# Galleon

version 1



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### Overview

### **Executive Summary**

Galleon is a set of standards for the design and development of operational systems for the Information Operations Center (IOC). Systems built according to these standards are said to be Galleon compliant.

The Galleon Consortium is an ad-hoc group composed of engineers, operators, and managers who direct the development of Galleon standards and advise in the implementation of Galleon systems.

### **Design Principles**

Galleon is designed and operated in keeping with several key principles.

- Galleon should not be a system; it should be a model and set of interfaces used to *build* systems.
- Galleon should allow growth over time to support the iterative development of complex systems.
- Galleon should provide components and interfaces that are subscriptive and not prescriptive.
- Galleon should define interfaces for any boundary between system layers, services, or functions.
- Galleon should promote the ownership of system components rather than whole systems.

### **System Model**

The Galleon System Model describes the structure and design of a Galleon system. The system model defines a layered architecture of discrete components that interoperate using defined sets of interfaces.

### **Layered Architecture**

The Galleon System Model follows a layered architecture where every constituent component of a system is assigned to a layer. Galleon defines three layers: infrastructure, tool, and management.

The Infrastructure Layer is reserved for functions and services that interact with operational networks, machines, and non-Galleon subsystems. This includes transporting data between system machines, publishing system output, and accessing notification subsystems.

The Tool Layer comprises any function or service dealing with the activity of one or more information operations tools. This includes building tool instances, sending tasks to tools, and processing the results of those tasks. Any component that has specific knowledge of a tool's internal operations belongs to the Tool Layer.

The Management Layer encompasses any function or service used to manage operations. This includes systems that automate or supervise operations.

The assignment of components to layers shapes the relationships between those components. Components located in higher layers will be implemented using the functions and services of lower layers. Generally, higher layers will initiate and drive the activity of lower layers.

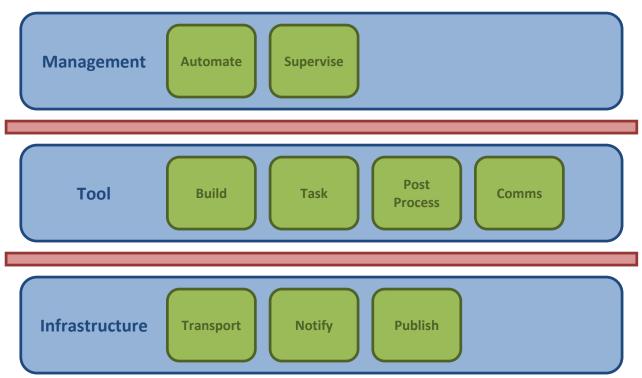


FIGURE 1: GALLEON LAYERED ARCHITECTURE

### Components

The Galleon System Model promotes the division of system parts into discrete components assigned to one of the Galleon layers.

Each system component is a treated as a product unto itself, individually developed and maintained by its owner. The productization of components support component reuse and appropriate ownership designation.

Ownership of system components is delegated based on the layer in which the component resides and by the purpose of the component.

#### **Interfaces**

The Galleon System Model advises the use of standardized interfaces to connect system components. These interfaces abstract system functions and services, allowing components implemented using these interfaces to remain agnostic to the details of system implementation.

Galleon currently standardizes three interfaces:

transport The Transport Interface provides services for the transmission of data between components in a Galleon system. This allows components to interact between machines without knowing any details of network or machine configuration.

publish The Publish Interface provides a mechanism for processing and exporting data from a Galleon system. System components will be able to post data to the system without any awareness of how that data will be handled by the system.

The Log Interface provides a mechanism for recording events that occur in a Galleon system.

Galleon interfaces expose functionality through handlers. System components access handlers by invoking executables which implement one or more handlers. A handler is specified by the executable that implements the interface and the arguments used to invoke that interface. The remaining usage for each handler type is part of the interface specification.

A configuration file for a Galleon system includes entries for each interface handler implemented by the system. The handler entry is comprised of the path to the handler's executable followed by any initial parameters to that executable to invoke the interface. Any parameters to the interface are appended to the content of the configuration entry.

### **System Configuration**

Galleon systems can store system configuration information in a configuration file. Configuration data is stored as key-value pairs in the text of the file.

A system component requiring Galleon support may be provided the path to their Galleon configuration file during installation. The Galleon configuration file should be read by system components upon starting. Changes to the configuration file at runtime need not be recognized until the next time the component starts.

#### **Format**

The Galleon configuration file will store one key-value pair per line. The key and value are to be delimited by one equals sign (=). Configuration keys and values are case sensitive. Key names are not necessarily unique within the file, but may be required to be unique for a particular key.

Empty lines or lines beginning with a hash (#) will be ignored. Comments may be added or keys disabled by using the hash character.

The configuration file will be encoded using UTF-8 and use Unix-style line endings.

Galleon configuration files do not support sections. This is to provide easy lookup of key-value pairs using the key names. File organization is accomplished through hierarchical key naming conventions.

#### **Conventions**

Galleon interfaces and system components will adhere to the following conventions when using a Galleon configuration file.

#### **Key Naming**

Galleon configuration files apply a hierarchical naming scheme. The keys will be dot-delimited series of name parts in descending significance.

Galleon Interfaces will use key names that conform to the following naming pattern:

interface.<interface\_name>.<key\_name>

## **Appendix A: Version History**

Date	Description
8 Nov 2013	Version 1, Revision 1 Galleon Design initialized and submitted for review.
28 Jul 2014	Version 1, Revision 2 Galleon Design revised after first Galleon pilot.
1 Dec 2014	Version 1, Revision 3 Galleon Design revised after second Galleon pilot.
1 Jun 2015	Version 1, Final Galleon Design finalized and delivered.

### **Appendix B: Future Work**

The following items have been identified as areas for future work:

#### **Notification Interface**

Provide an interface for accessing a notification subsystem. The interface should include a handler for posting notifications, including fields for subject, message, sender, and receiver.

### System Builder

Develop a mechanism for building Galleon systems based on a system descriptor. This would require the implementation of a package management scheme to handle installation and dependency management of system components.

#### **Situational Awareness**

Develop standards for data publication and logging to facilitate automated analysis for the purposes of situational awareness.