

Trinity: A Language for Multi-View Architecture Description and Control

Subtitle Text, if any *

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Abstract

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1. Introduction

2. Design

Trinity is designed to unify software architecture design and implementation for not just a single architecture view, but in all three (module, component-and-connector, and deployment).

To demonstrate how Trinity makes software architecture live in Wyvern systems, we have implemented a simple 3-tier web application whose abridged code is shown in Figure 1. In overview, a database is accessed by a server that handles requests from a client. The example architecture contains two components, the client and server. As in more theoretical software architecture, components are runtime entities that may have ports that act as access points to interact with other components. Our example server and client each have complementary ports, `sendInfo` and `getInfo` respectively, that enable interact; here, the server can send information to the client using a JSON connector responsible for serialization and deserialization. Note that Trinity connectors enable the joining two compatible component ports, analogous to ports in software architecture. The architectures attachments section actually/physically connects the client and the server using their matching ports and the JSON connector.

The client and server have their own component-specific architectures given before the general architecture code.

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Listing 1. Simple 3-tier web application architecture

```
1 component Client
2     port getInfo: requires CSIface
3
4 component Server
5     port sendInfo: provides CSIface
6
7 external component DB
8     port dbIface: target DBModule
9
10 connector JDBCCTR
11     val connectionString: String
12
13 architecture
14     components
15         RequestHandler ch
16         DB db
17
18     connectors
19         JDBCCTR jdbcCTR
20
21     attachments
22         connect rh.dbIface and db.dbIface
23             with jdbcCTR
24
25     bindings
26         sendInfo is rh.sendInfo
27
28 architecture
29     components
30         Client client
31         Server server
32
33     connectors
34         JSONCTR jsonCTR
35
36     attachments
37         Connect client.getInfo
38             and server.sendInfo with jsonCTR
39
40     entryPoints
41         Client: start
```

Both components have corresponding ports that depend on a client-server interface, denoted by the requires/provides CSIFace types of each port. This interface is required of a server by the client, as stated by the requires CSIFace type, and the server fulfills it, as shown by the provides CSIFace server port type. The database is an external component of the server, which differs from a component in that the programmer does not provide its source code. port dbIface: requires DBModule The database and server are connected by a JDBC connector. This is used within a sub-architecture of the server that connects a specified request handler and the database. Finally, the bindings section of the servers sub-architecture specifies that the client-facing port, sendInfo, of the server component is indeed the same sendInfo port of the request handler.

A. Appendix Title

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Acknowledgments

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References

P. Q. Smith, and X. Y. Jones. ...reference text...