.5 [34]	4.3	Grid architecture	Partial compliance. The WP4.3 is using basic components of OGSA specification but not the full version.
PANA / AAA Interworking		IETF	Protocol for Carrying Authentication for Network Access (PANA) [22]	4.2	AAA	Partial compliance
Presence Event Package for SIP		IETF	RFC 3856 A Presence Event Package for SIP (August 2004) [13]	4.2	Context	Full compliance. Used by the Context Manager when subscribing to user presence data in the SIP Server's Presence Agent.
Presence Information Data Format	PIDF	IETF	RFC 3863 Presence Information Data Format (August 2004) [14]	4.2	Context	Partial compliance. Presence documents are, although PIDF-compliant, very basic right now.
Protocol for Carrying Authentication for Network Access	PANA	IETF	Protocol for Carrying Authentication for Network Access (PANA) [22]	4.1	Authenti-cation	Partial compliance
Resource ReSerVation Protocol	RSVP	IETF	RFC 2205 Resource ReSerVation Protocol Version 1 Functional	4.1	Resource	Full compliance.

Topic	Abbr ev-iat-ion	Orga niza-tion	Standard	Lay -er	General area	Notes on usage
			Specification			
Rich Presence Extensions to PIDF	RPID	IETF	RFC 4480 RPID: Rich Presence Extensions to the Presence Information Data Format (PIDF) (July 2006) [15]	4.2	Context	Context description used in Akogrimo is inspired by, but not compliant to this standard.
RTP: A Transport Protocol for Real-Time Applications	RTP	IETF	RFC 1889 RTP: A Transport Protocol for Real-Time Applications	4.1	Multi-media	Fully compliance with RFC 1889, but the chosen implementation for Linux (JMF, Java Media Framework) allows only the usage of a limited subset of codecs - see Table 2
Security Assertion Markup Language	SAML	OASIS	Security Assertion Markup Language 1.1 [23]	4.2	Security	Full compliance; used for Authentication Assertions and Identity Tokens during Authentication
Service Location Protocol	SLP	IETF	RFC 2165 Service Location Protocol [16]	4.2	Context	Partial compliance. Computation context is used in Akogrimo and the context description is based on this standard.
Session Description Protocol	SDP	IETF	RFC 2327 Session Description Protocol	4.1	Session	Full compliance
Session Initiation Protocol	SIP	IETF	RFC 3261 Session Initiation Protocol	4.1	Session	Full compliance. For security/authentication/authorisation purposes, some project-specific header fields have been defined (e.g. the headers fields that contain the A4CToken or the OpVO token). This does not affect the standard compliance since extensions were taken into account in the SIP standard definition.
Simple Object Access Protocol	SOAP	W3C	W3C Recommendation SOAP Version 1.2	4.3	Web Services	Fully compliant

Topic	Abbr ev-iat-ion	Orga niza-tion	Standard	Lay -er	General area	Notes on usage
SIP Event State Publication		IETF	RFC 3903 SIP Extension for Event State Publication (October 2004)	4.2	Session	Full compliance. Used by MT's wishing to publish user presence data. Not implemented. Used by Service Publication Agents (SPA) to publish service details for the SIP SD infrastructure.
SIP Refer		IETF	RFC 3515 SIP Refer Method	4.1	Session	Full compliance
SIP Specific Event Notification		IETF	RFC 3265 SIP - Specific Event Notification (June 2002) [25]	4.2	Session	Full compliance. Used by the SIP Server's Presence Agent to handle the subscriptions from the Context Manager, to notify changes in presence data, etc. Not implemented. Used by the Service Discovery Agent (SDA) and the Service Discovery Subscribers (SDS) to handle subscriptions and notifications in the SIP SD infrastructure.
Site Requirements (Usage Records) for Grid Authentication, Authorization and (mainly for) Accounting	UR	OGF	none yet	4.3	AAA	Component involved: Metering. Is considered for full compliance. Up to the moment is uses only the basic concepts of UR (for CPU, Disk usage and memory usage).
Universal Description, Discovery, and Integration	UDDI	OASIS	UDDI Version 3.0.2 [27]	4.2	Discovery	Not implemented. GrSDS is intended to be based on UDDI.
WAP User Agent Profile	WAP-UAPROF	OMA	WAP-248-UAPROF-20011020-a [17]	4.2	Context	Compliant. Device description (description of the user's mobile terminal - part of

Topic	Abbr ev- iat- ion	Orga niza- tion	Standard	Lay- er	General area	Notes on usage
						computation context) is based on this standard.
Web Ontology Language	OWL	W3C	OWL Web Ontology Language Overview, February 2004 [26]	4.2	Services	Not implemented. Akogrimo context description is intended to be based on owl.
Web Services	WS	W3C	Web Services Architecture, W3C 11.2.2004	4.3	Web Services	Compliant to the concept of the WS architecture.
Web Services Agreement Specification	WS- Agree- ment	OGF	Web Services Agreement Specification [35]	4.3	SLA	Is used.
Web Services Description Language	WSDL	W3C	WSDL v1.1, W3C 15.3.2001	4.3	Web Services	Is considered but not yet deployed.
Web Service Level Agreement	WSLA	indu- stry	Web Service Level Agreement [36]	4.3	SLA	Is considered but not yet deployed.
Web Services Policy Framework	WS- Poli- cy	indu- stry	Web Services Policy Framework [37]: September 2004 version is from industry partners; version 1.2 (2006) has been submitted to W3C for consideration	4.3	Policy	This is elaborated in the WP4.3 architecture.
Web Services Security	WSS	OASIS	Web Services Security [38]	4.3	Security	Not implemented yet. Is under consideration.
WS Base Notification	WS- Base Noti- fica- tion	OASIS	Still draft	4.3	WSRF	Implemented available Grid toolkit.
WS Resource Framework	WSRF	OASIS	WS- ResourceProperties, WS-ResourceLifetime, WS-BaseFaults, and WS-ServiceGroup	4.3	WSRF	Compliant with: WS-ResourceProperties, WS-Resource- Lifetime, WS-BaseFaults, and WS-ServiceGroup are also considered.
X.509 Public Key Infra- structure	X.509	IETF - was ITU-T	Internet X.509 Public Key Infrastructure Certificate and Certificate	4.1	Security	Full compliance

Topic	Abbr ev-iat-ion	Orga niza-tion	Standard	Lay -er	General area	Notes on usage
			Revocation List (CRL) Profile RFC 3280 [39]			

Table 1: Standards used in Akogrimo

Audio	G.711 (U-law) 8 kHz
Audio	GSM mono
Audio	G.723 mono
Audio	4-bit mono DVI 8 kHz, 11.025 kHz and 22.05 kHz
Audio	MPEG Layer I, II
Video	JPEG (420, 422, 444) - only for video dimensions that are in multiple of 8 pixels
Video	H.263 (only for 3 different video dimensions - SQCIF (128x96), QCIF (176x144) and CIF (352x288).)
Video	MPEG-I

Table 2: Subset of codecs implemented in chosen Linux implementation of RTP (as mentioned in Table 1)