



Openwings Community Overview

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1. Introduction

1.1 Scope

This document provides an overview of the Openwings organizational structure and processes. It is meant to provide the reader with a high level context of what it means to be a participant in the Openwings community. This document provides an overview of the Openwings Architecture and Process. For detailed information see the Openwings Community Process document and Openwings Overview document.

1.2 Definitions

| Term | Definition |
|--|---|
| Process Management Office (PMO) | The administrative and oversight function for the Openwings community. |
| Specification | A written document defining the some aspect of the architecture. Each specification will contain an overview, requirements, use cases, architecture description, interfaces, examples and compliance. |
| Reference Implementation (RI) | The RI is a fully functional implementation of a specification. It is meant to provide an example of an implementation of the specification. |
| Compatibility Test Suite (CTS) | The CTS is a set of tests that validate the specifications. Any implementation of the specification must be validated using the CTS. |
| Openwings Specifications Request (OSR) | A formal request presented to the PMO for the creation of a new specification. |
| Expert Team | A team of engineers with domain expertise within a given area. The expert team is assembled to create the specifications, RI & CTS for some architecture component. |
| Specification Lead | The leader of an expert team who is ultimately responsible for creating the artifacts of a specification (Spec, RI & CTS) |

Figure 1: Definitions

1.3 Overview

1.3.1 Openwings Overview

Openwings™ is an open community, non-proprietary effort to define specifications for self-forming, self-healing systems. Motorola (now General Dynamics Decision Systems) and Sun Microsystems established the Openwings™ consortium in June of 1999. Since then, over 100 companies have registered to help mature its development, and more companies are registering daily.

The core Openwings™ framework is designed to incorporate existing commercial standards and is intended for use in both commercial and military environments. Openwings™ is being developed using a community development process modeled after the very successful Java Community Process. Anyone may join the Openwings™ community, participate on expert teams, or use the resulting specifications free of charge by merely signing up at the community web site (<http://www.openwings.org>).

The Openwings™ Architecture provides a framework for building plug-and-play, service-oriented, network-centric, self-forming, self-healing systems that are independent of middleware, databases, platforms, and deployment contexts. Openwings™ has a special focus on issues of availability, security, and interoperability. Openwings™ is the embodiment of a new movement in the software engineering community towards a paradigm known as Service-Oriented Programming (SOP). For an introduction to SOP, refer to <http://www.openwings.org/download/specs/ServiceOrientedIntroduction.pdf>.

The key value of the Openwings architecture is the ability to create systems composed of completely reusable components. The architecture is based on key abstractions that make this vision of reusable components possible: environment independence, protocol independence, platform independence, and database independence. The following figure is a basic four-layer diagram showing the core services of the Openwings Architecture.

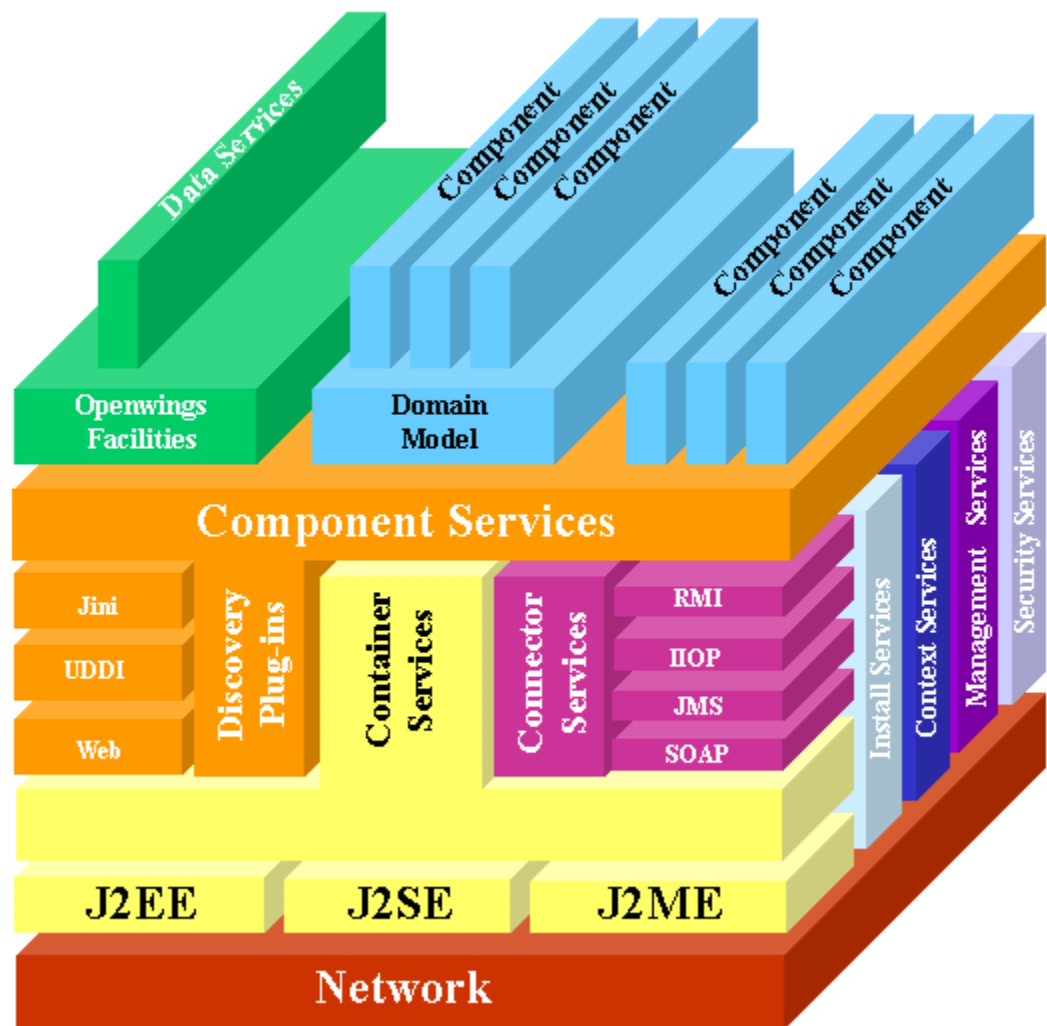


Figure 2: Openwings Architecture Layer Diagram

1.4 Openwings Specifications

The Openwings architecture is defined by 14 separate specifications. The specifications are listed in the table below (for a more detailed overview see the “Openwings Overview” document):

| Name | Description |
|--|---|
| Overview | High-level description of Openwings requirements and architecture. |
| Architecture Description Specification | Describes the Openwings architectural component model for plug and play software / hardware components. |
| Interface Specification | Describes the requirements for compliant service interfaces in the Openwings framework. |
| Availability Specification | Introduces availability concepts and defines the techniques in the Openwings architecture for achieving high availability systems, focusing specifically on software availability techniques. |
| Security Specification | Describes how networks, platforms, and services are secured in the Openwings framework |
| Component Services Specification | Describes the Openwings component model and its relationship to other component models in the industry, such as CORBA and Enterprise Java Beans (EJB). |
| Connector Services Specification | Describes the protocol abstraction used in Openwings. |
| Container Services Specification | Describes how the Openwings architecture makes the processing resources of common platforms available to the network as services. |
| Policy Specification | Defines the Openwings policy framework. Policies are a combination of configuration data and configuration logic. |
| Management Services Specification | Defines the Openwings framework for management of components and services. |
| Context Services Specification | Defines the Openwings framework for secure, available contexts for system formation and service discovery.. |
| Install Service Specification | Defines the Openwings framework for installation of components. |
| Data Services Specification | Defines a persistence abstraction mechanism built on top of the Openwings core services. |

Figure 3: Openwings Specifications

2. The Openwings Community Structure

The Openwings structure consists of three major elements: The Process Management Office (PMO) that provides management and administrative oversight; Expert teams, which are responsible for creating the specifications and reference implementations, and the community members. Figure 4 shows the basic structure of the Openwings community:

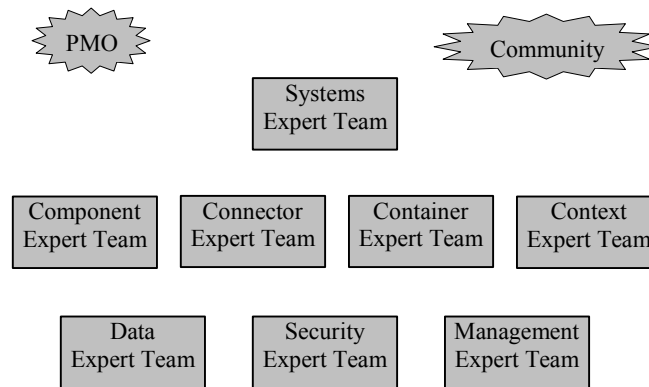


Figure 4: Openwings Community

2.1 Process Management Office (PMO)

The PMO provides administrative support and management oversight to the Openwings community. The PMO is managed by Sun and General Dynamics Decision Systems. Up to 5 other members can be added to the PMO as elected by the community.

Responsibilities of the PMO include:

- Evaluate OSRs and post them to the web site for community review
- Select Specification leads for the expert teams
- Post a call for experts for new specifications
- Audit the specification development process
- Manage the Openwings web site
- Provide CM control for Specifications, Reference Implementations and Compatibility Test Suites.

Participation in the PMO will be self-funded.

2.2 Expert Teams

Expert teams are the heart and soul of the Openwings community. They are composed of experts in their respective fields that have agreed to work cooperatively to define an overall specification and work together to ensure the validation of the concept.

2.2.1 Structure and Responsibilities

2.2.1.1 Specification Lead

The specification lead is the leader of the expert group and carries the primary responsibility for completing the specification. The Spec Lead is responsible for managing the development of the Specification and has the responsibility for developing the RI & CTS (usually developed by the spec lead, but can be delegated to other members of the team if so desired). The specification lead is chosen by the PMO and answers to the PMO for process-related issues (schedule, status and process compliance).

Requirements for a Specification lead are as follows:

- Must be an expert in the given field
- Must be able to be dedicated to the task for the duration of the specification development (this might be a 50%-75% time commitment).
- Must agree to the Openwings licensing agreement for the specification, RI and CTS.

2.2.1.2 Core Team

The remainder of the expert team will be chosen by the Spec lead from candidates who have responded to the “Call for Experts”. The basic requirements for membership in the core team are as follows:

- Must be an expert in the given field
- Must be willing to actively participate in the specification development (willing to spend 25-50% of their time working specification related issues).
- Must agree to the Openwings licensing agreement for the specification development.

2.2.1.3 1st Level Review Team

The first level review team is comprised of the remainder of those who have responded to the CAFE. They provide the first level of independent review on the given specification. Their comments on the specification will be documented and responded to by the expert team. The complete list of comments and responses will be posted to a protected area on the Openwings web site available only to that expert team.

2.2.2 Openwings Expert Teams

There are currently eight expert teams defined for the development of the Openwings framework. Additional expert teams may be added when deemed necessary by the community (by submission of an OSR to the PMO).

The following paragraphs discuss the expert teams, their charters and qualifications.

2.2.2.1 Systems Expert Team

The Systems Expert team is responsible for the overall architecture design. Members of the systems expert team are, by default, on the first level review team for all specifications. The systems team has responsibility for the following documents:

1. Architecture Description Specification
2. Naming Specification
3. Interface Specification
4. Availability Specification

Qualifications for serving on the expert team:

1. Served as systems architect on a major software effort
2. Understanding of the issues related to integrating 3rd party components in a systems-of-systems environment
3. Desired experience includes:
 - Experienced with the Java2 platform (mandatory requirement)
 - Jini
 - XML
 - Middleware technologies (CORBA, JMS, RMI, DCOM, etc)
 - Security (JAAS, JCE, JSSE)
 - Databases (JDBC, SQL, OQL)

2.2.2.2 Security Expert Team

The charter of the Security Expert Team is to develop a comprehensive approach to network, platform, and service security. The intent of the Openwings Security Specification is to use define the existing security technologies to achieve secure systems in a mobile environment. The Openwings Security Specification will address the architecture in whole to include Authorization/Authentication, confidentiality and Data Integrity.

The Security Expert Team will be responsible for delivering the following:

1. Overall security specification
2. Reference Implementation
3. Compatibility Test Suite

Qualifications for serving on the expert team:

1. Experienced with the Java2 platform (mandatory requirement)
2. Experience developing secure Java applications
3. Knowledgeable of DoD security requirements
4. Desired experience includes:
 - Java 2 security classes
 - Java Authentication Authorization Specification (JAAS)
 - Java Cryptology Extension (JCE)
 - RMI Security
 - Public Key Infrastructure (PKI)
 - Java Secure Socket Extension (JSSE)

2.2.2.3 Component Services Expert Team

The charter for the Component Services Expert team is to develop a component framework that will provide the ability to provide, locate and use services, without being dependent on any specific service location/lookup mechanisms. Initial implementations will be based on Sun's Jini technology, but will be flexible enough to move to other lookup/discovery services (i.e. HP Chai or Universal Plug-n-Play).

The Component Services Expert team will be responsible for developing the following:

1. The Openwings Component Services specification
2. Component Services Reference Implementation
3. Component Services Compatibility Test Suite

Desired qualifications for serving on the expert team:

1. Experienced with the Java2 platform (mandatory requirement)
2. Experience with ad-hoc networking technologies (i.e. Jini, Chai, UPnP)
3. Desired experience includes:
 - Java 2 security classes
 - Java Authentication Authorization Specification (JAAS)
 - Java Cryptology Extension (JCE)
 - RMI Security

2.2.2.4 Connector Services Expert Team

The charter for the Connector Services Expert team is to develop an approach for connecting components together. A connector is a transport implementation for connecting components together. It is envisioned that there will be three generic types of connectors: Synchronous, Asynchronous and Streaming. The goal is to be able to define and develop components independent of the middleware connection technology such that a component may be deployed with a CORBA connector in one environment, but may use an RMI connector in another. Examples of protocols that would be implemented using connectors are: CORBA, RPC, RMI, Sockets, EJB, DCOM, etc.

The Connector Services Expert team will be responsible for developing the following:

1. The Openwings Connector Services specification
2. Connector Services Reference Implementation
3. Connector Services Compatibility Test Suite

Desired qualifications for serving on the expert team:

1. Experienced with the Java2 platform (mandatory requirement)
2. Experience with a variety of inter-process communications technologies.
Examples include:
 - TCP/IP Sockets
 - Remote Method Invocation (RMI)
 - Common Object Request Broker Architecture (CORBA)
 - Distributed Computing Environment (DCE)
 - Java Message Service (JMS)
 - Streaming Protocols

2.2.2.5 Container Services Expert Team

The charter for the Container Services Expert team is to define an abstraction for computational resources within the system. Container Services abstracts the use of processing resources on a given platform by both Java and non-Java programs. Key topics include process lifecycle, mobile code and availability.

The Container Services Expert team will be responsible for developing the following:

1. The Openwings Container Services specification
2. Container Services Reference Implementation
3. Container Services Compatibility Test Suite

Desired qualifications for serving on the expert team:

1. Experienced with the Java2 platform (mandatory requirement)
2. Experience with load balancing and system management.
3. Detailed knowledge of the inner workings of the Java SecurityManager and ClassLoader.

2.2.2.6 Management Services Expert Team

The Management Services Expert Team will focus on the management framework necessary to automatically manage system operations including security, system formation and system services.

The Management Services Expert team will be responsible for developing the following:

1. The Openwings Management Services specification.
2. Management Services Reference Implementation
3. Management Services Compatibility Test Suite

Desired qualifications for serving on the expert team:

1. Experienced with the Java2 platform (mandatory requirement)
2. Experience with Java Management Extension (JMX)
3. Knowledgeable in XML

2.2.2.7 Context Expert Team

The Context Expert Team focuses on providing a secure, available context for system formation and service discovery. It is the job of the context to provide the core services required for self-forming and self-healing systems. This includes network formation, component installation, intra-space discovery, inter-space discovery, management, and other required services. Developers of this specification need to understand the Openwings Security Specification, Openwings Availability Specification, Openwings Platform Services Specification, and Openwings Management Specification.

The Context Expert team will be responsible for developing the following:

1. Context Services Specification.
2. Context Services Reference Implementation
3. Context Services Compatibility Test Suite.
4. Install Service Specification.
5. Install Service Reference Implementation
6. Install Service Compatibility Test Suite.

Desired qualifications for serving on the expert team:

1. Experienced with the Java2 platform (mandatory requirement)
2. Understanding of network formation technology (DHCP, DNS, MobileIP, ZeroConf, related IETF RFCs)
3. Understanding of installation technology (Webstart, OSGI)
4. Understanding of gateway technologies (OSGI, Microsoft Net)
5. Understanding of network security and container security (firewalls, code security)
6. Understanding of management
7. Understanding of discovery technology (Jini, Upnp, Chai, Ninja)
8. Understanding of Naming and Search Technology (Web Search Engines, LDAP)

2.2.2.8 Data Services Expert Team

The charter for the Data Services Expert team is to define an abstraction for data storage in the system. Information in the system will be provided through the use of a Data Server, which provides a three-tier data retrieval architecture. The Three-tier approach is designed to isolate components from the specific implementations of the data storage mechanism.

The Data Services Expert team will be responsible for developing the following:

1. Data Services Specification.
2. Data Services Reference Implementation
3. Data Services Compatibility Test Suite.

Desired qualifications for serving on the expert team:

1. Experienced with the Java2 platform (mandatory requirement).
2. Experience with issues in implementing Object and Relational Databases.
3. Familiar with ODBC and JDBC database connection technology.

2.3 Openwings Community members

The Openwings community is open to all interested parties. To become a member of the Openwings community you must simply register at the Openwings registration page. As a member of the Openwings community you will have access to the download area, have voting rights within the community and be able comment on specifications put out for public review. The registration URL is <http://www.openwings.org/regis.html>.

3. Openwings Development Process

Openwings development process is a formal, auditable process for developing the Openwings Specifications. The development lifecycle consists of seven phases that take a specification from concept through implementation. There are three products produced for each specification:

- The specification itself
- A Reference Implementation (RI) - a fully functional implementation of the specification
- A Compatibility Test Suite (CTS) that can validate other implementations of the specification. The entire lifecycle development is designed to take less than 12 months. The phases are briefly outlined in the diagram below.

| | | Phases | | | | | | |
|-------------------|--|-----------------|-------------------|-------------------|-------------------------|---------------|----------------------|----------------------|
| | | Review OSR | Form Expert Group | Participant Draft | Participant Review | Public Review | Beta Release | Maintenance |
| Responsible Party | | PMO | PMO | Spec Lead | Spec Lead | Spec Lead | PMO | Spec Owner |
| Audits | | | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ |
| Web Products | | OSR Application | CAFE | | Participant's Draft (1) | Public Draft | Draft Spec. & RI/CTS | Final Spec. & RI/CTS |
| | | | | | RI/CTS Dev. | | | |
| | | | | | | ★ Release 0.9 | ★ Release 1.0 | |
| Duration | | 7-30 Days | 15-30 Days | 30-60 Days | 30-60 Days | 30-60 Days | 30-90 Days | Ongoing |

Our OpenWings specifications are developed using a 7-phase process that has been proven by the commercial industry to produce quality specifications

The development cycle begins when an Openwings Specification Request (OSR) is filed with the PMO. OSRs can be submitted via the Openwings web site.

3.1 OSR Review

In this phase the PMO reviews the request and will either approve the addition of a new specification or reject the request. The PMO has 30 days to formally respond an OSR.

3.2 Expert Group Formation

The next step in the process is to form an Expert Group. The expert group consists of members of the community who have an interest in the technology being developed. The leader of the expert group is the "Specification Lead". The Spec Lead is responsible for managing the development of the Specification and has the responsibility for developing the RI & CTS. This phase is expected to take 15 to 30 days.

3.3 Participant Draft

During this phase the expert group develops the initial draft of the specification. Once it is ready for internal review it is posted to the participant web site for review and comments. Although the duration of this phase will vary depending on the complexity of the specification, it is expected to 30-60 days to produce the initial draft.

3.4 Participant Review

In this phase the expert group receives comments from other participants and updates the specification. It is during this phase that the RI/CTS development begins. This phase is expected to take 30-60 days.

3.5 Public Review

During this phase, the specification is made available to the general public and is posted on the public web site. The expert team continues to make revisions to the specification based on comments received.

3.6 Beta Release

Once all comments have been received and incorporated and the Reference implementation is complete, the specification moves to the beta test phase. Here both the software and specification are made available for public download from the public web site. Developers are encouraged to work with beta software and report bugs back to the expert team. This period is anticipated to last 30-90 days.

3.7 Maintenance

Once the product has been through beta testing it is formally released as a completed specification. The Specification, RI & CTS are made available for download on the public web site. At this point the expert group is disbanded and the Specification Lead becomes the Spec Owner and will oversee the maintenance of the specification.

4. Specification Development

4.1 Specification Lead Responsibilities

The Specification Lead has three main work products: a specification, reference implementation, and compatibility test suite. To aid in the process of producing these products this section describes several guidelines.

The Specification Lead can structure specification development any way they see fit. This may mean dividing writing assignments between experts, soliciting information, calling meetings, etc. At times the Specification Lead will have to solve disputes in the community. It is the intent that this is done as fairly as possible, while retaining the design center of the specification.

The Specification Lead is the steward for the open nature for the specification. The Specification Lead must work with the specification contributors, regardless of where they come from, to verify that no proprietary information is in the specification. Each community member agrees to this when joining the Openwings Community to release proprietary claims on technical data going into the specification. The specification and right to implement the specification are free to the community.

4.1.1 Reference Implementation Development

All Reference Implementations must be made available for free download for the purpose of evaluation and development. The Specification Lead must coordinate ownership of the Reference Implementation for joint RIs. Regardless of whether the RI is jointly owned or individually owned it is at the sole discretion of the owner to decide how the implementation will be licensed for deployment. This can take the form of runtime licensing, a no cost license, open source, or any other variant.

4.1.2 Compatibility Test Suite Development

The Compatibility Test Suite is freely available just as the specification is. It is the intent to make the CTS open source, to aid implementers of the specification in developing correct implementations. The Specification Lead needs to coordinate the creation of the compatibility test suite with the expert team and reference implementation team.

4.2 Intellectual Property & Licensing Agreements

Though mentioned previously, it is important to highlight the intellectual property and licensing rules, as this is the cornerstone of an open specification process:

| Product | IP / Licensing Issues |
|--------------------------|--|
| Specification | Free for re-distribution and implementation by any community member. |
| Reference Implementation | Free for evaluation and development. The RI owner(s) decide about runtime licensing in deployed products and whether to go open source or not. |
| Compatibility Test Suite | Free for re-distribution and use. The CTS is required to be open source. |