

Coordinated Web Services Orchestration

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Presentation overview

Introduction
Business Event
Orchestration

Structured Web Services Orchestration

**Existing notification
specifications**

Overview of eventing standards

**Existing coordination
specifications**

Overview of coordination standards

**Business Event
Architecture**

How can we build a Business Event
Architecture? (reusing existing standards)

Conclusions

Conclusions & Future Research



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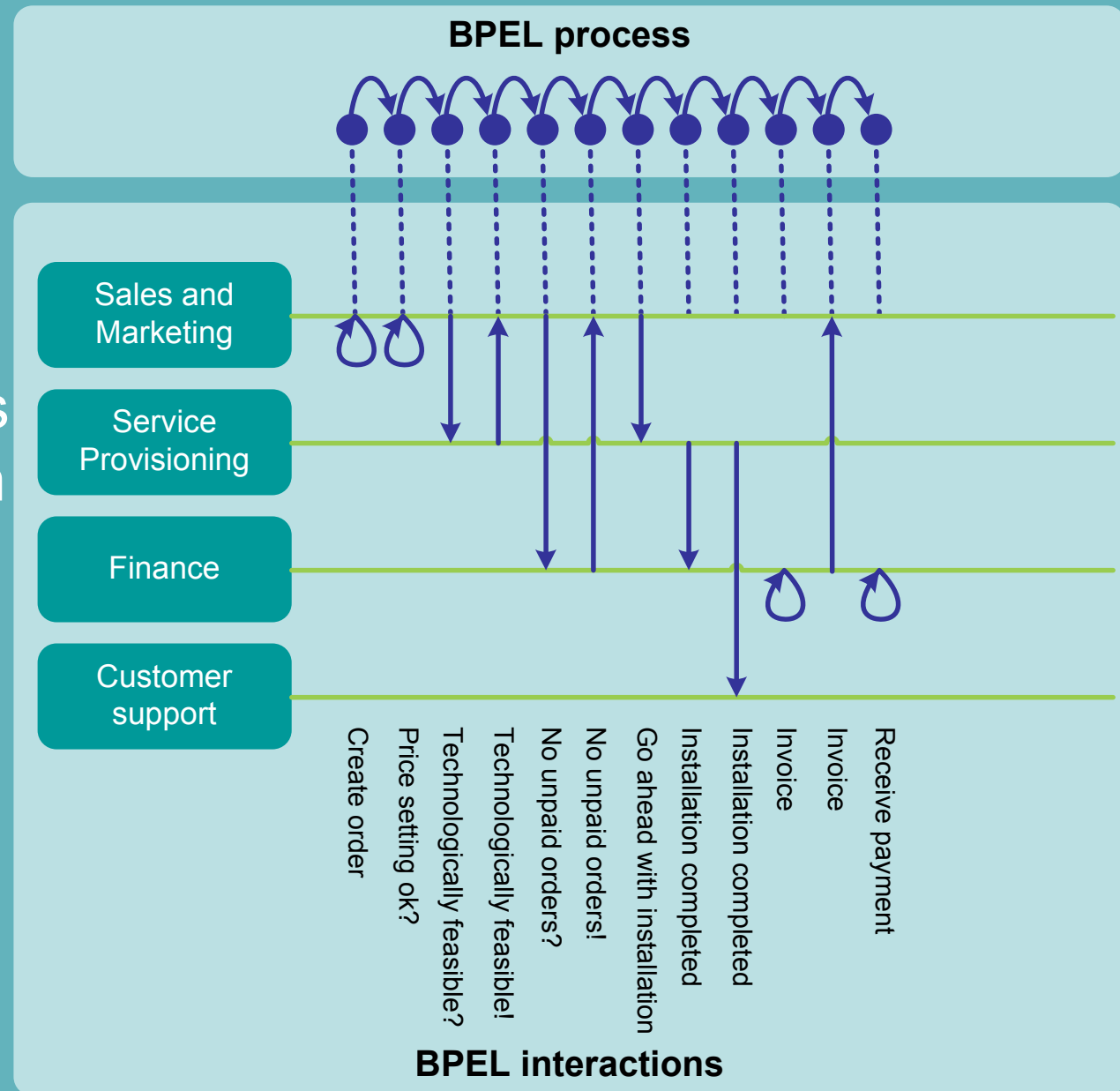
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A traditional BPEL process

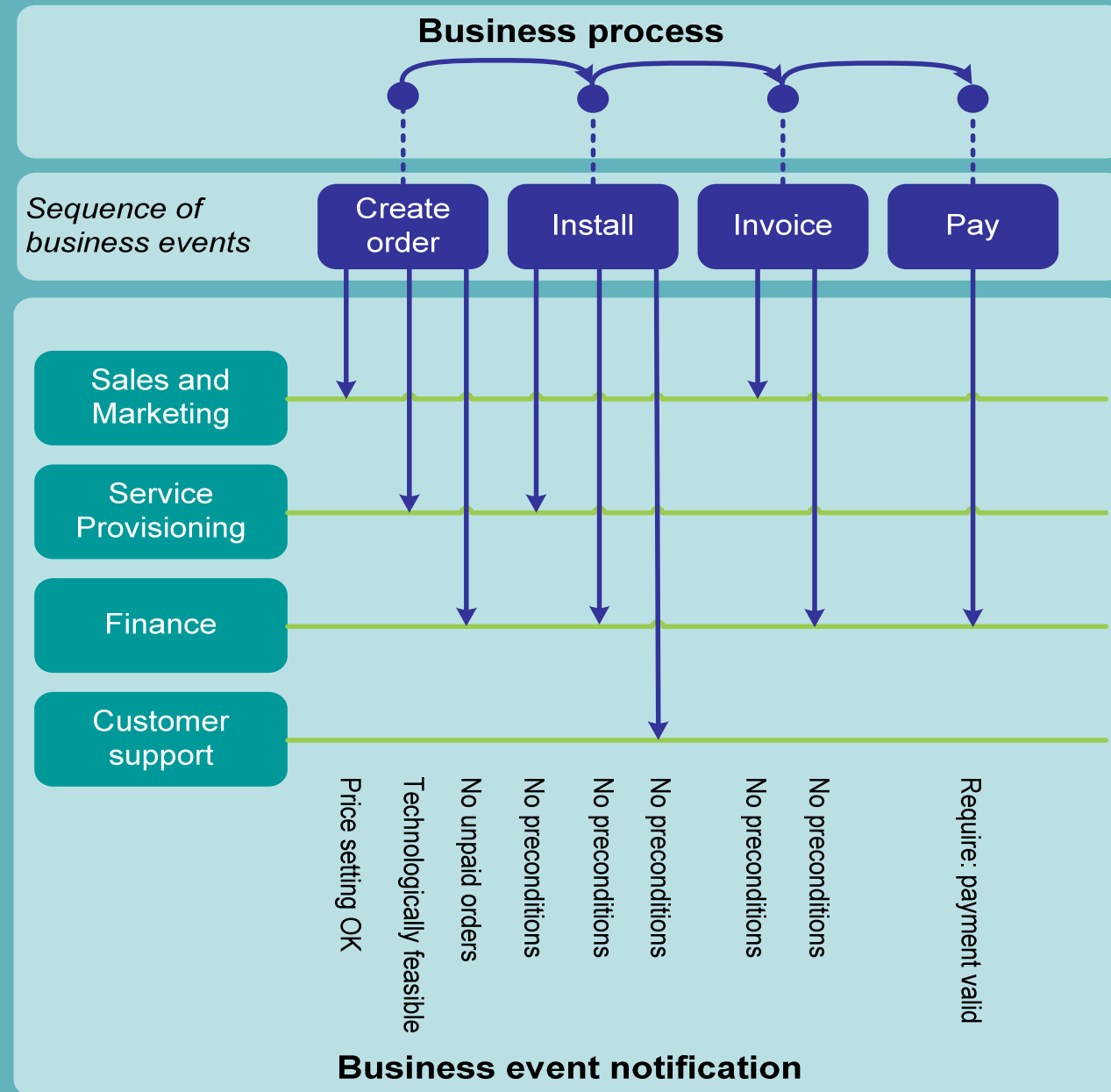
- Spaghetti of messages
- Business and technical aspects interwoven
- No separation of business activities and coordination of these activities
- Low-level
- Overview easily lost
- Challenge: structure!





Business Event Orchestration

- Business event groups a set of messages
- This set of messages is relevant for one specific business activity
- Notification
 - of Business event participants
 - of desire to process event
- Coordination
 - atomicity
 - business rules and constraints as preconditions of the business event





Business Process and Business Events

- Business events are high-level units of coordination and atomic units of (inter)action
- Notification and coordination aspects abstracted away
- Building blocks for business processes
- High-level and clear overview

Business process layer



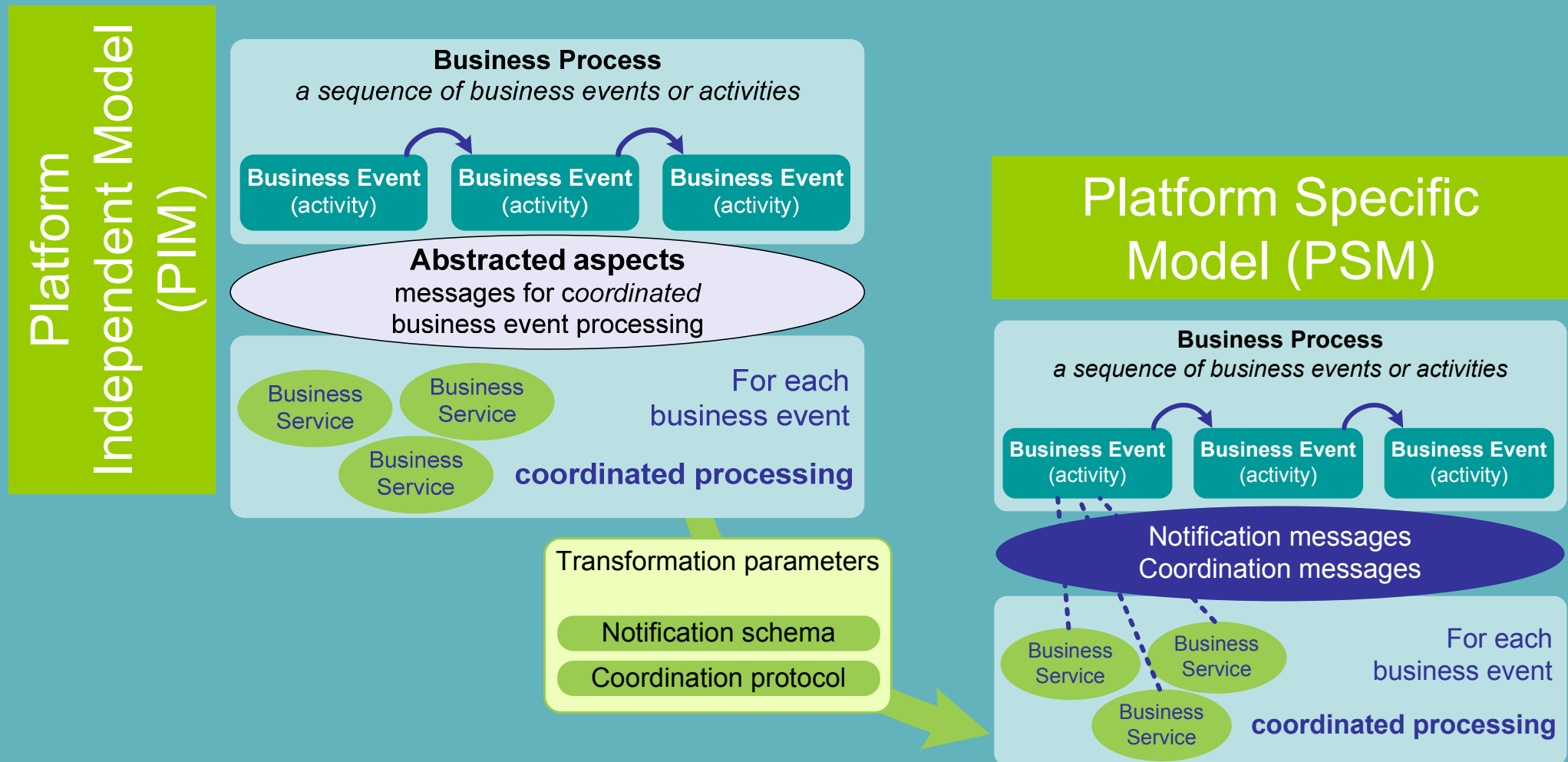
Technical layer





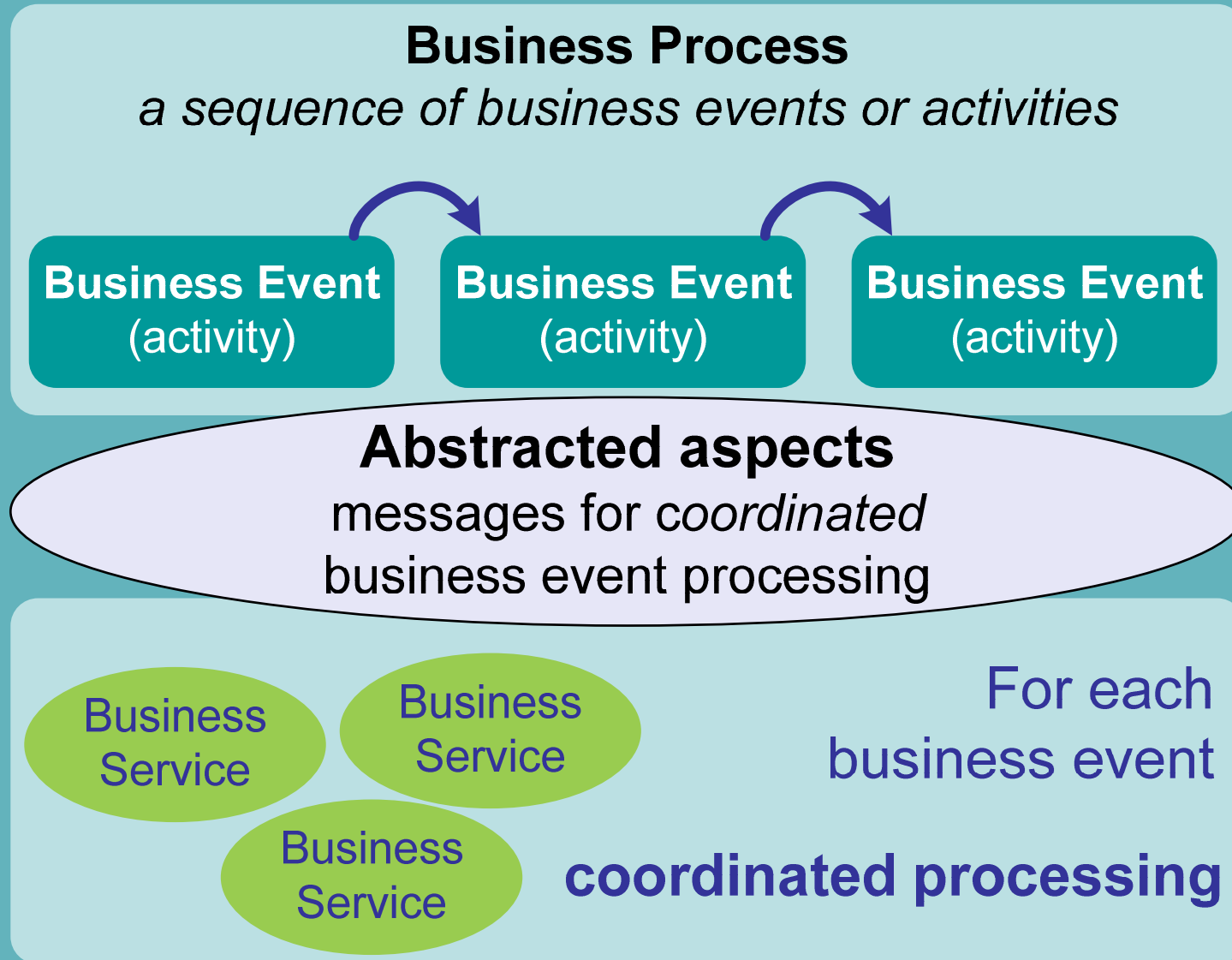
A Model-Driven Approach

The Business Event Approach fits well in the model driven architecture (MDA)



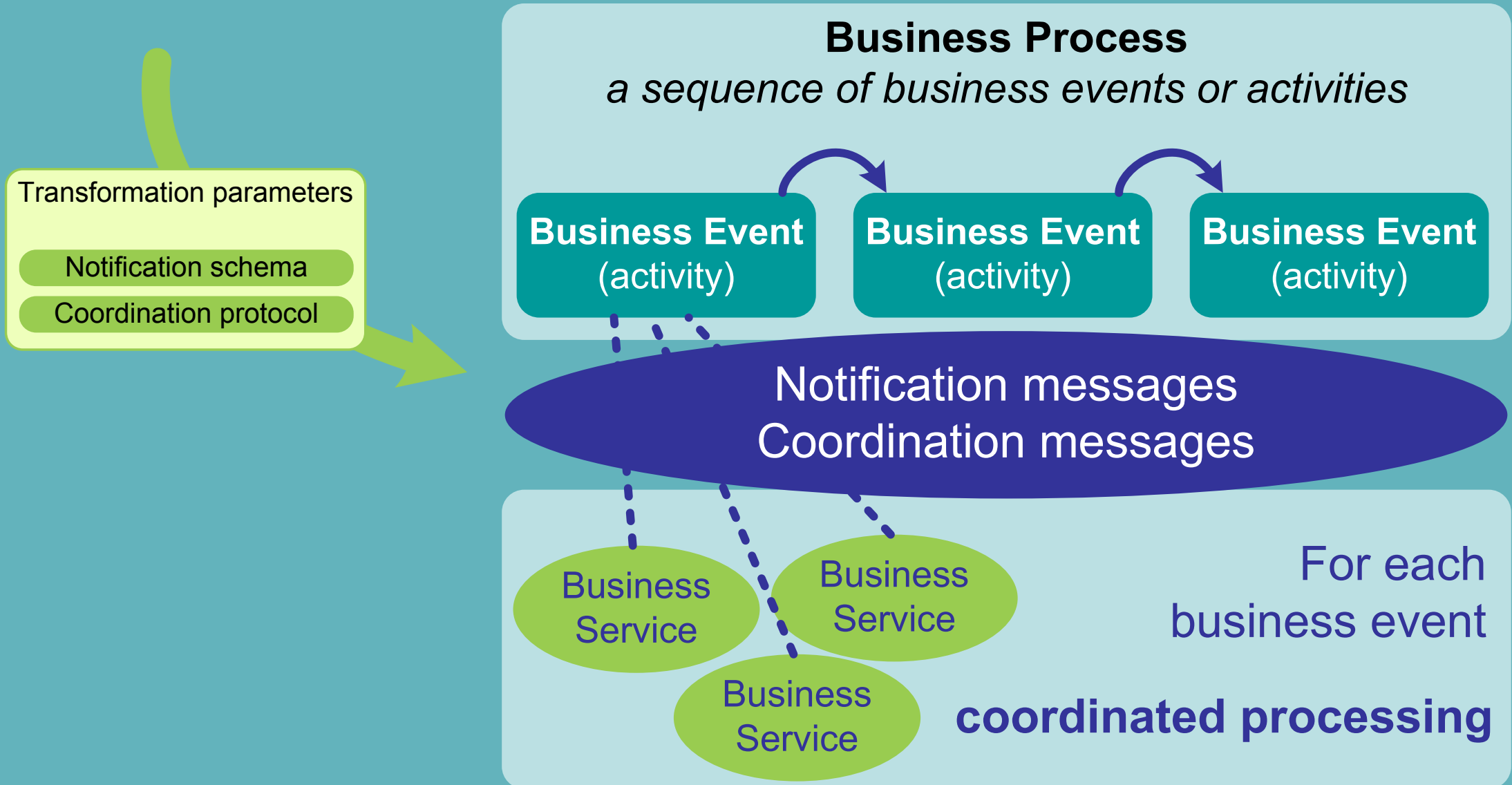


Platform Independent Model





Platform Specific Model





Towards a business event architecture

- WS based Business Event architecture
- Notification + coordination specification = Business Event architecture ?
- Discussed notification specifications:
 - (WS-Events – see text)
 - WS-Eventing
 - WS-Notification (including the brokered version)
- Discussed coordination specs:
 - WS-Coordination
 - WS-Coordination Framework



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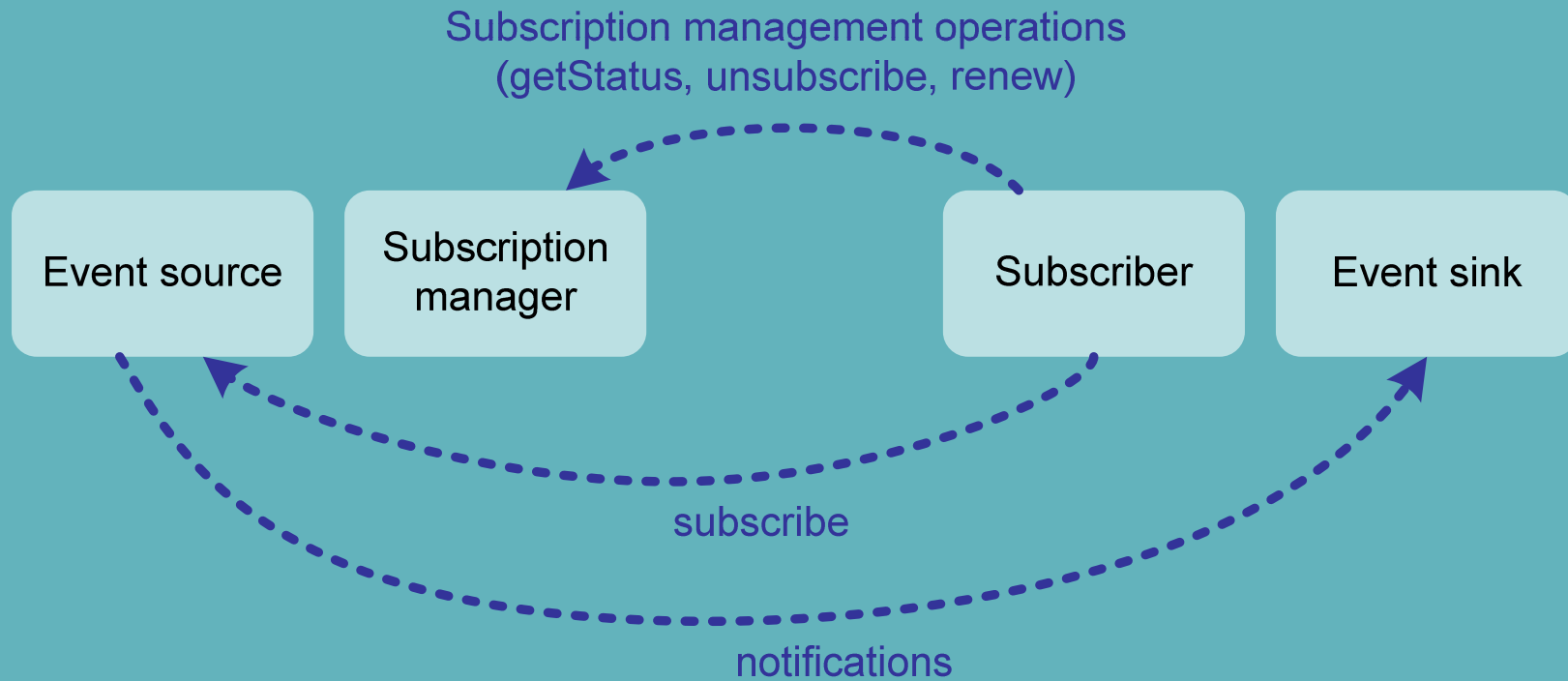
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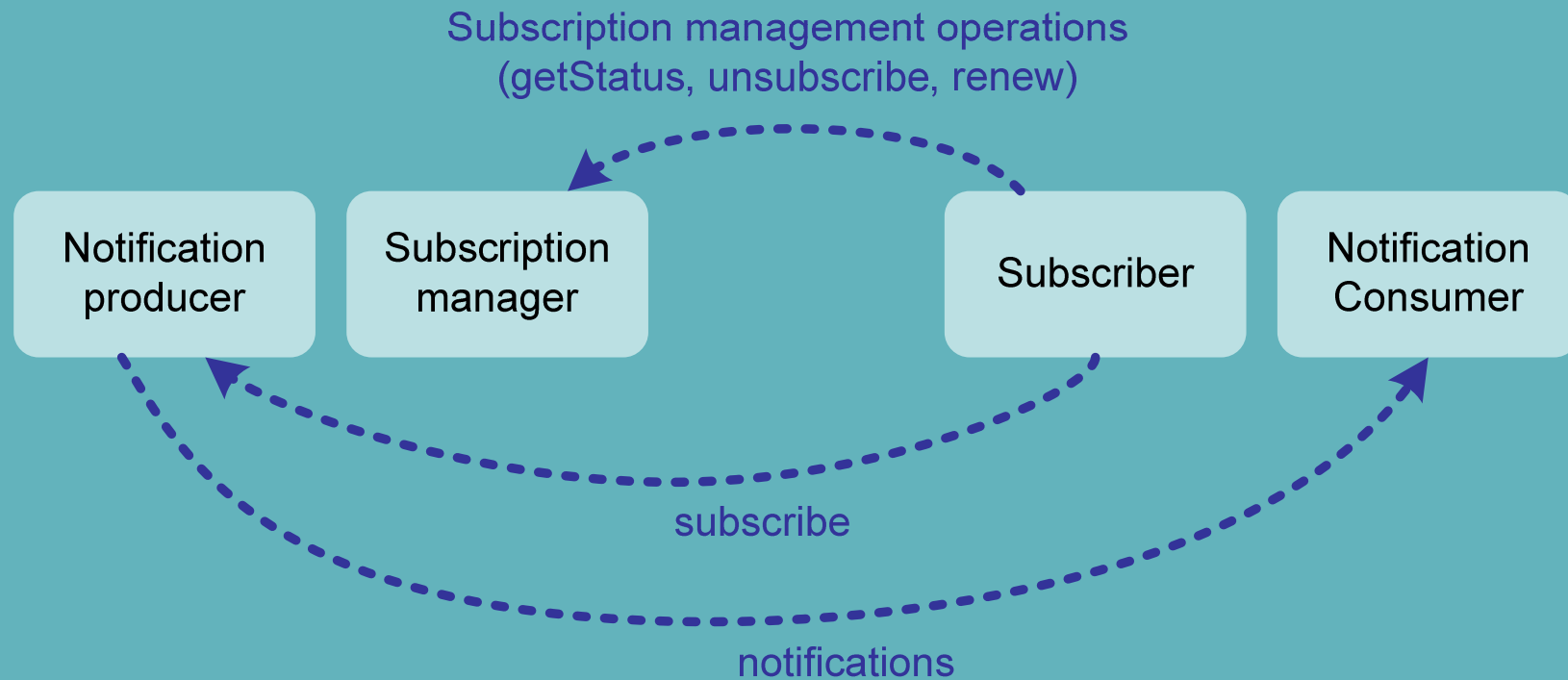


WS-Eventing



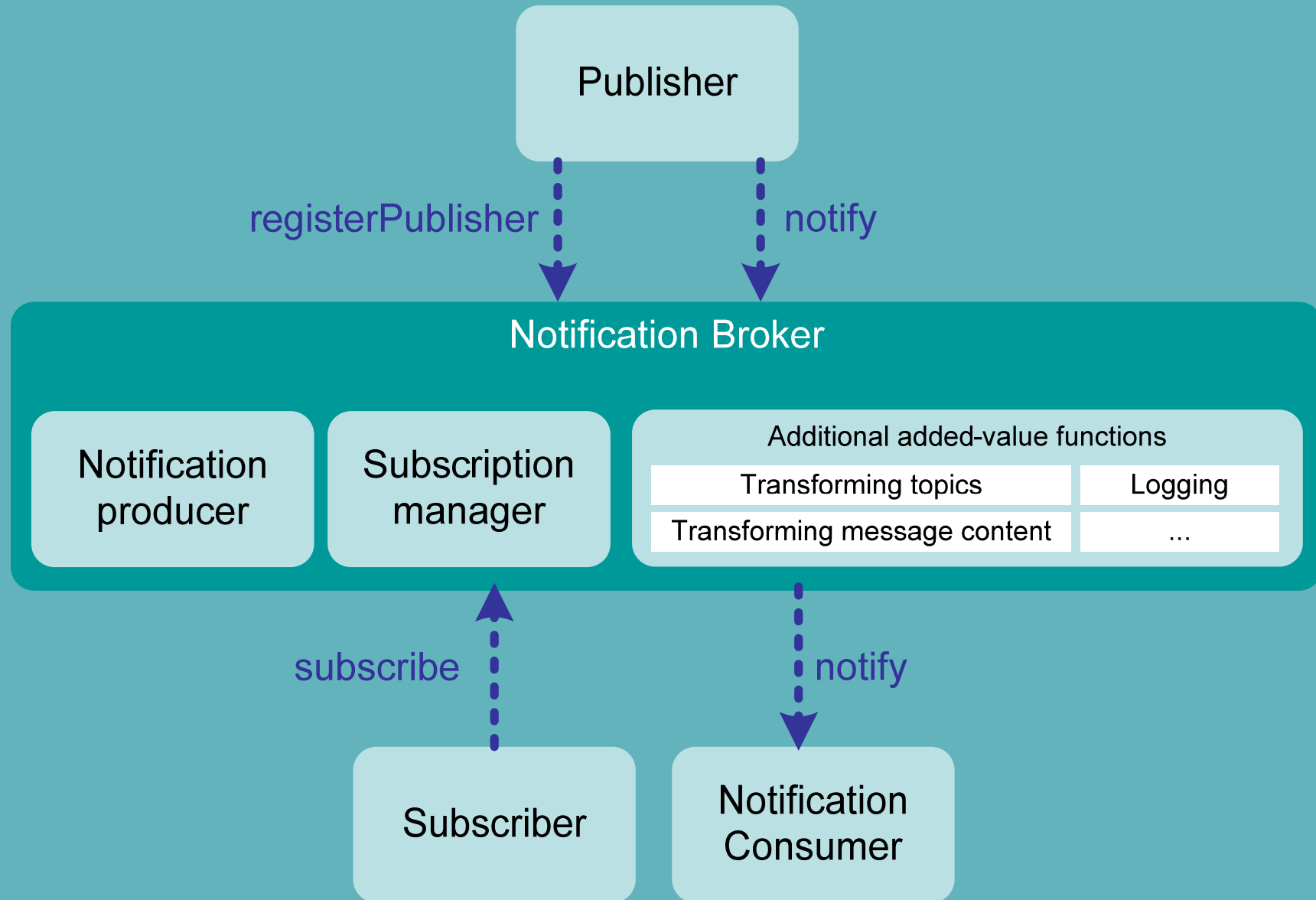


WS-Base Notification





WS-Brokered Notification





Concluding remarks on eventing

- Most standards have fire-and-forget character
- Not sufficient for Business Event approach
- Business Events need **coordinated** processing
- Need for adding coordination capabilities to the eventing architecture
 - Studying coordination specifications



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WS-Coordination (WS-C)

Client application

Participant

Participant

Coordinator

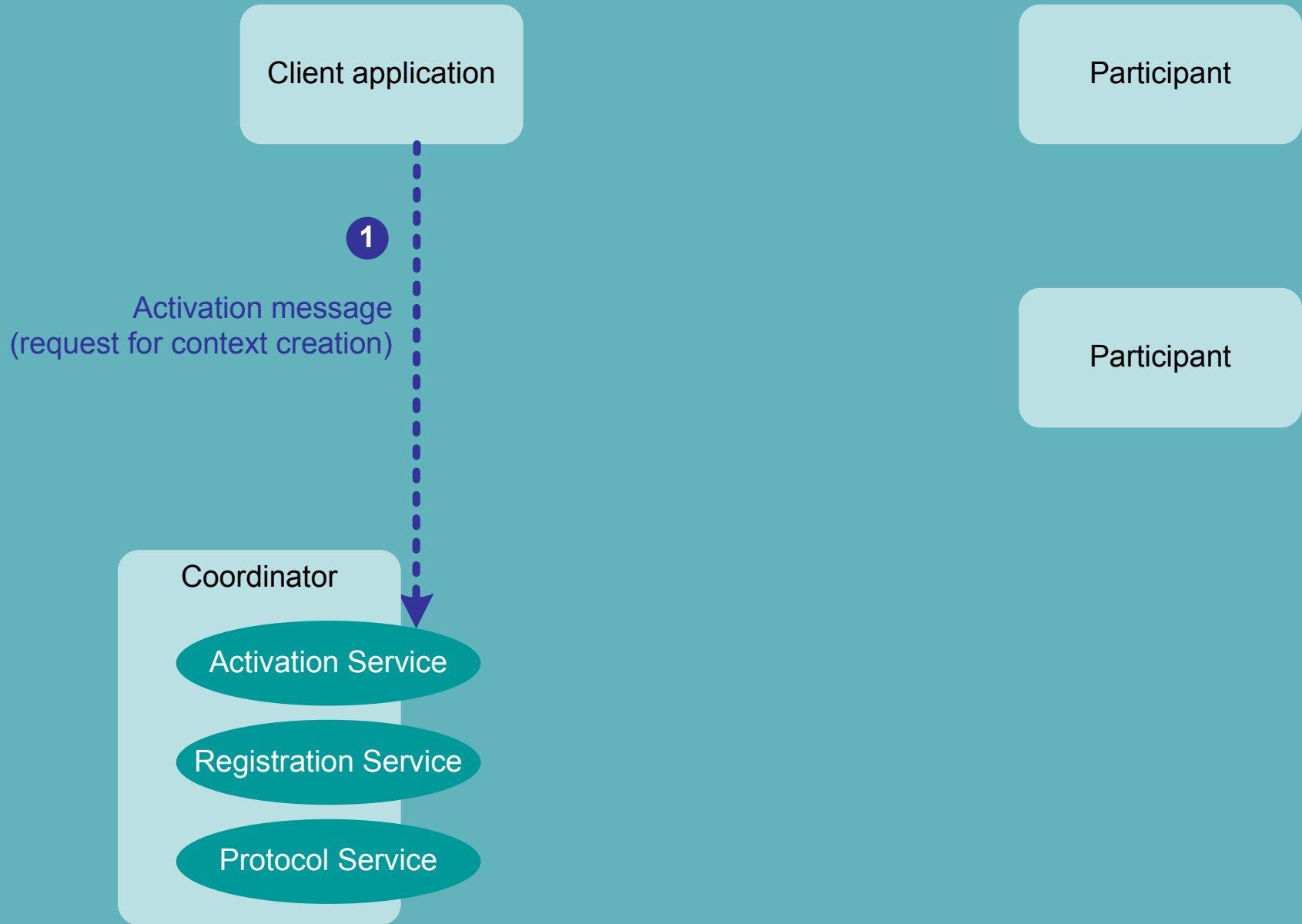
Activation Service

Registration Service

Protocol Service

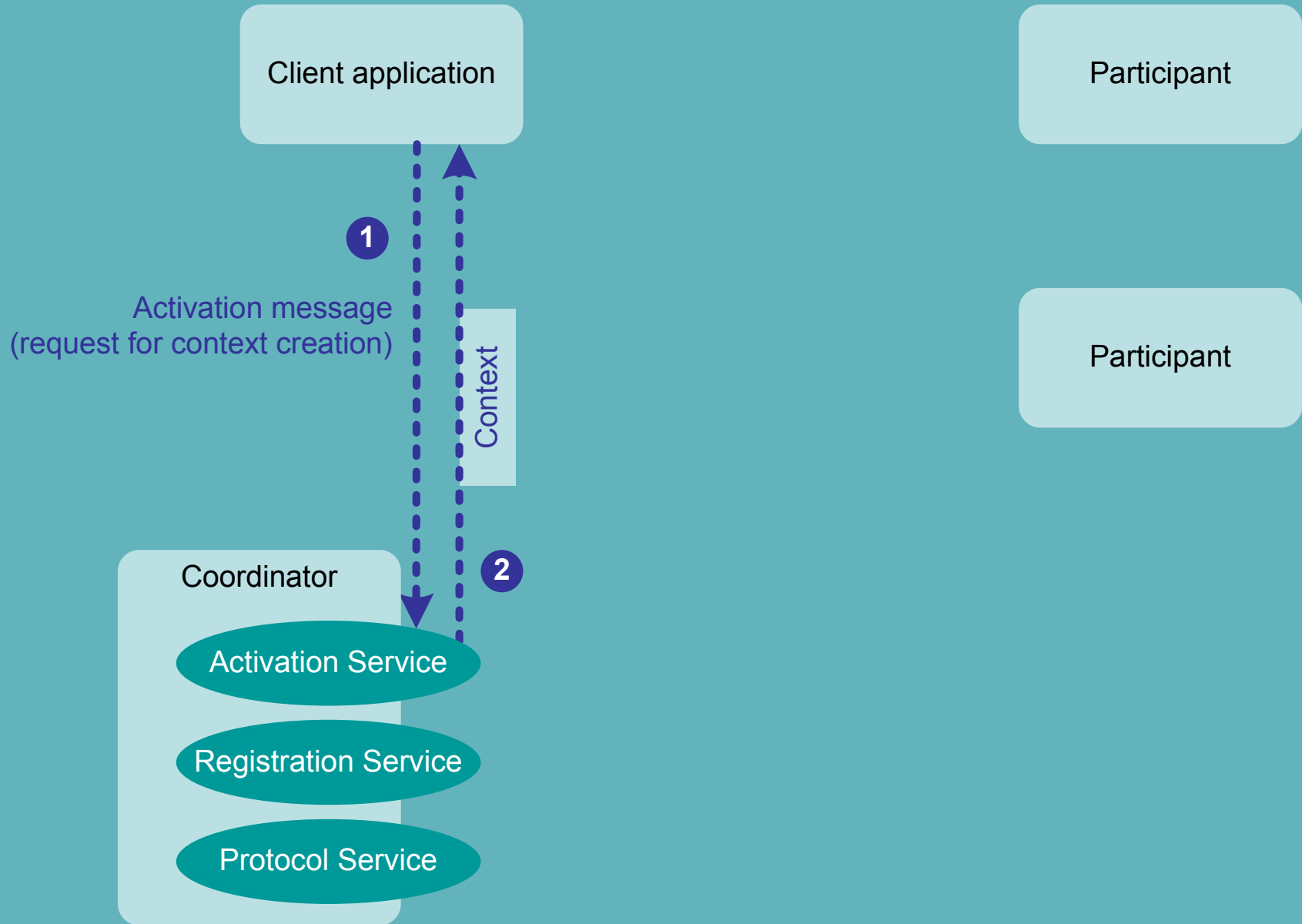


WS-Coordination (WS-C)



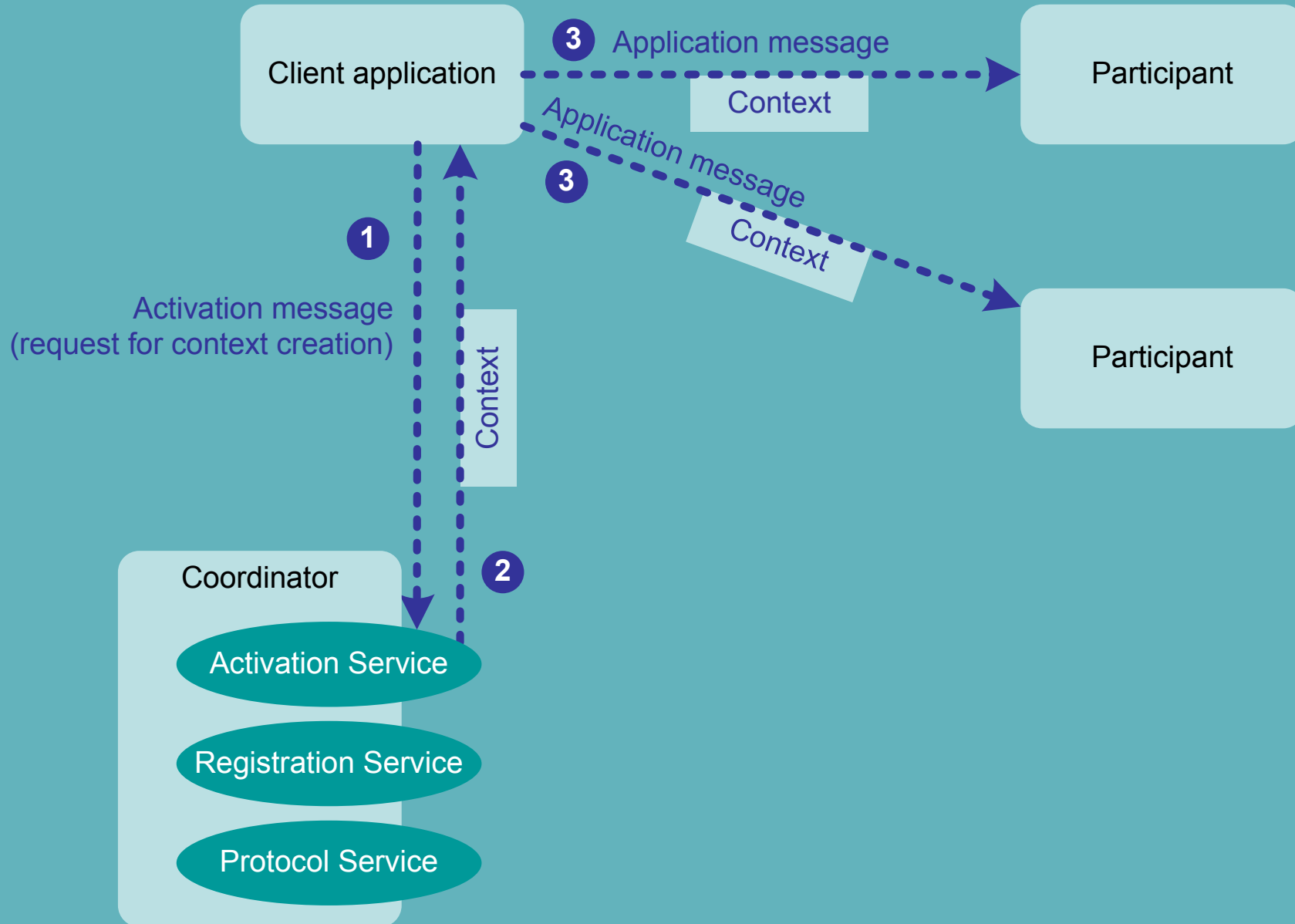


WS-Coordination (WS-C)



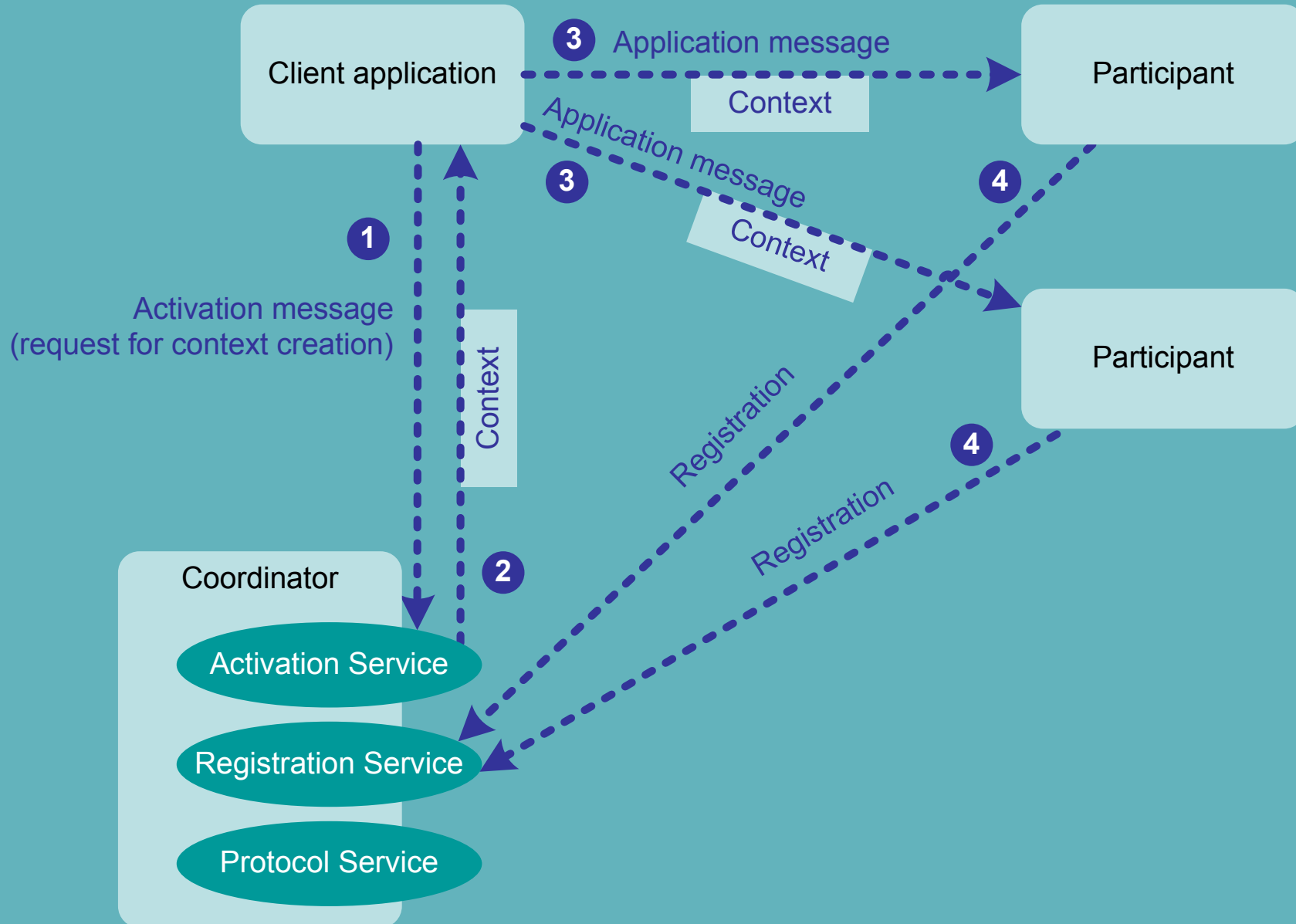


WS-Coordination (WS-C)



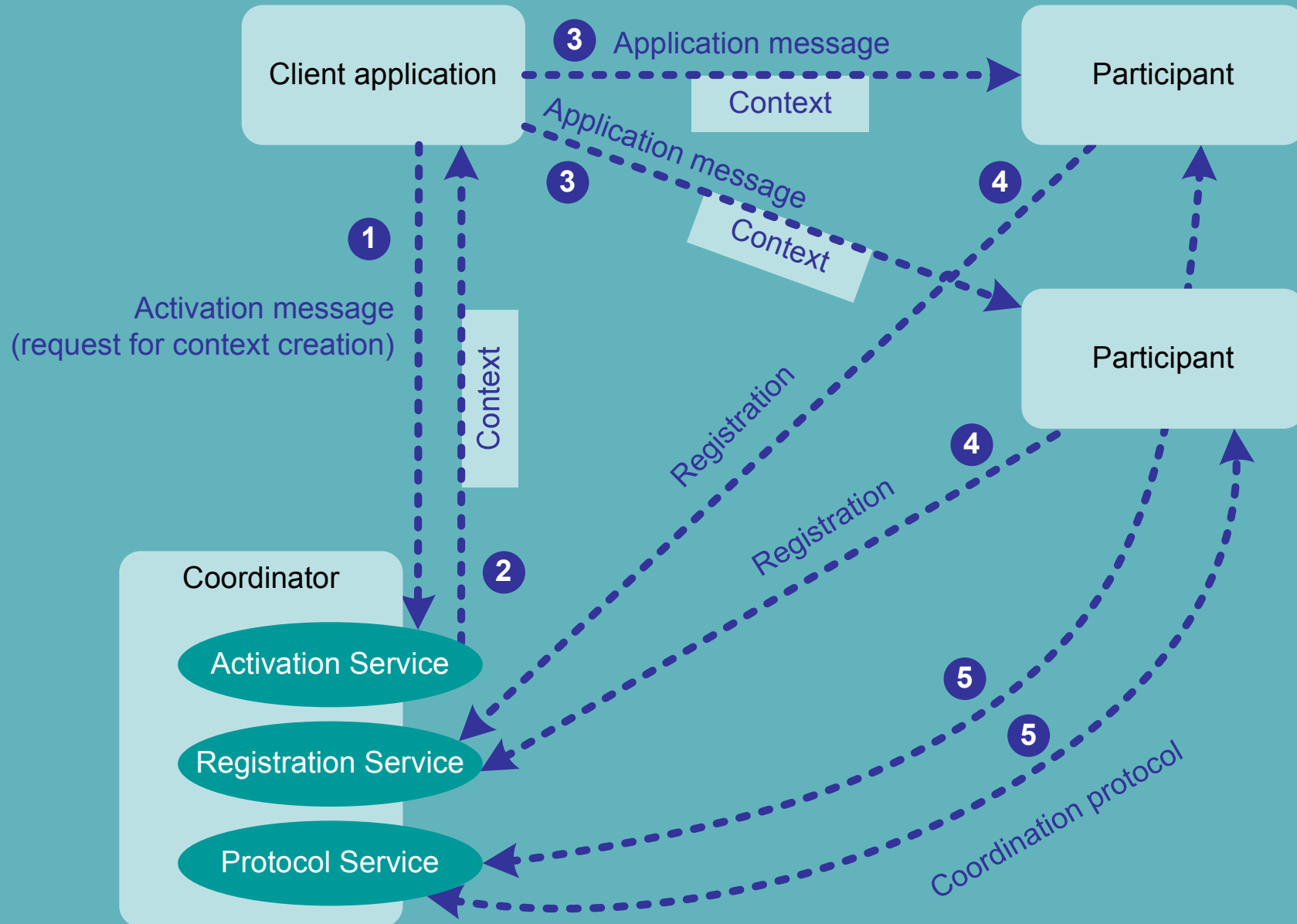


WS-Coordination (WS-C)





WS-Coordination (WS-C)





WS-Coordination Framework (WS-CF)

Client application

Participant

WS-Context

Context Service

Context Manager Service
optionally

WS-Coordination Framework

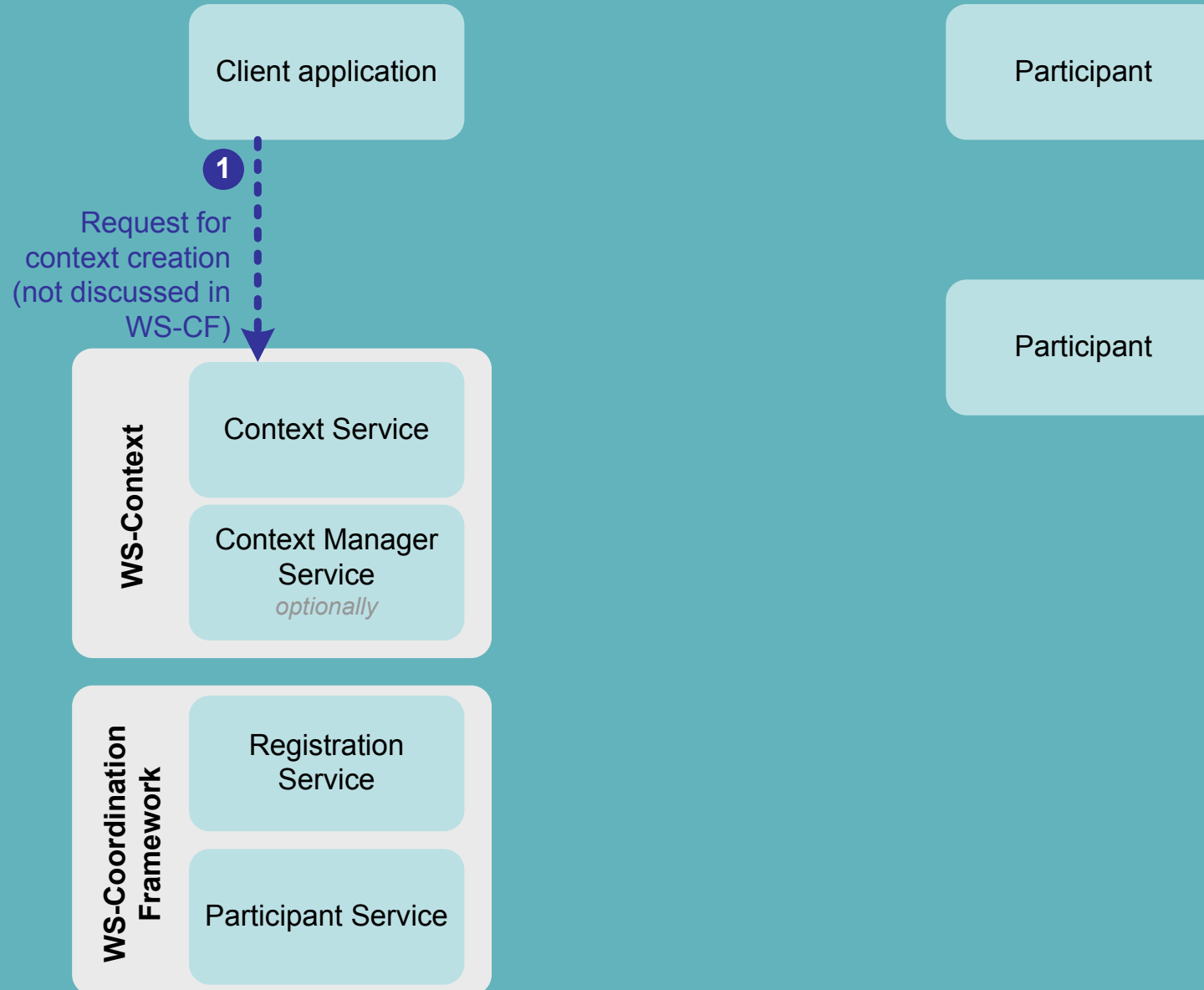
Registration Service

Participant Service

Participant

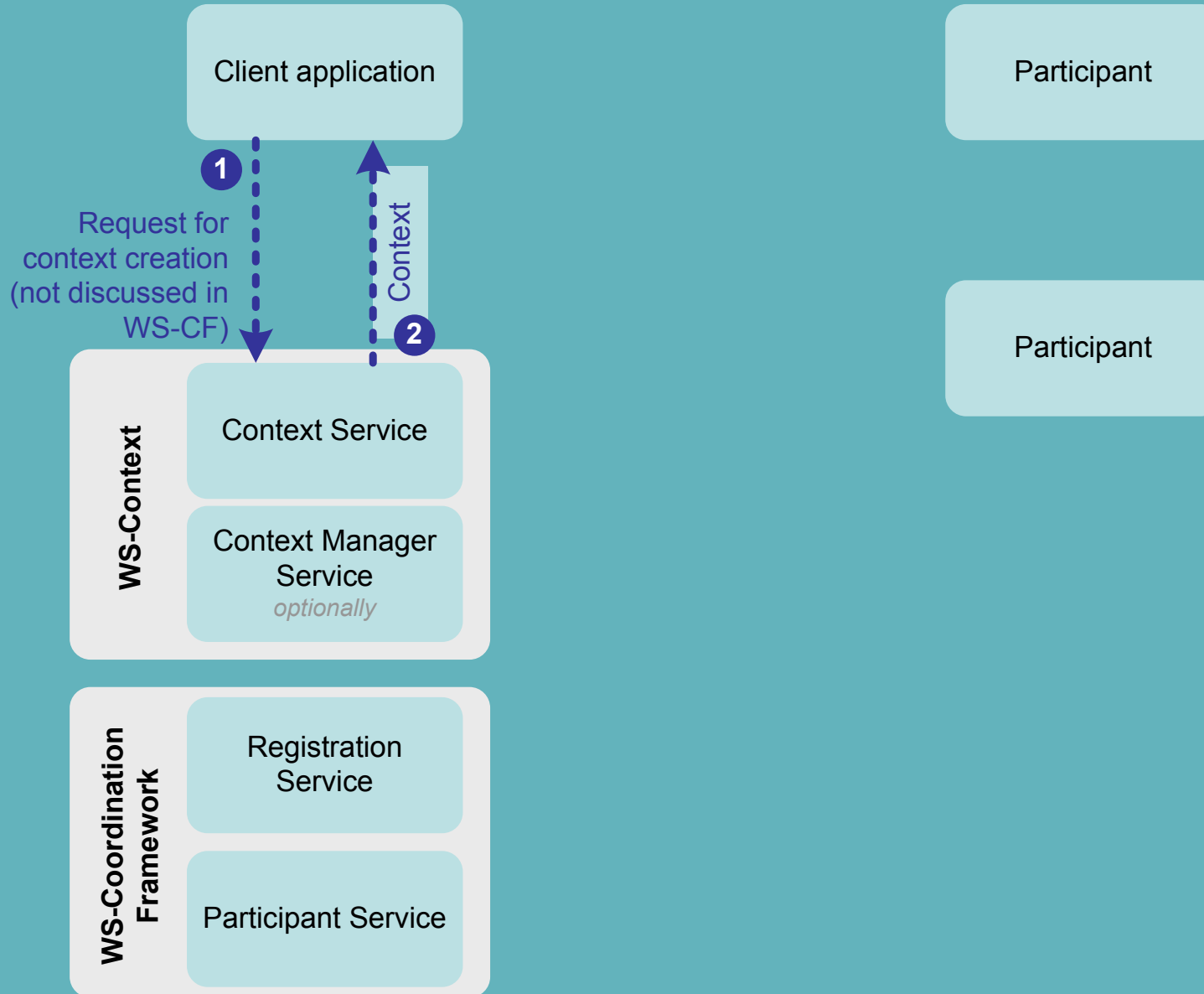


WS-Coordination Framework (WS-CF)



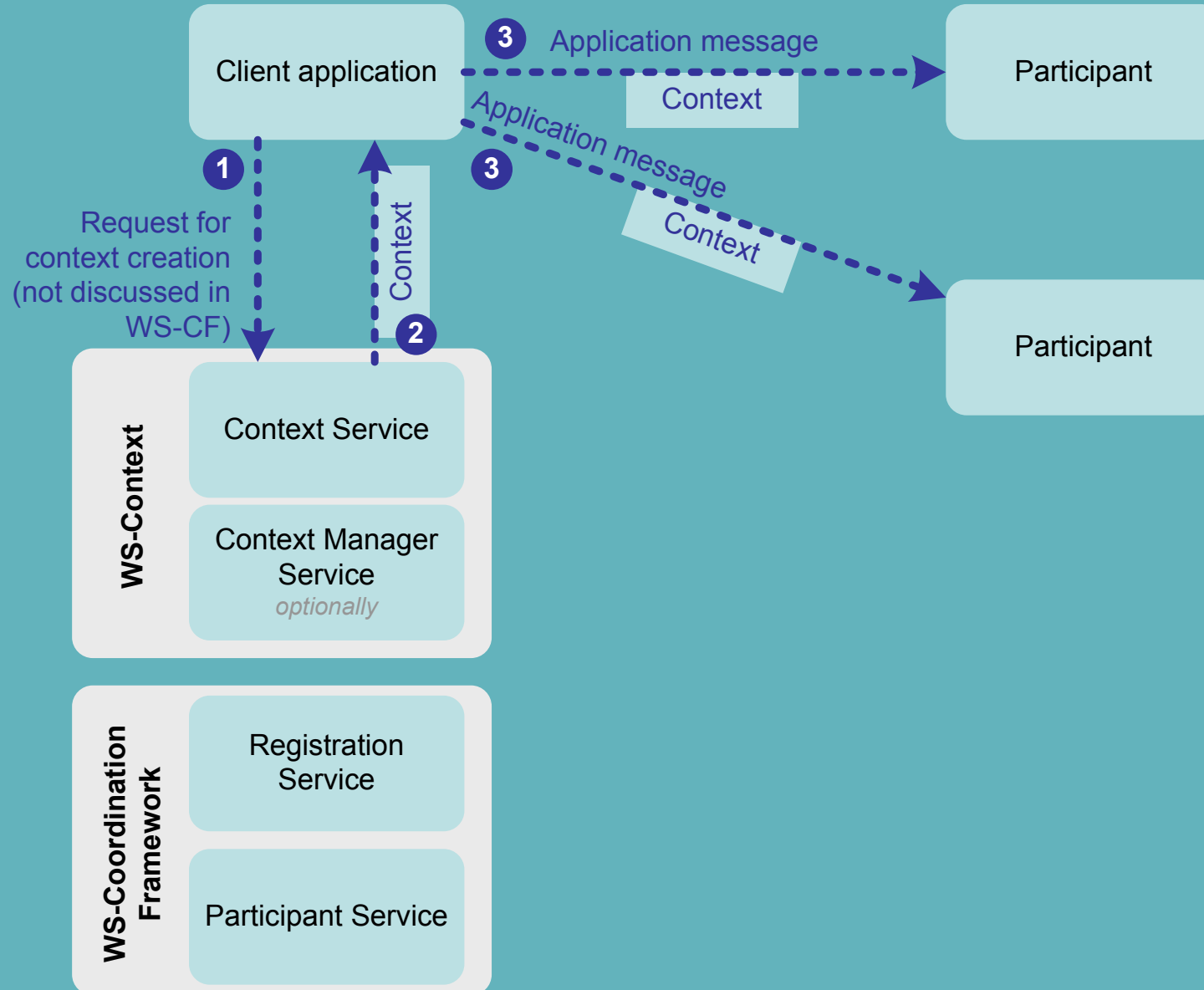


WS-Coordination Framework (WS-CF)



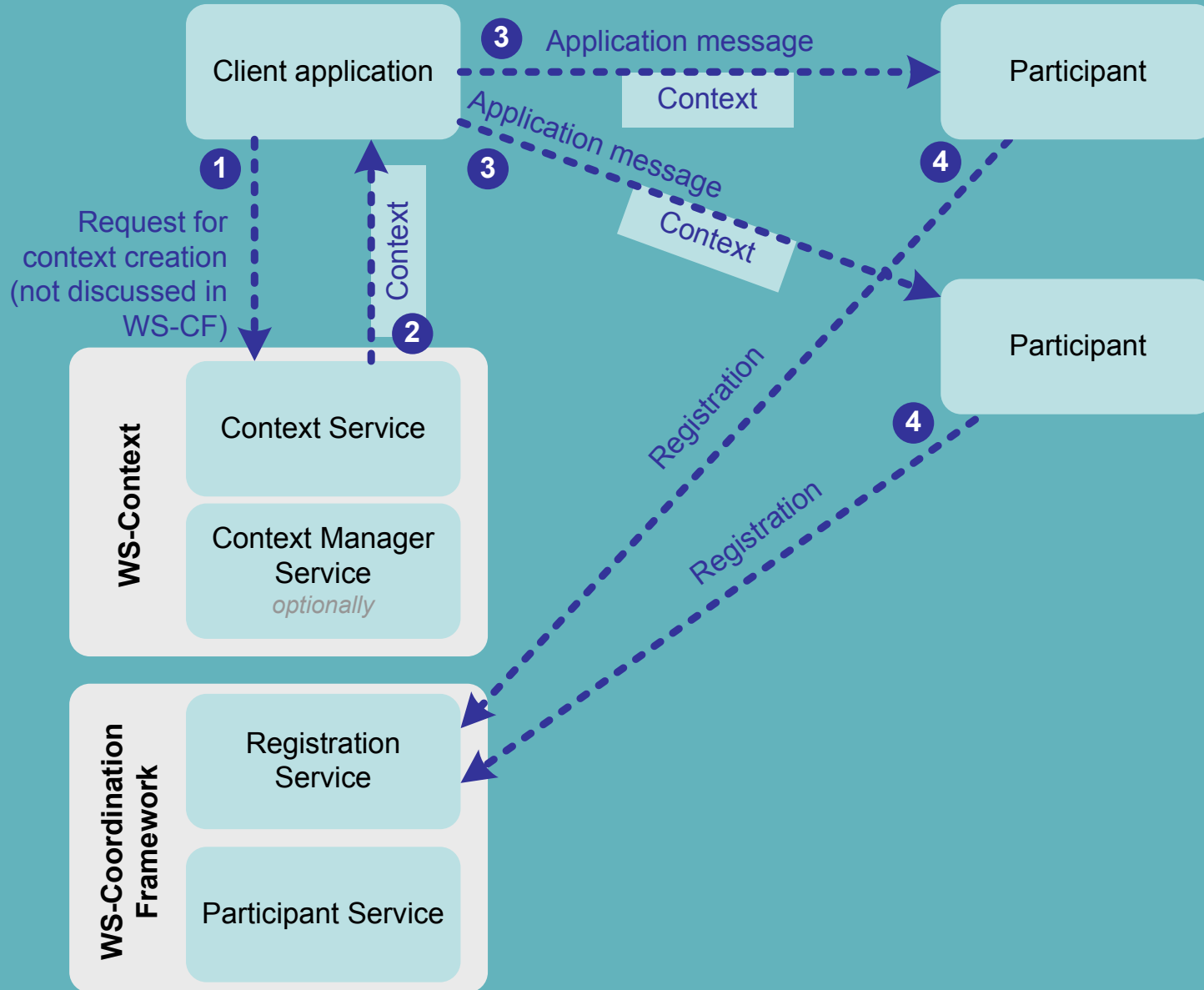


WS-Coordination Framework (WS-CF)



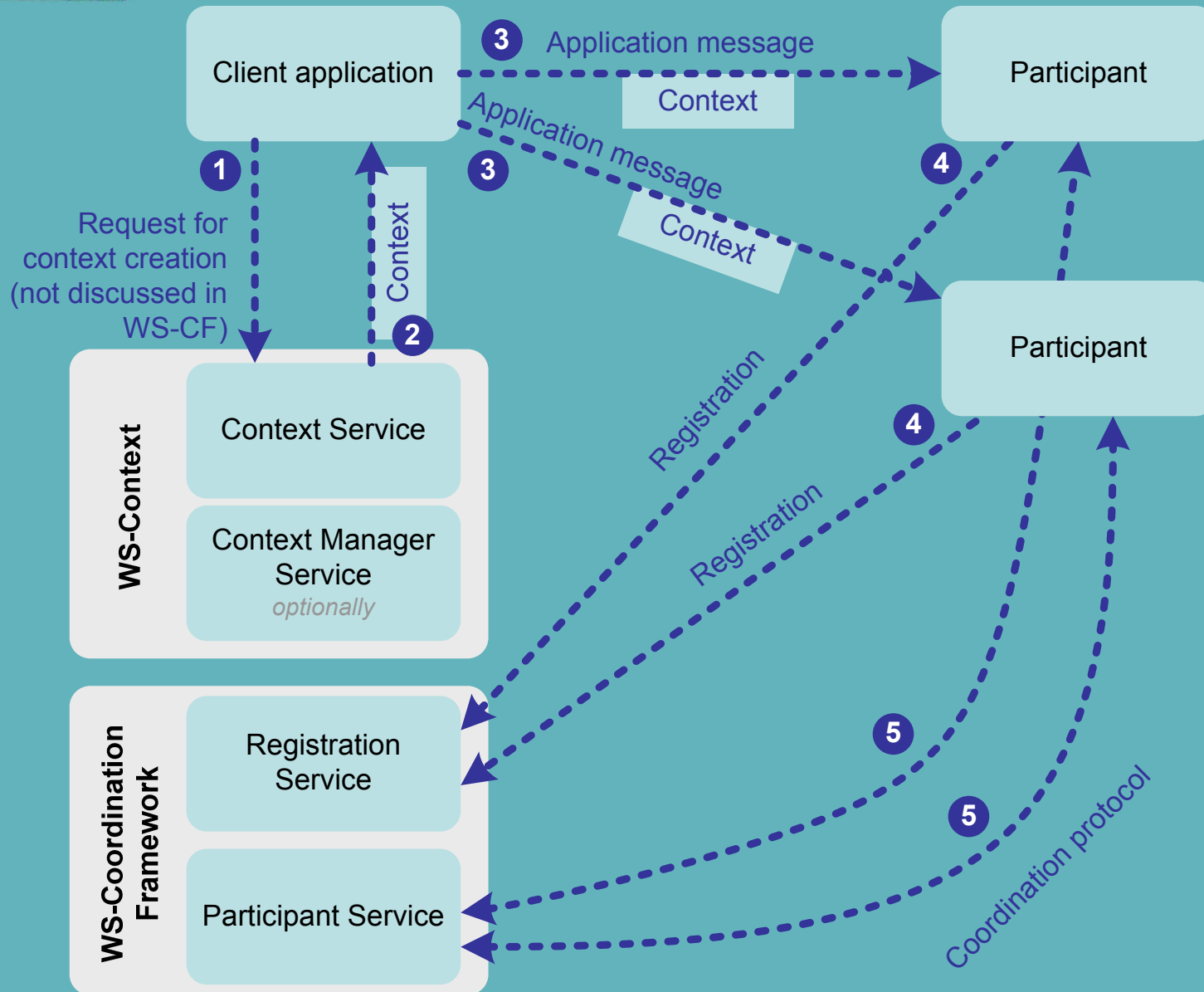


WS-Coordination Framework (WS-CF)





WS-Coordination Framework (WS-CF)





Concluding remarks on coordination

- WS-Coordination and WS-Coordination Framework are quite similar, but
- WS-CF somewhat more generic than WS-C



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A WS-based Business Event Architecture

- Event based spec used for
 - **notifying** business event participants when an entity triggers a business event and request processing of a business event
- WS-C intended for: coordinating activities (=distributed units of work)
- WS-CF intended for: ensuring correct result of series of operations comprising a single business transaction



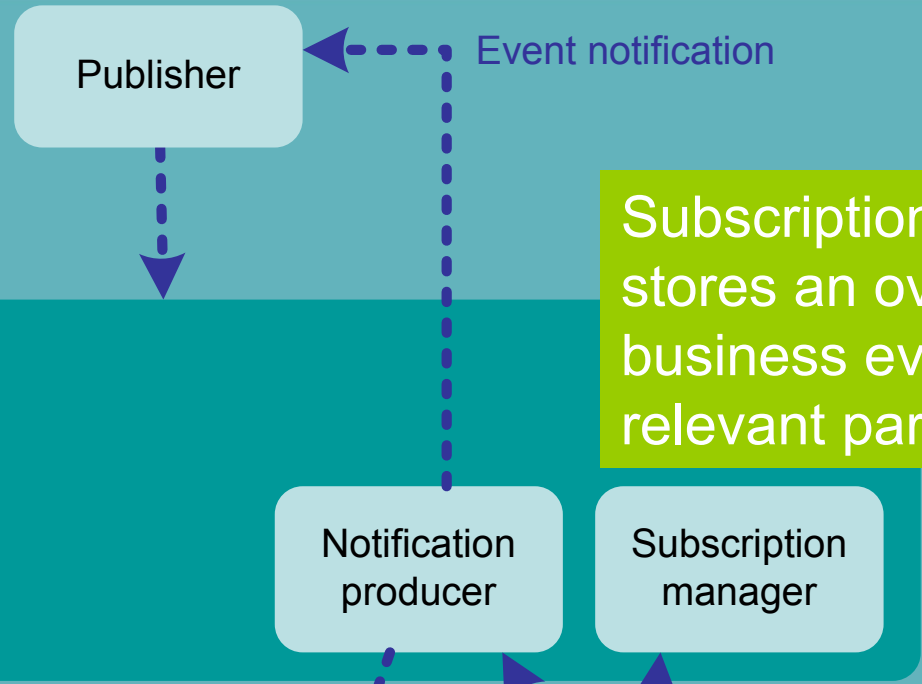
A WS-based Business Event Architecture

- Hence, rational to use WS-C or WS-CF for business event coordination since a Business Event is:
 - distributed unit of work
 - series of operations comprising a single business transaction
- Concept of context functions as the **glue** that binds all low-level one-to-one messages into a high-level business event



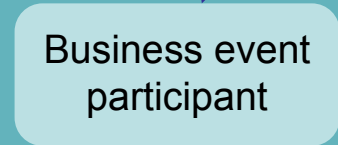
Eventing spec as basis

Publisher can be a business event participant or a higher-level entity like a business process engine



Subscription manager stores an overview of business events and relevant participants

Business event participants are event consumers

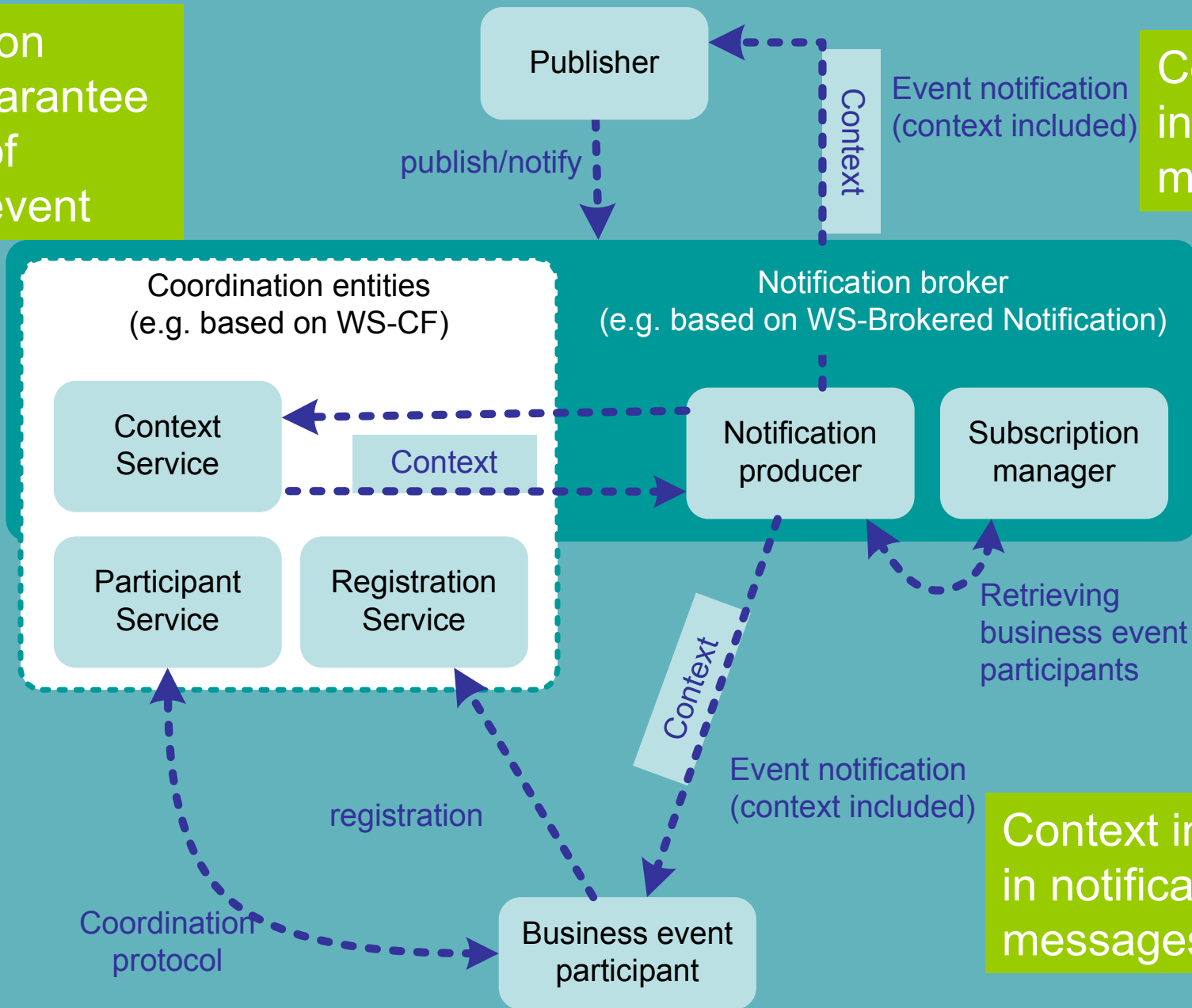




Adding coordination capabilities

Coordination entities guarantee atomicity of business event

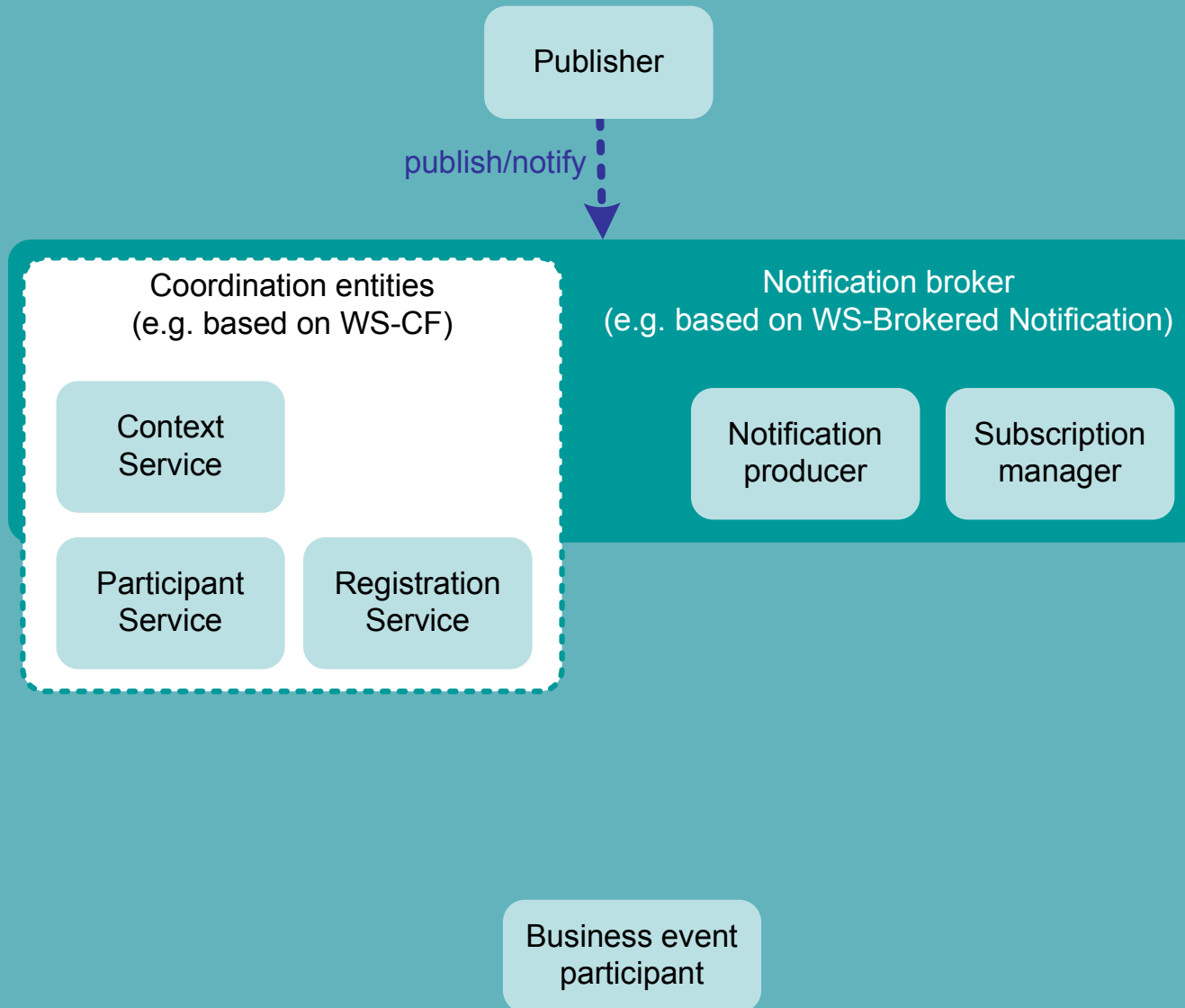
Context included in notification messages



Context included in notification messages

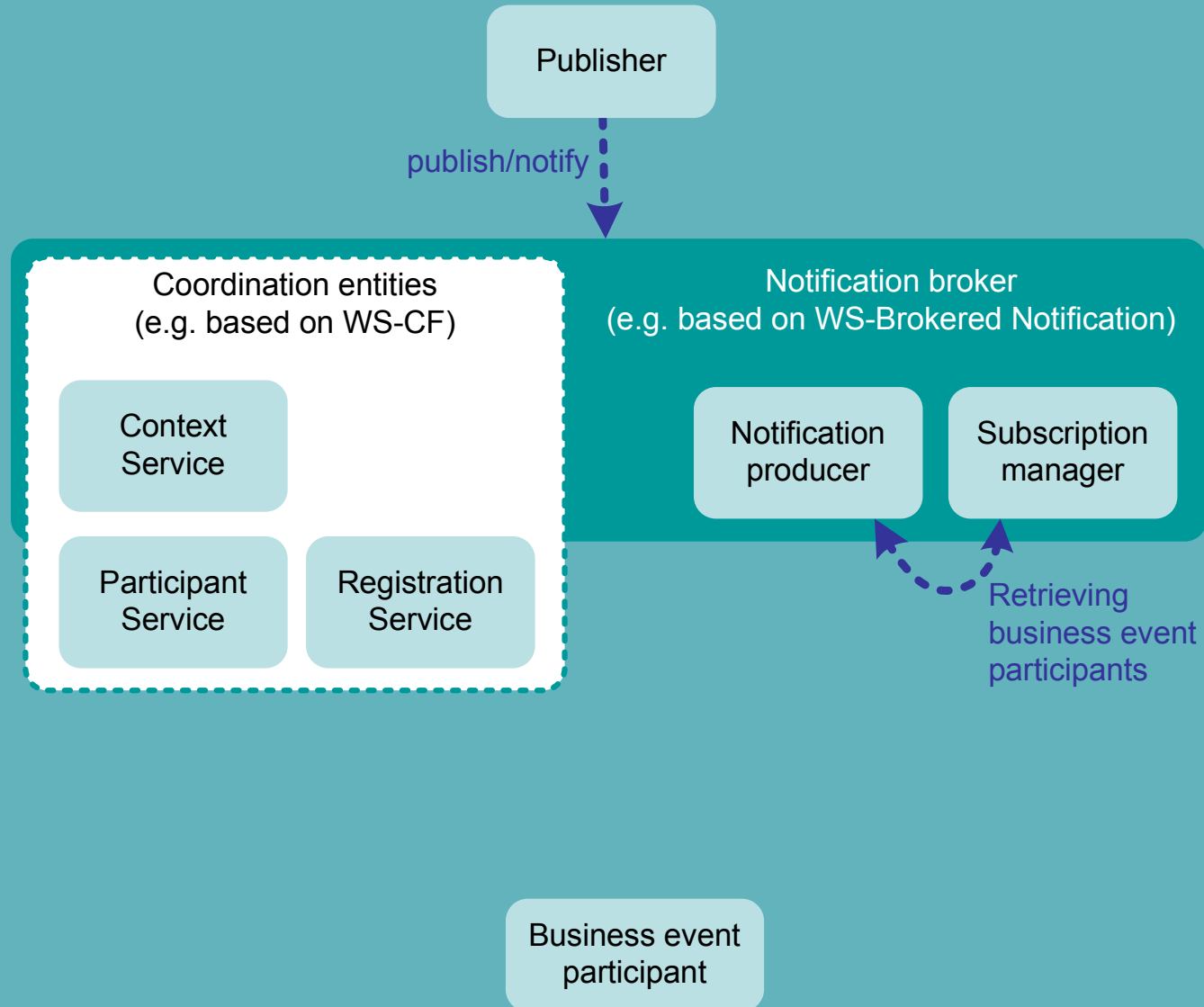


The big picture...



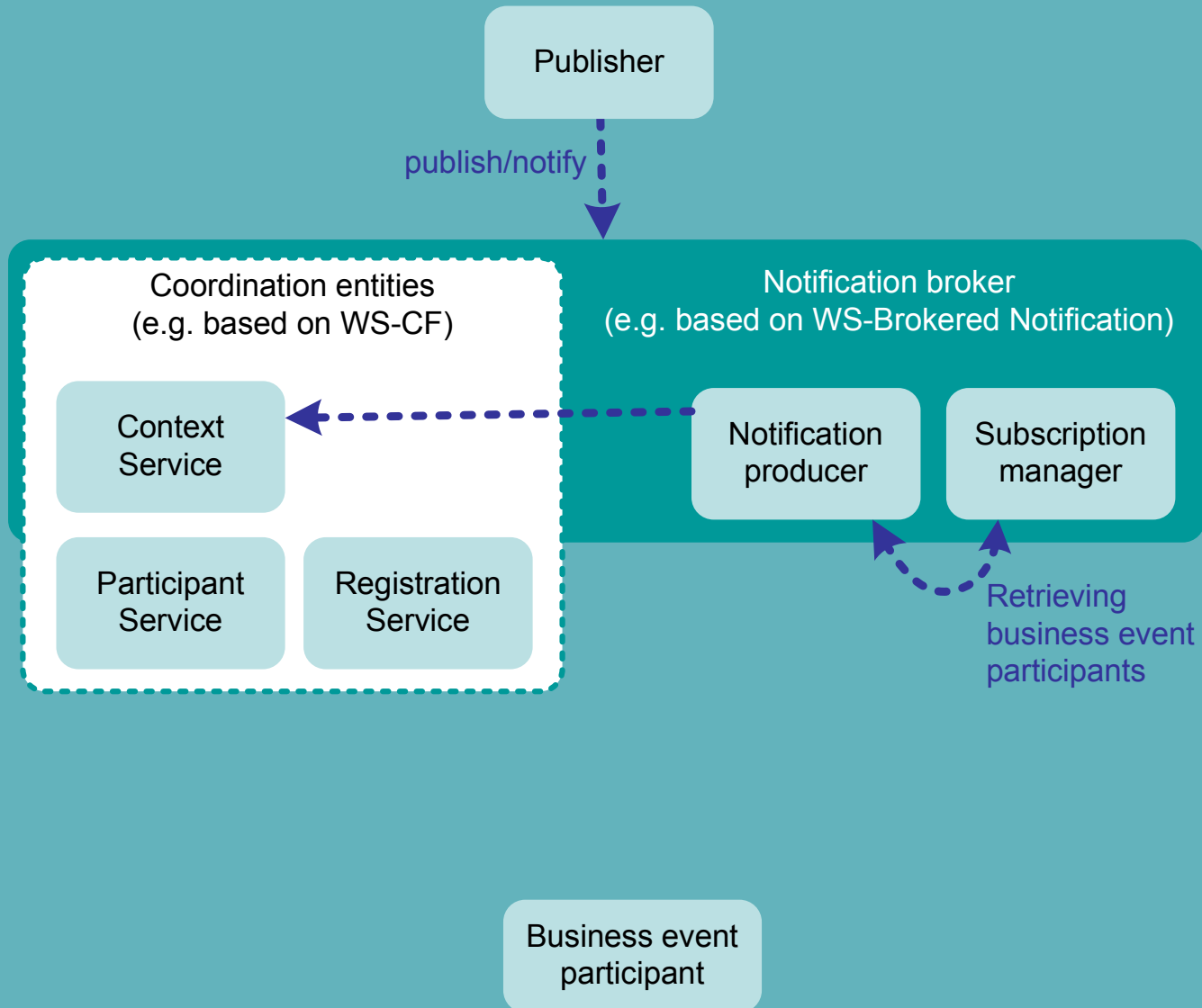


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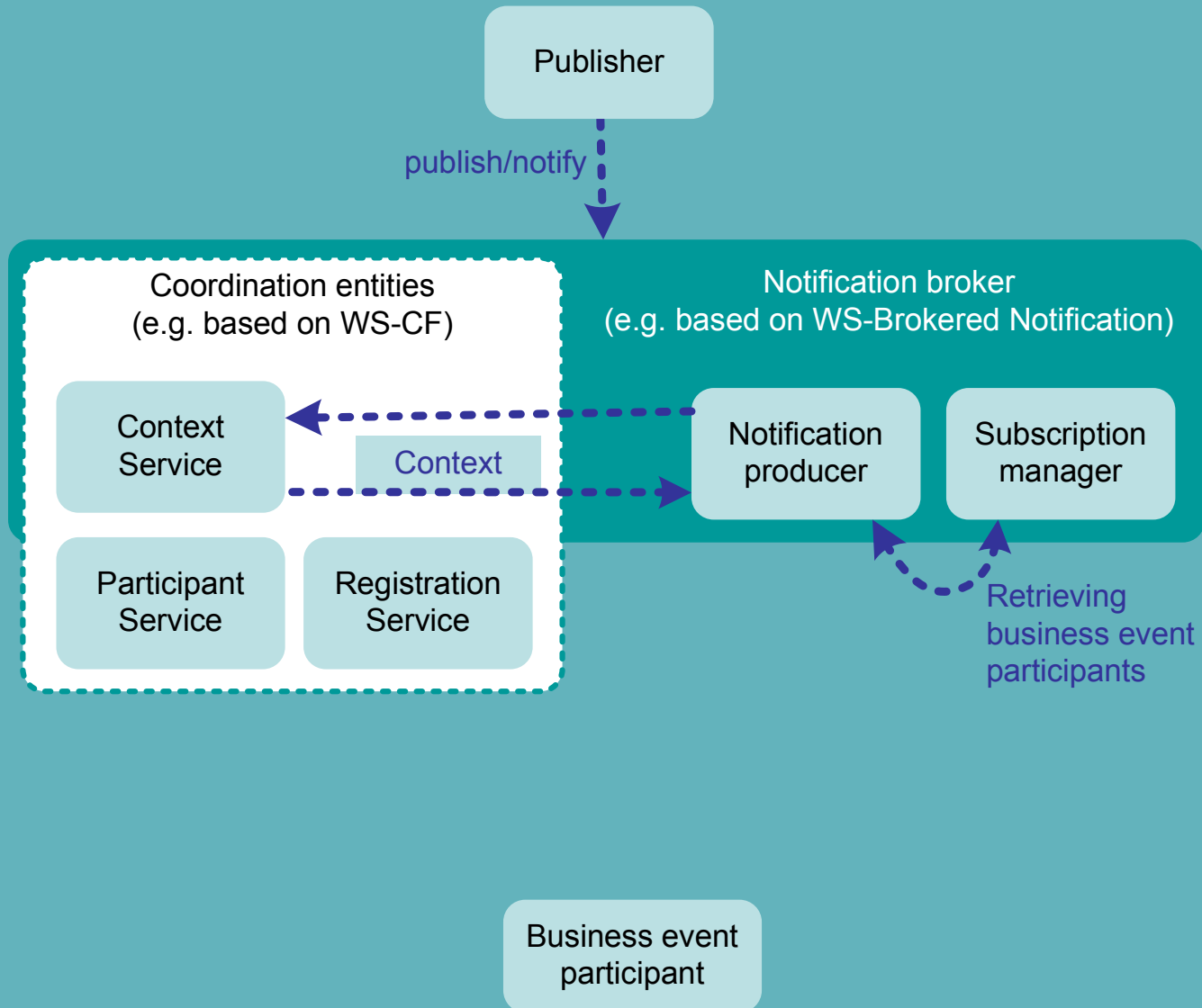


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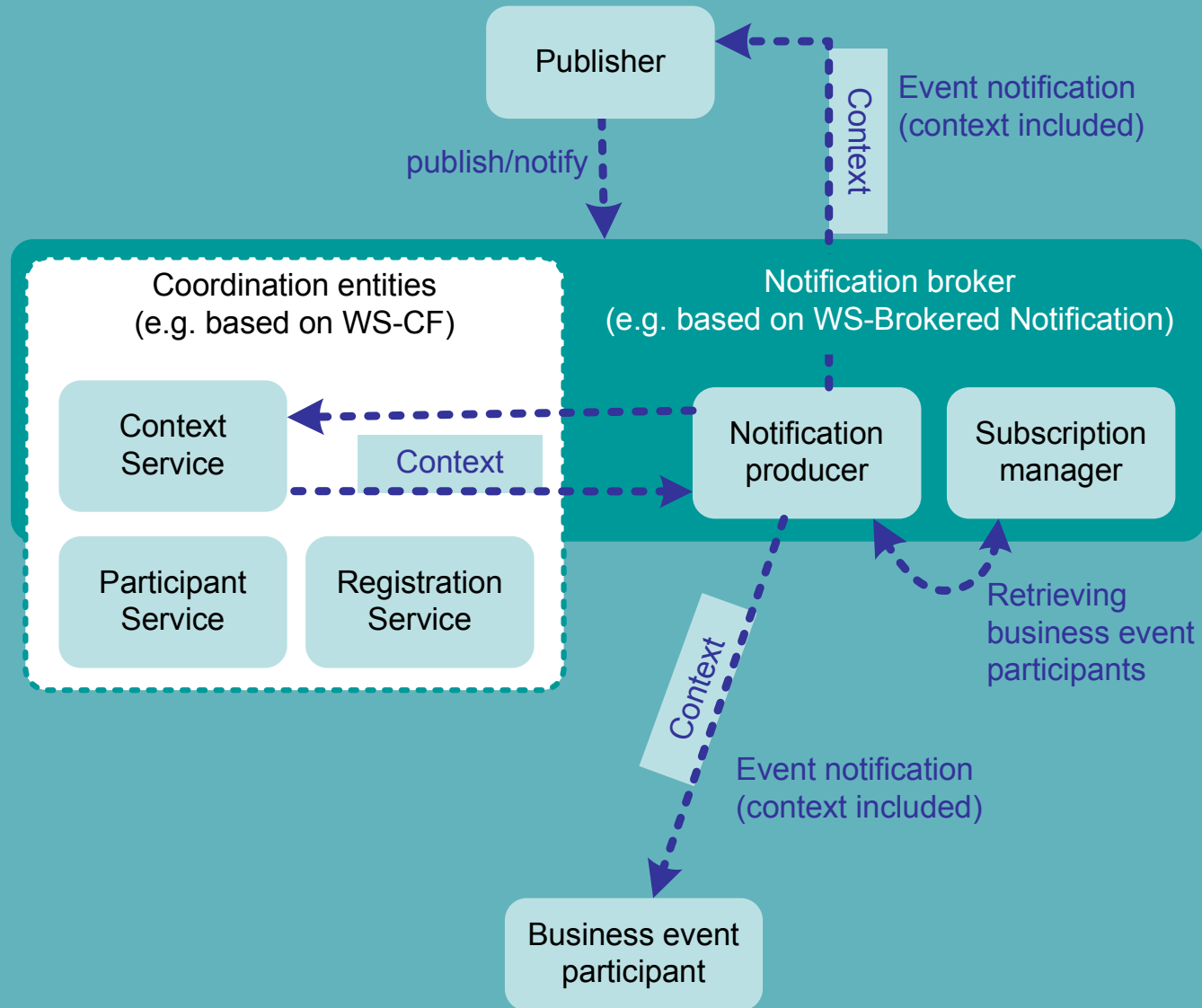


The big picture...



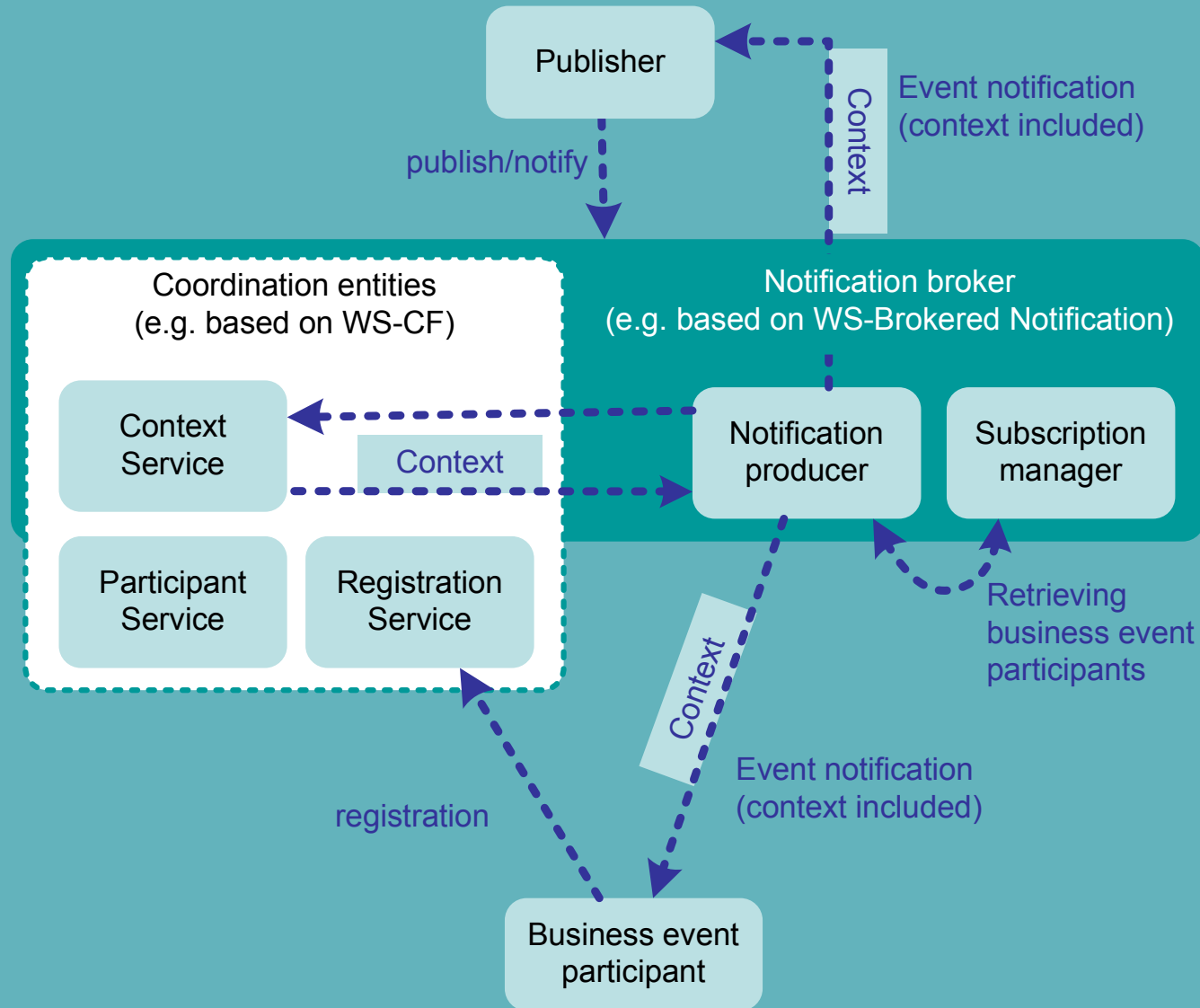


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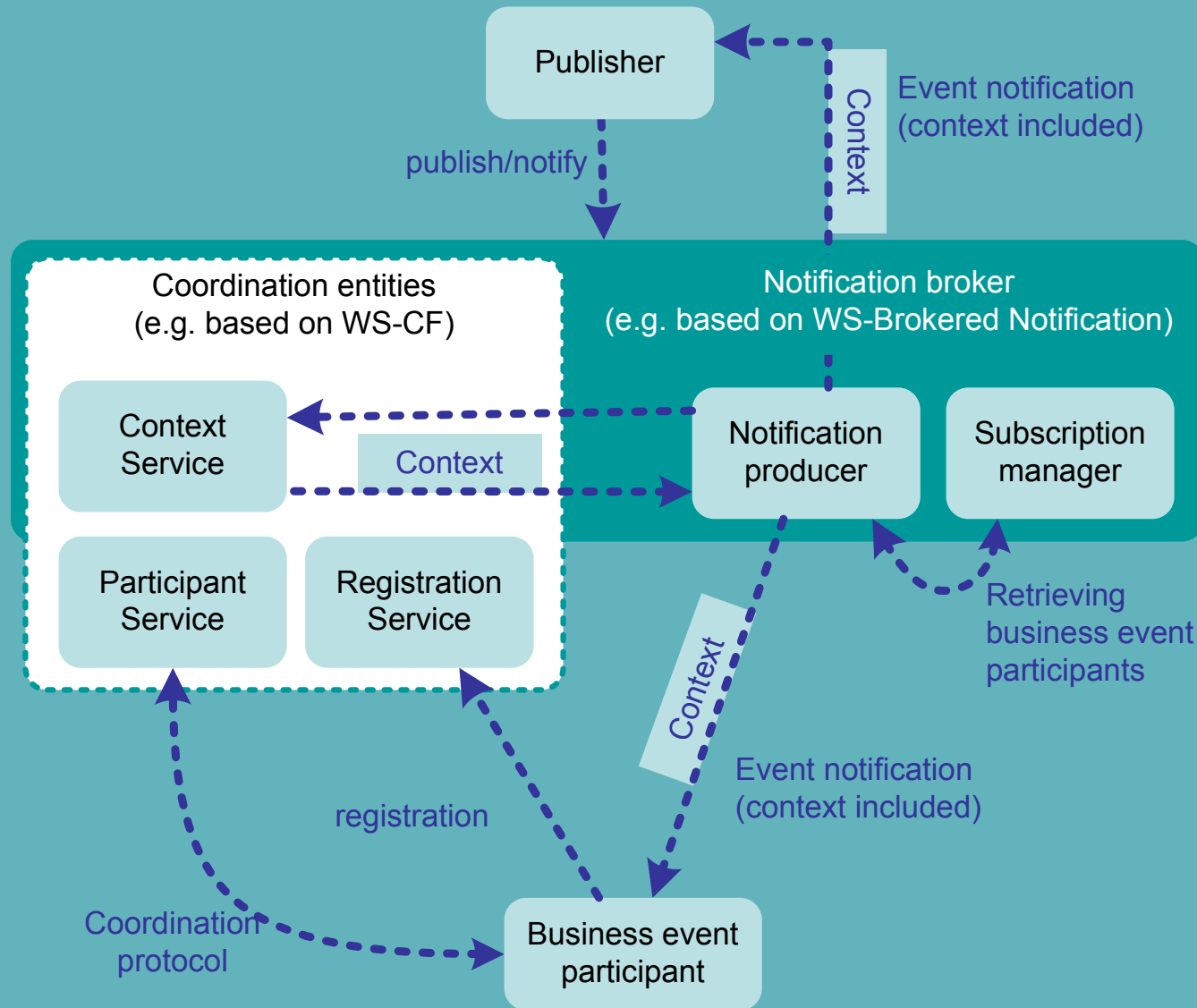


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- Presented structured and layered architecture to achieve a **coordinated** Web service orchestration
- Clear separation of high-level business process and low-level message interactions required for the processing of the business activities
- Low-level notification and coordination issues are handled by the business event architecture



Future research

- Implementing a prototype in Java and .NET
(Java implementation already working)
- Focus on model-driven development
- Defining transformation patterns
- More info can be found via:
 - <http://beco.econ.kuleuven.be>
 - <http://mda.econ.kuleuven.be>



Questions & Answers

Thanks for your attention!

Any questions?

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