How to use EAI patterns in JavaEE

Multiple approaches possible

- Do-it-yourself by leveraging the JEE 6 APIs
- Use a mediation framework
  - Apache Camel
  - Spring Integration

Enterprise Application Integration patterns for Java EE cloud applications

JavaOne 2012

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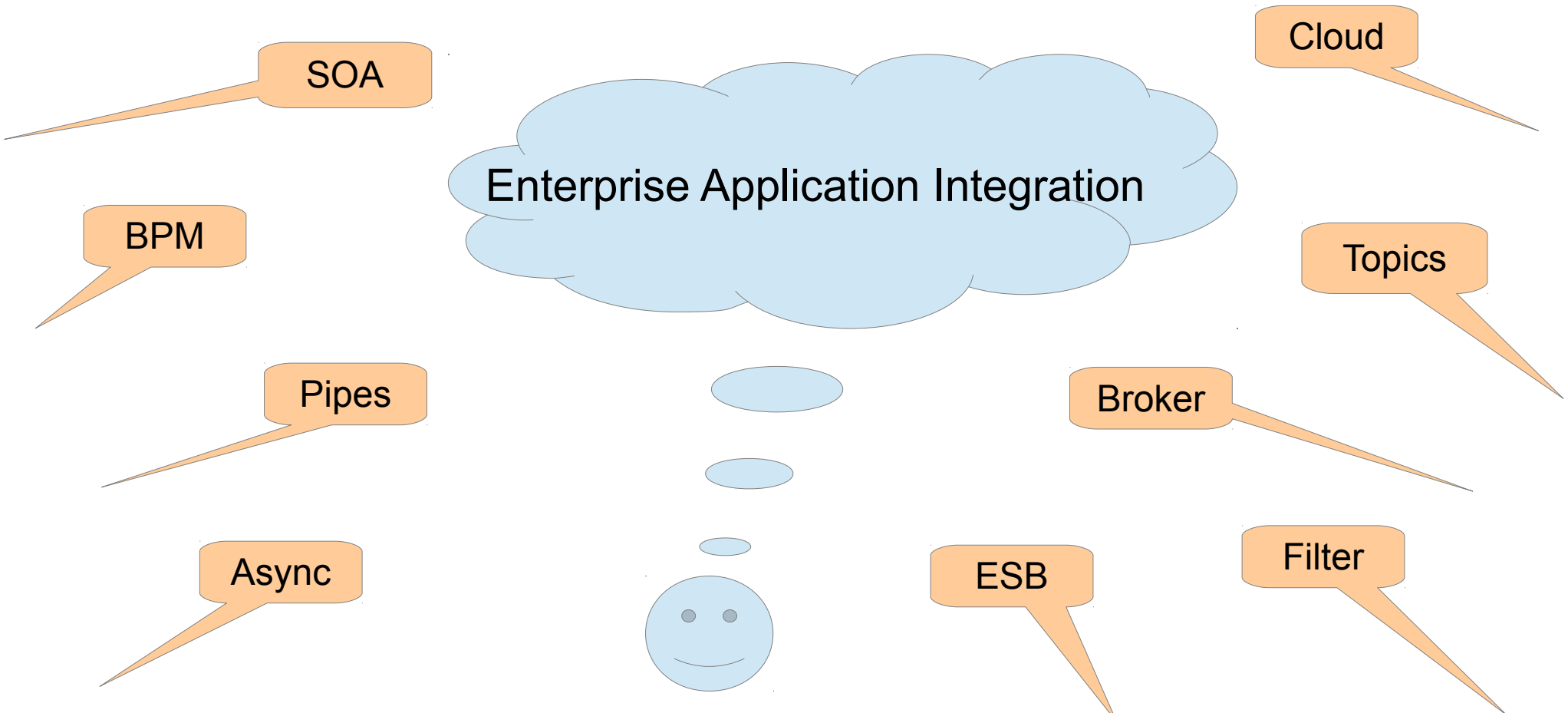
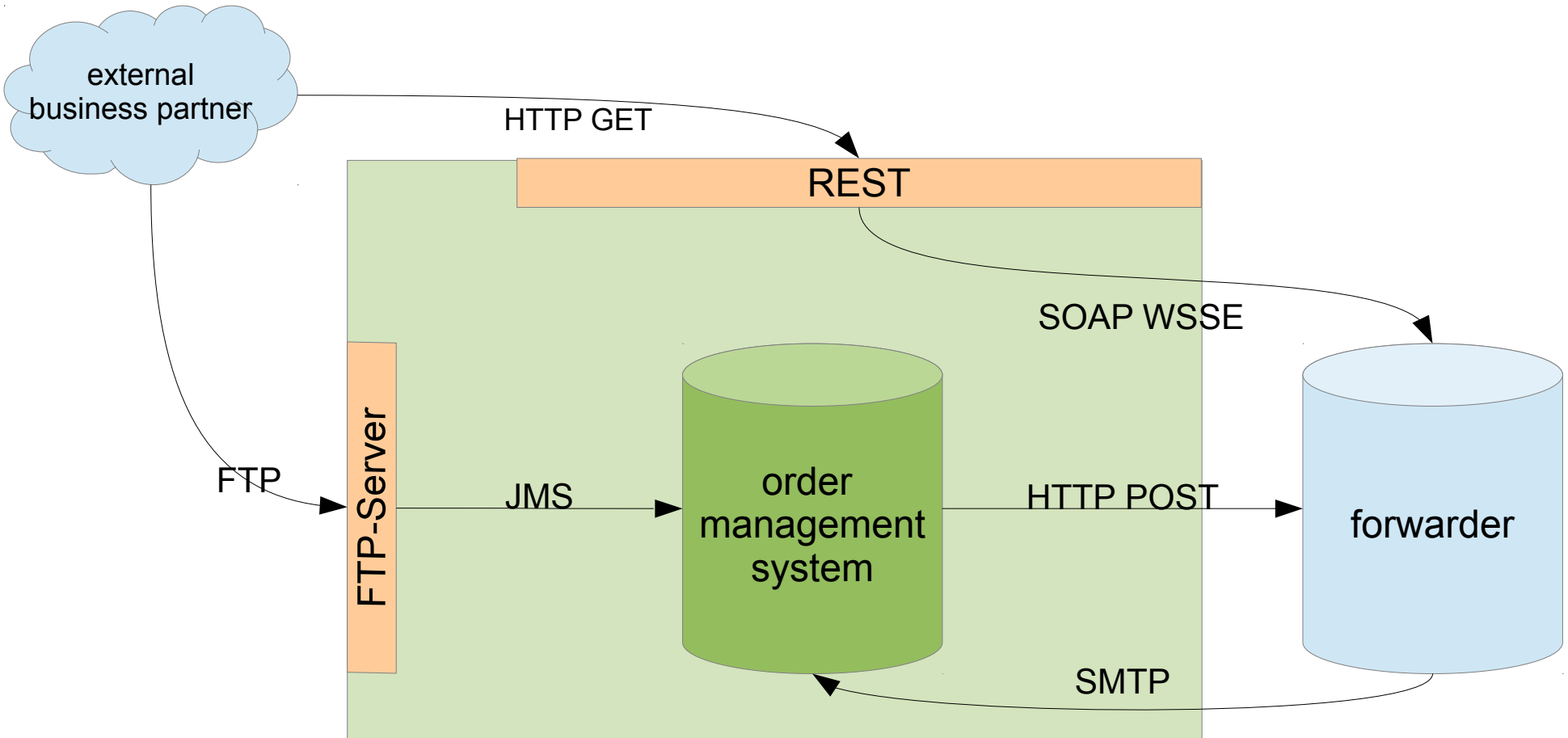
Handling the buzz



Real life scenario - a logistics service provider



Definition of 'Enterprise Application Integration'

“Enterprise application integration (EAI) is def ned as the use of software and computer systems architectural principles to integrate a set of enterprise computer applications.”

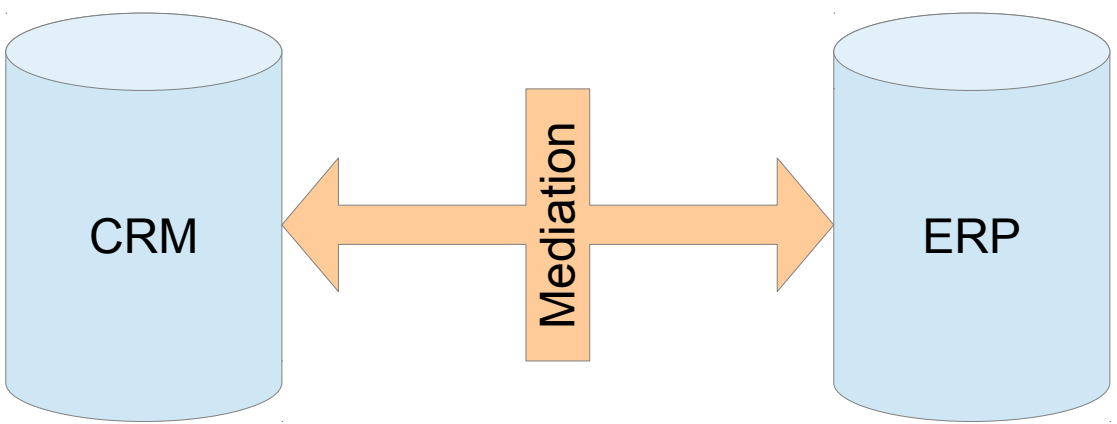
- Wikipedia

Enterprise Application Integration

- set of “computer applications” a.k.a. “information silos”

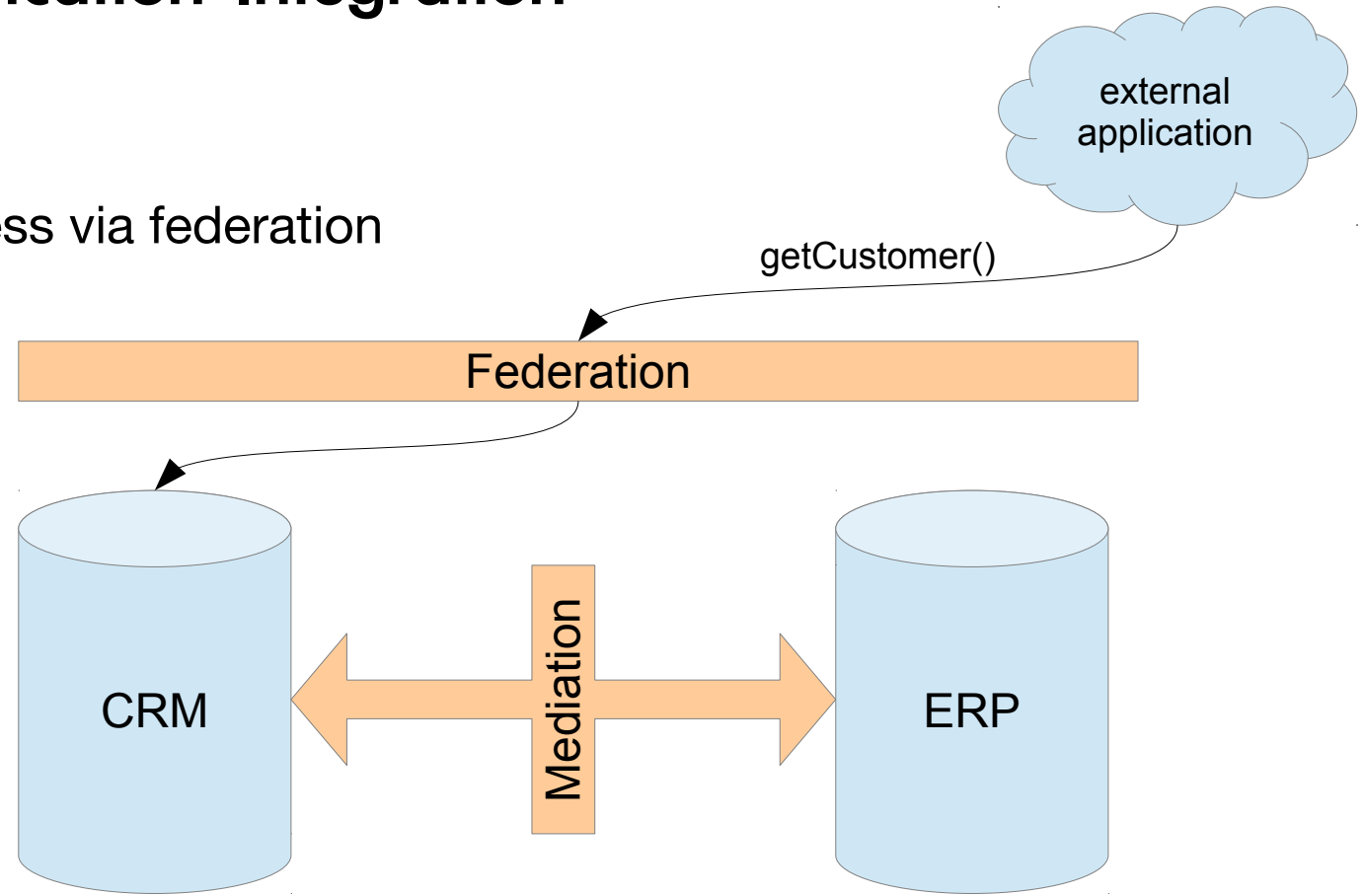
Enterprise Application Integration

- linking 'information silos' via mediation

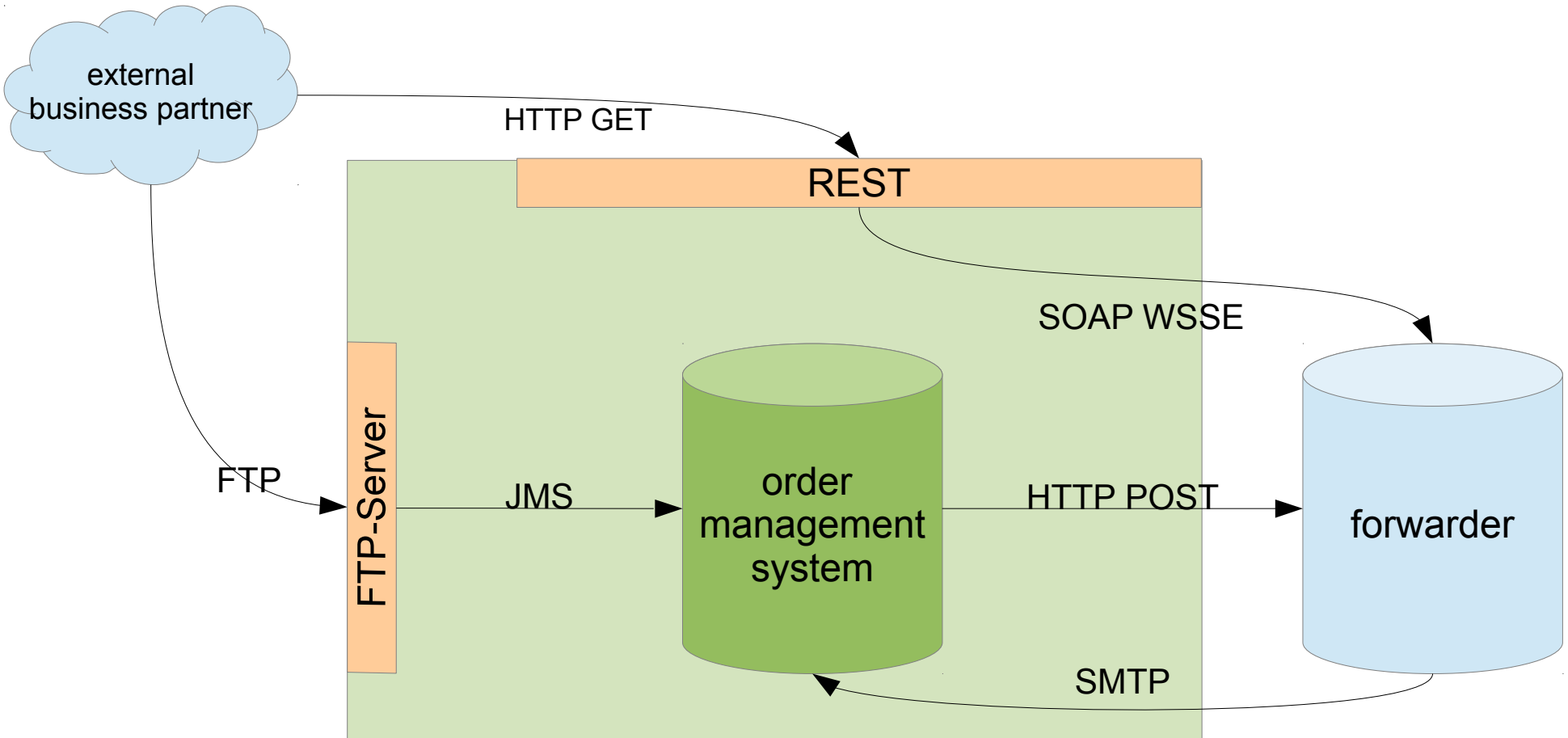


Enterprise Application Integration

- providing access via federation



Real life scenario - a logistics service provider



Enterprise Application Integration

- linking 'information silos' via
  - mediation – explicitly connecting multiple applications
  - federation – providing access for external applications

“Various technologies have been around (…). We all believe that asynchronous messaging carries the greatest promise.”

- Martin Fowler (Enterprise Integration Patterns, 2003)

EAI in the real world

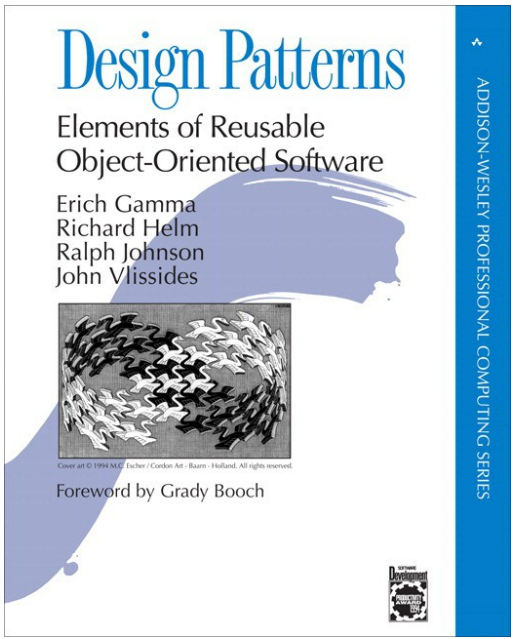
As every application has a kind of mailbox imagine a …

… **reliable** postal service

Benefits of using messaging

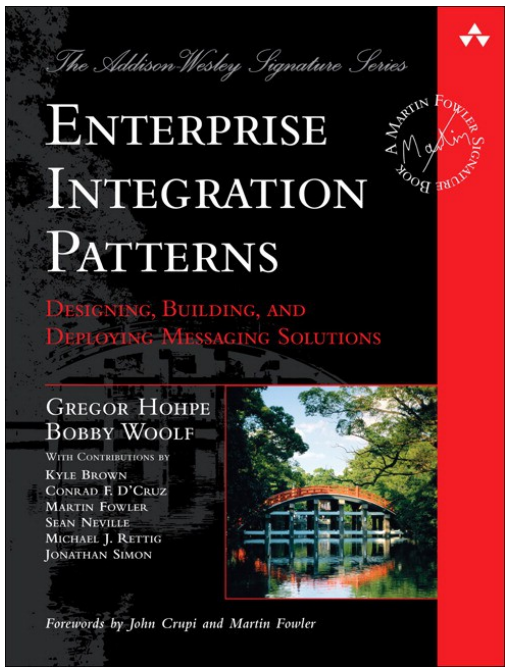
- message-based communication allows decoupling
- integrate heterogenous platforms/ languages
- variable timing & throttling – every application works at its pace
- reliable communication
- disconnected operation

Patterns applied to EAI



Design Patterns (Gamma et al), 1994

Proven solutions for common problems



Enterprise Integration Patterns, 2003

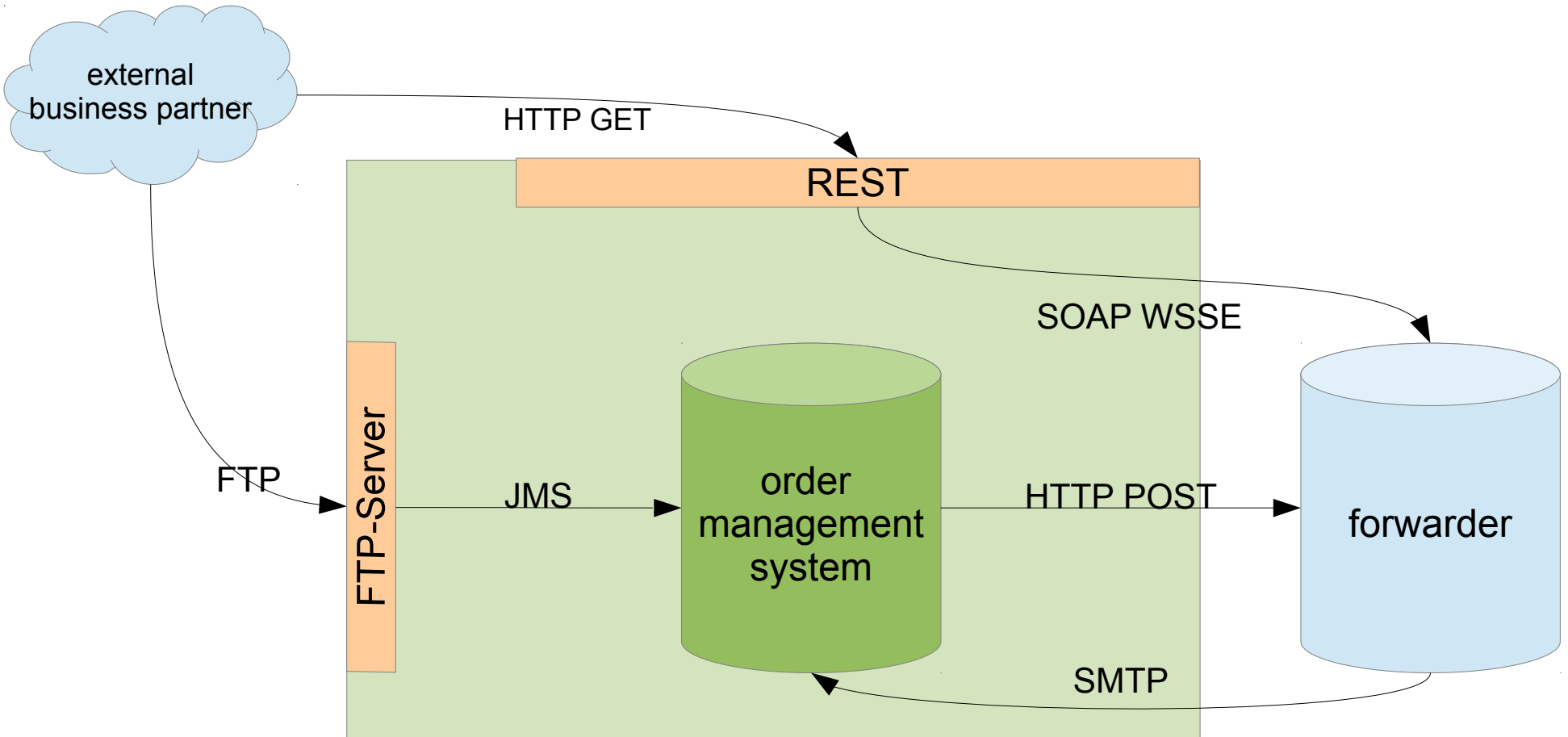
Swiss-army knife for asynchronous messaging

Samples for common EAI patterns

- adapters
- pipes and filters
- router
- transformer
- splitter
- aggregator

...and many more

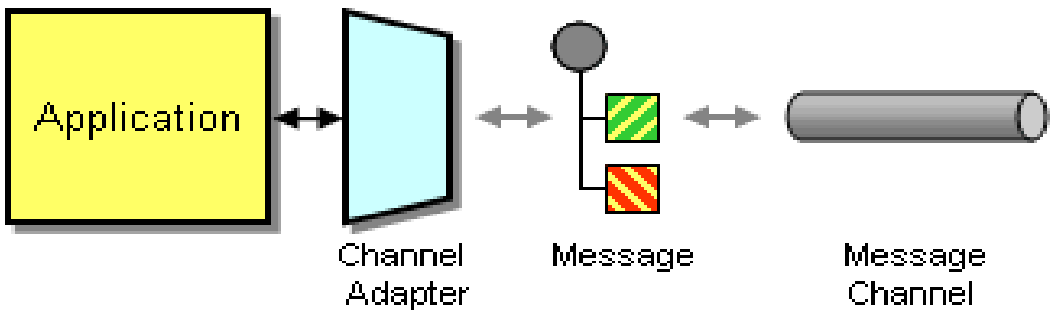
EAI in real life - domain model



EAI Pattern: Inbound- and Outbound-Adapter (Scenario)

- every application has a specific interface
  - business partner's system provides data via FTP
  - forwarder's system only provides SOAP WSSE for tracking data
  - forwarder's system sends E-Mail notification for successful shipping

EAI Pattern: Inbound- and Outbound-Adapter



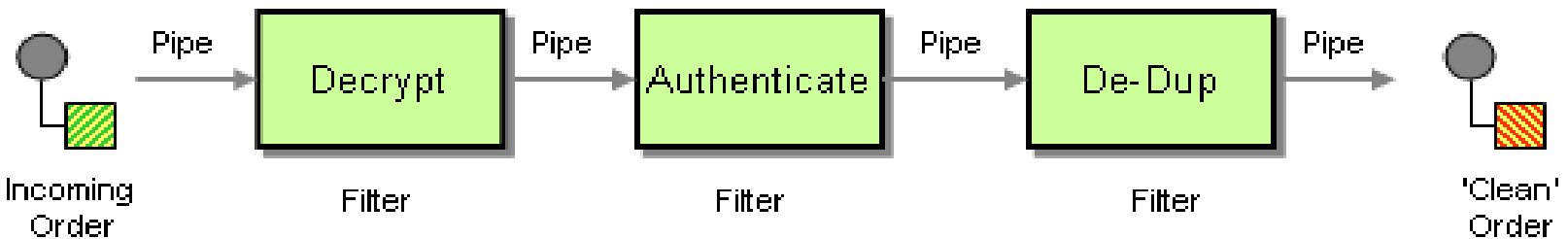
- adapter = endpoint fitting the specific capabilities of the remote system's API
- inbound adapter = from application to EAI system
- outbound adapter = from EAI system to application

http://www.eaipatterns.com/ChannelAdapter.html

EAI Pattern: Pipes and Filters (Scenario)

- decouple processing into simple steps unaware of each other
  - new purchase order arrives as a message
    - order is encrypted to insure integrity → decrypt
    - trusted customer's deserve special treating → authenticate
    - we don't want duplicated orders → check

EAI Pattern: Pipes and Filters



- divide complex processing tasks into simple steps
- easier maintenance, reusable and exchangeable
- steps (Filters) are connected by channels (Pipes)

http://www.enterpriseintegrationpatterns.com/PipesAndFilters.html

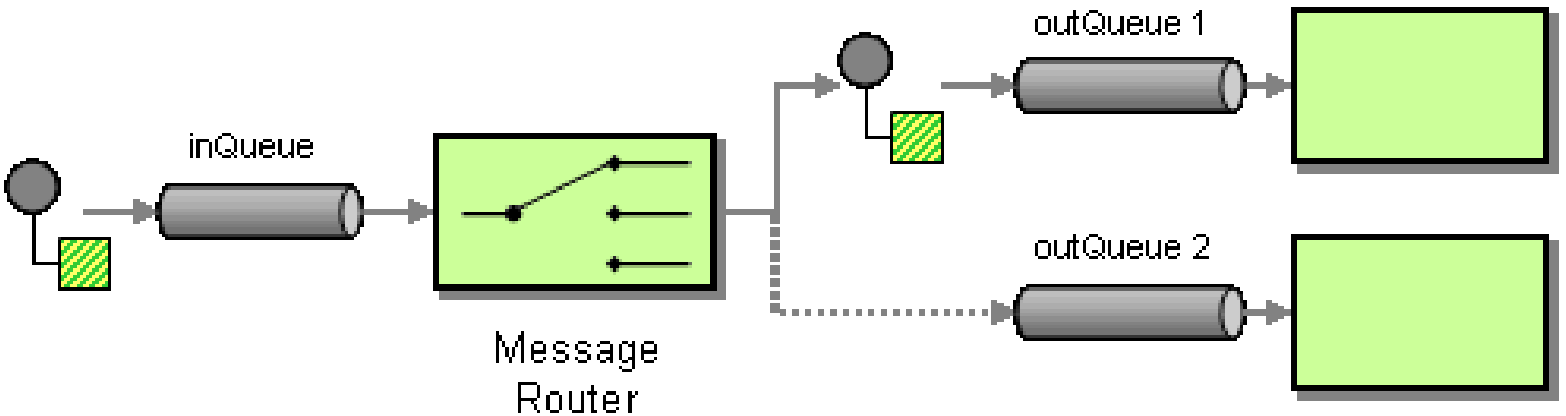
EAI Pattern: Gateway Sample

- **Demo**
  - configuration of pipes and filters and howto use in your application
  - see “gateway-sample.xml” for details

EAI Pattern: Message Router (Scenario)

- forward messages depending on conditions
  - product type: downloadable software cannot be shipped
  - payment method: credit card transactions vs. direct debit

EAI Pattern: Message Router



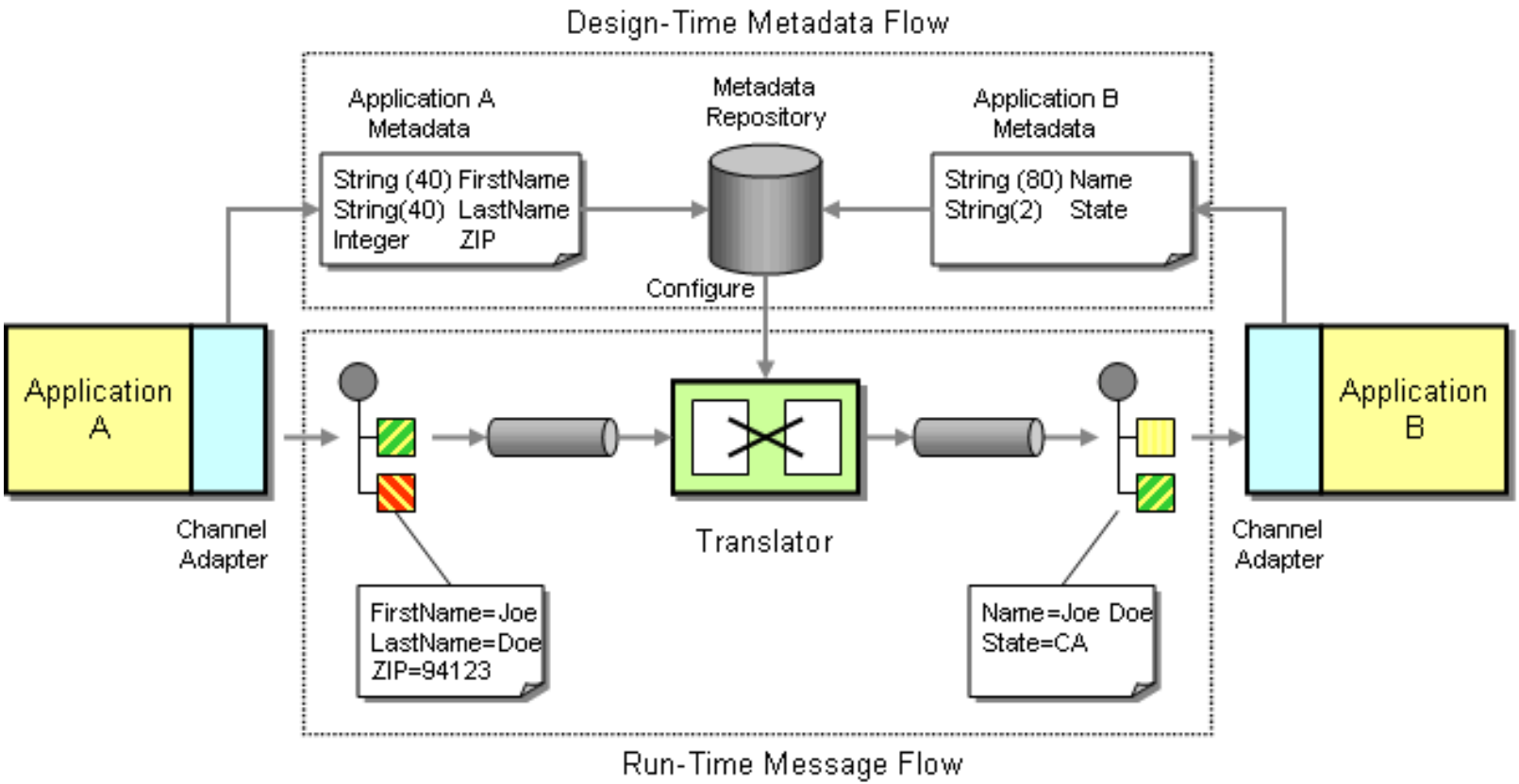
- a message router forwards but doesn't modify message
- a message router can have multiple output channels (difference to filter)
- decoupled: surrounding components are unaware of its existence

http://www.enterpriseintegrationpatterns.com/MessageRouter.html

EAI Pattern: Transformer (Scenario)

- communicating applications have a different data model
  - customer data from ERP (A) needs to be send to Forwarder (B)
    - different data model
    - fields have different semantics
    - fields have different length

EAI Pattern: Transformer

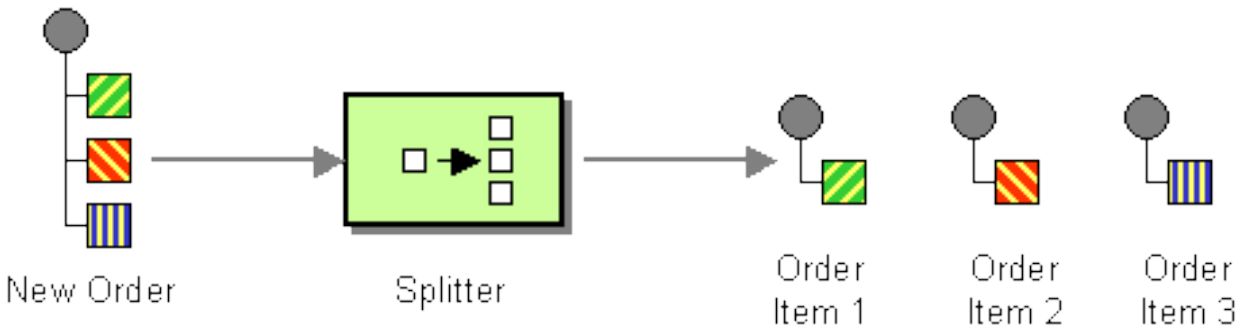


http://www.enterpriseintegrationpatterns.com/MessageTransformationIntro.html

EAI Pattern: Splitter (Scenario)

- message shall be split for further processing
  - a CSV file shall be imported line by line
    - warehouse system sends picking information for orders in a large CSV file

EAI Pattern: Splitter



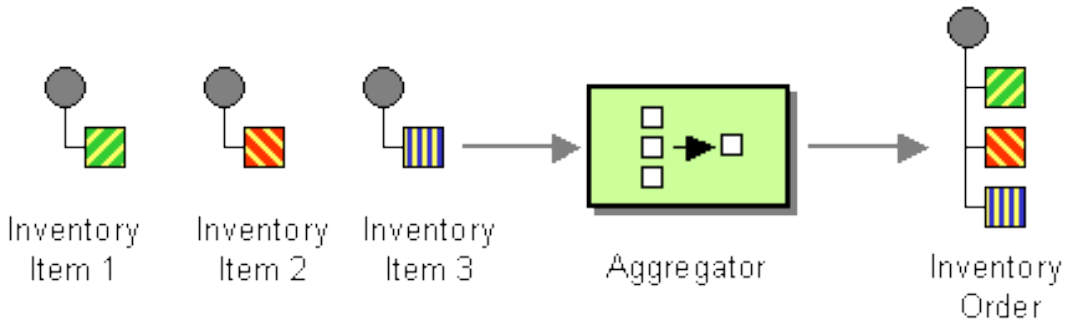
- splitter publishes one message for each item of the original message

http://www.enterpriseintegrationpatterns.com/Sequencer.html

EAI Pattern: Aggregator (Scenario)

- single messages shall be combined for further processing
  - state of order positions is aggregated to report order state
    - aggregate order state depending on shipping state of order positions

EAI Pattern: Aggregator



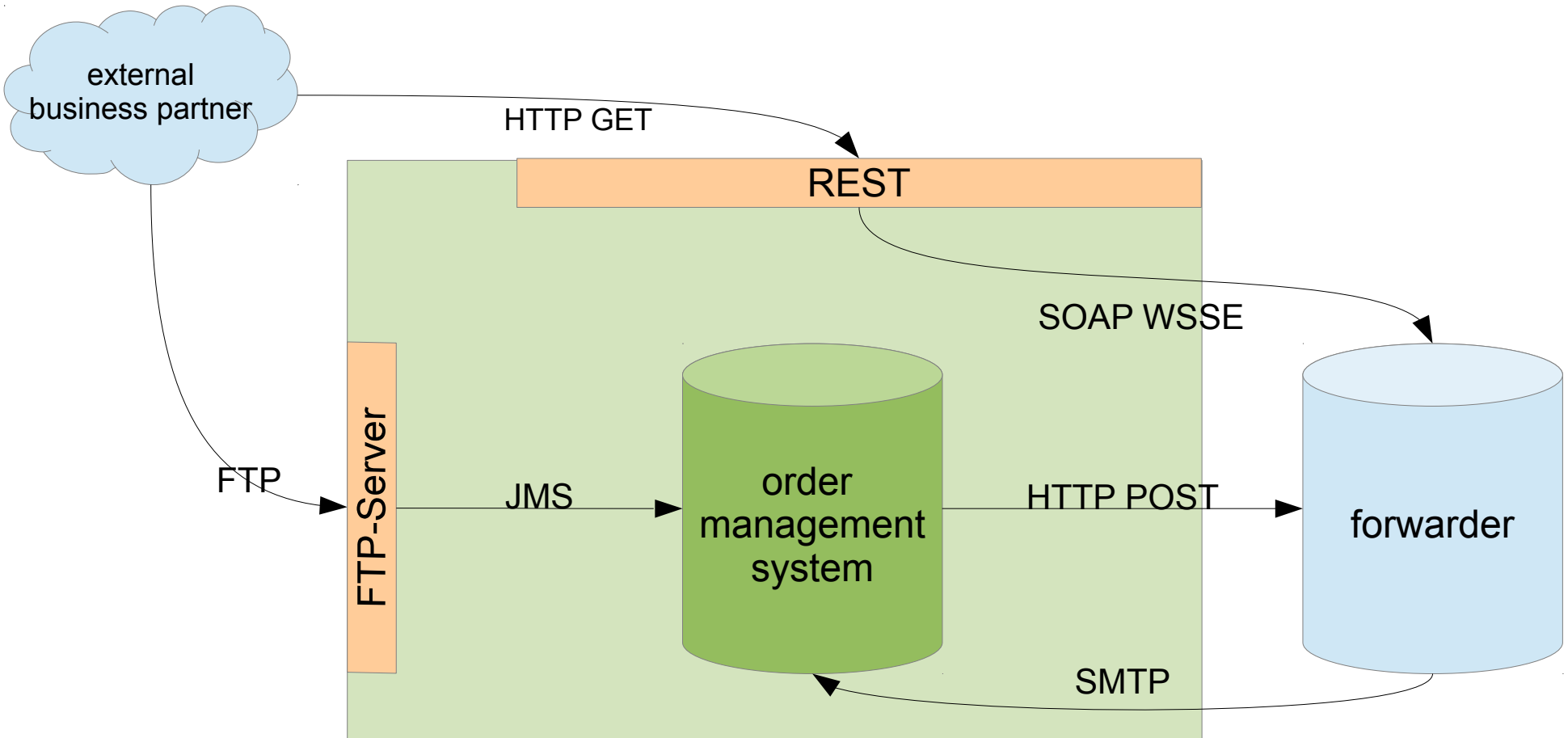
- aggregator collects messages until a set of related messages is complete

http://www.enterpriseintegrationpatterns.com/Aggregator.html

EAI Pattern: Demo

- **Demo**
  - scenario: an importer for CSV files with different content
  - configuration of file to string transformer
  - configuration of a router
  - configuration of an expression based splitter
  - see “csv2db-route-context.xml” for details

Real life scenario - the cloud



EAI in the cloud

- specific environment
- limited number of I/O gateways
  - no filesystem → no hot folder
  - mostly no open ports → no basic TCP to custom ports
- scalable but unique endpoints are needed
  - transport mostly via JMS, AMQP or HTTP
- keep an eye on traffic and network I/O

Q & A

Feel free to

- ask questions now
- contact us on twitter @goldstift & @stefanreuter
- post issues on github:
  https://github.com/aheusingfeld/javaone2012/issues

Thanks for your attention

If you have any questions afterwards

- contact us on twitter
  - @goldstift
  - @stefanreuter

- post issues on github so everyone can benefit:
  https://github.com/aheusingfeld/javaone2012/issues

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