Carnegie Mellon University

Integrability

Outline

- **Introduction**
- Routing messages
- Managing interfaces
- Message bus

integrability Definition

- We will focus on interoperability – one portion of integrability
- Interoperability is the ability to usefully exchange information between two software components.

Aspects of exchanging information

- A component must know how to route a message to other components.
- The components must agree on the format of the data to be exchanged.
- The components must correctly interpret the data being exchanged.

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Options for routing messages

- Manual- user informs system of existence and location of a particular component. System informs other components.
- Discovery – component is entered into a table with component ID and location. Table is used to look up component by ID

Options for routing messages

- Plug and play – when component is plugged into a network, it broadcasts a “I am here” message giving tts ID ad details. Some piece of the system listens for the message and records that information.
- Two components can communicate through a third component.
  - Each registers with the third component
  - The third component forwards messages from one component to the other.
  - A message bus is common.

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Manage interfaces - syntax

- Typically achieved through standards
  - HTTP
  - REST
  - SOAP
  - XML
  - …
- May involve both syntax and sequence. E.g.
  - Must initialize component prior to invoking it.

Managing interfaces – semantics

- Requires agreement between parties wishing to interoperate. E.g.
  - What is a residential address? Differs in various portions of the world. May be number, street, city, state.
  - May be telephone pole number
  - Etc.
- A third party may define agreed upon interpretation.
  - Domain specific organization

Managing interfaces – semantics

- May require translation from one representation to another

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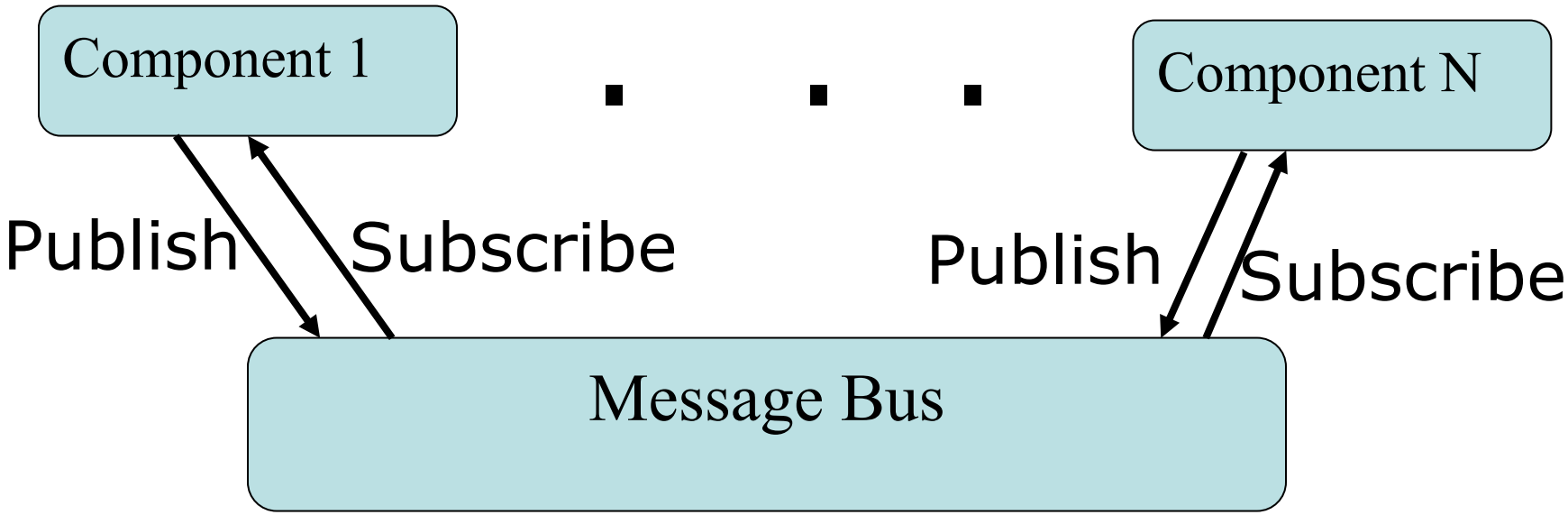
- Introduction
- Locating component with which to interoperate
- Managing interfaces
- **Message bus**

Common pattern – message bus



For a list of topics, components can publish or subscribe to messages on those topics.

Translation

- The message bus can
  - Translate from one format to another
  - Make semantic translations

Summary

- For two components to interoperate, they must
  - Know how to send messages to each other
  - Agree on the syntax of the message
  - Agree on the semantics of the message
- A message bus is a common pattern used to facilitate interoperability.