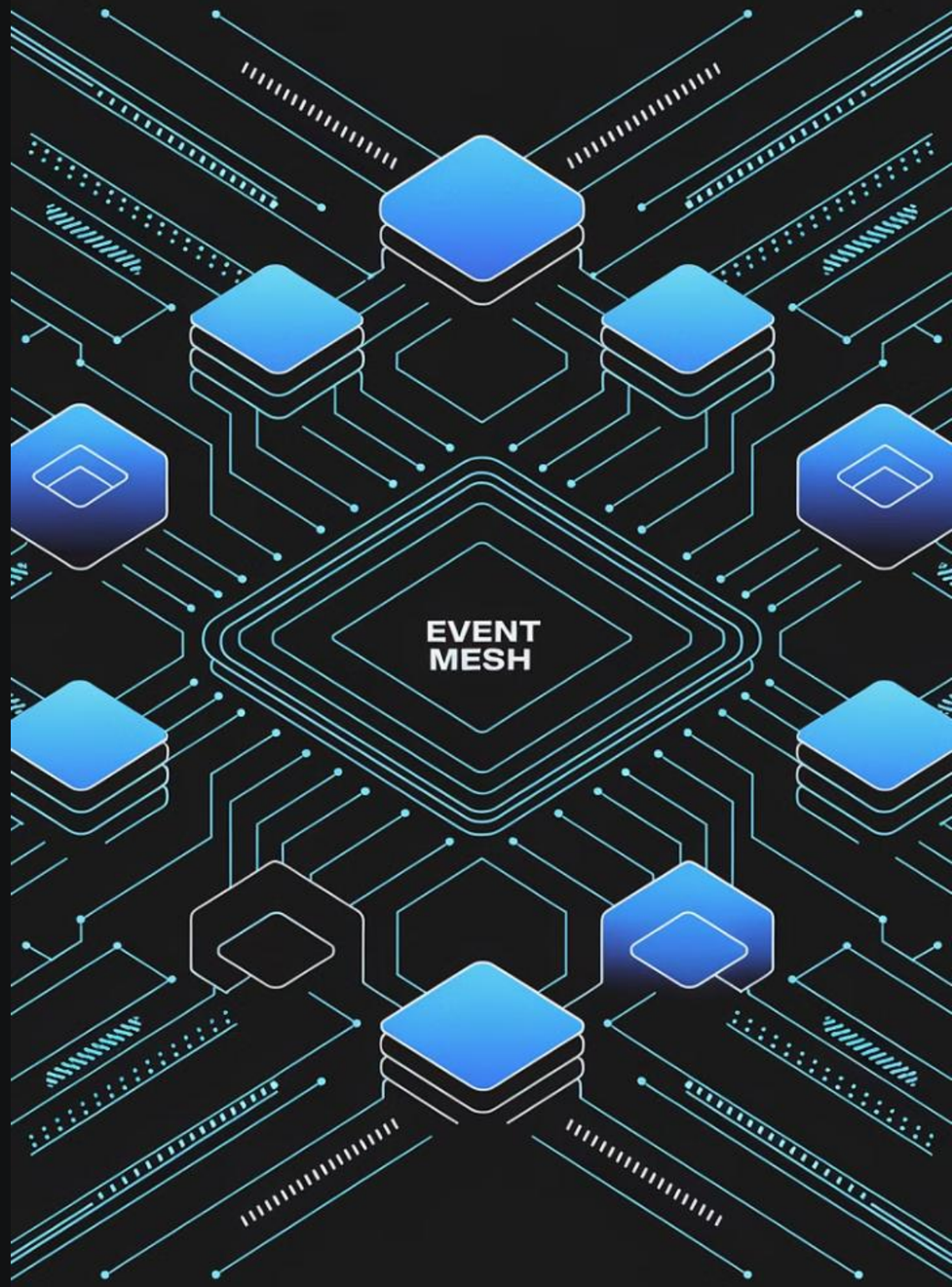
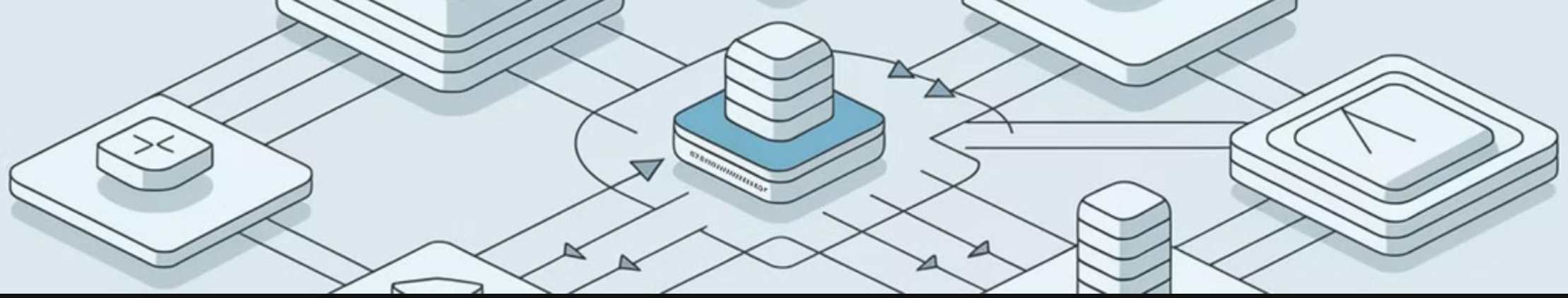
Event-Driven Architecture and SAP Event Mesh

por Mayko Silva





What is Event-Driven Architecture (EDA)?

Event-driven architecture (EDA), sometimes known as reactive architecture, is an architectural pattern primarily used within cloud-native, microservice, and serverless software ecosystems.

The basic idea is that distributed components of an application interact through asynchronous events rather than direct point-to-point HTTP(S) requests. Such direct communications can become complex and result in tightly coupled systems that are hard to scale and maintain.

1

Publish Events

Services publish events indicating significant occurrences or actions that have taken place.

2

Event Bus

Services communicate with other services through an event bus that routes messages.

3

Subscribe

Other interested services subscribe to specific event topics and receive immediate notifications.

Benefits and Challenges of Event-Driven Architecture

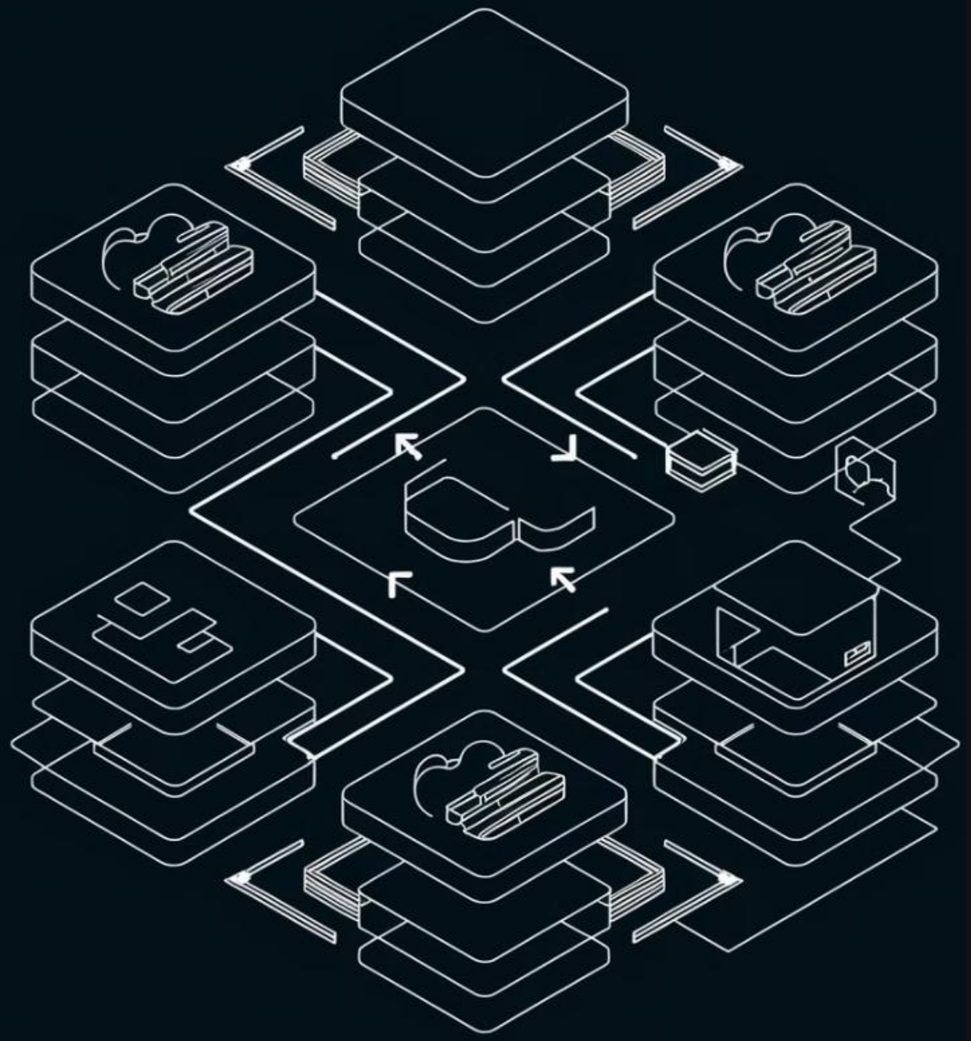
Event-driven architecture conveys distinct advantages, but there are challenges to consider as well when implementing this approach in your systems.

Benefits

- Real-time communication capabilities
- Greater operational efficiency
- Better scalability and improved fault tolerance
- Increased versatility and asynchronous behavior

Challenges

- Complexity in data management and system design
- Difficulty of tracking event flows
- Challenges in designing and chaining complex events
- Limitations when implementing synchronous flows; usually events follow "fire and forget" principles



Event Mesh Concepts

An **Event Mesh** is an architectural concept for a network of real-time communication between different applications, microservices, or components of an application, enabling them to publish, consume, and route events asynchronously.

1 Loose Coupling

Provides loose coupling between sender and receiver components, allowing them to evolve independently.

2 Enhanced Scalability

Enhances scalability by allowing event distribution across multiple systems and geographies.

3 Proactive Interactions

Enables proactive and reactive interactions in distributed architectures.

4 Multi-Cloud Integration

Enables seamless integration across multi-cloud or hybrid landscapes through standard specifications and protocols.

SAP Event Mesh

Within SAP BTP, the **SAP Event Mesh** is a fully managed cloud service designed to facilitate event-driven architecture solutions. It provides performant event bus capabilities, allowing seamless communication through asynchronous event-sharing among applications.

Fully Managed

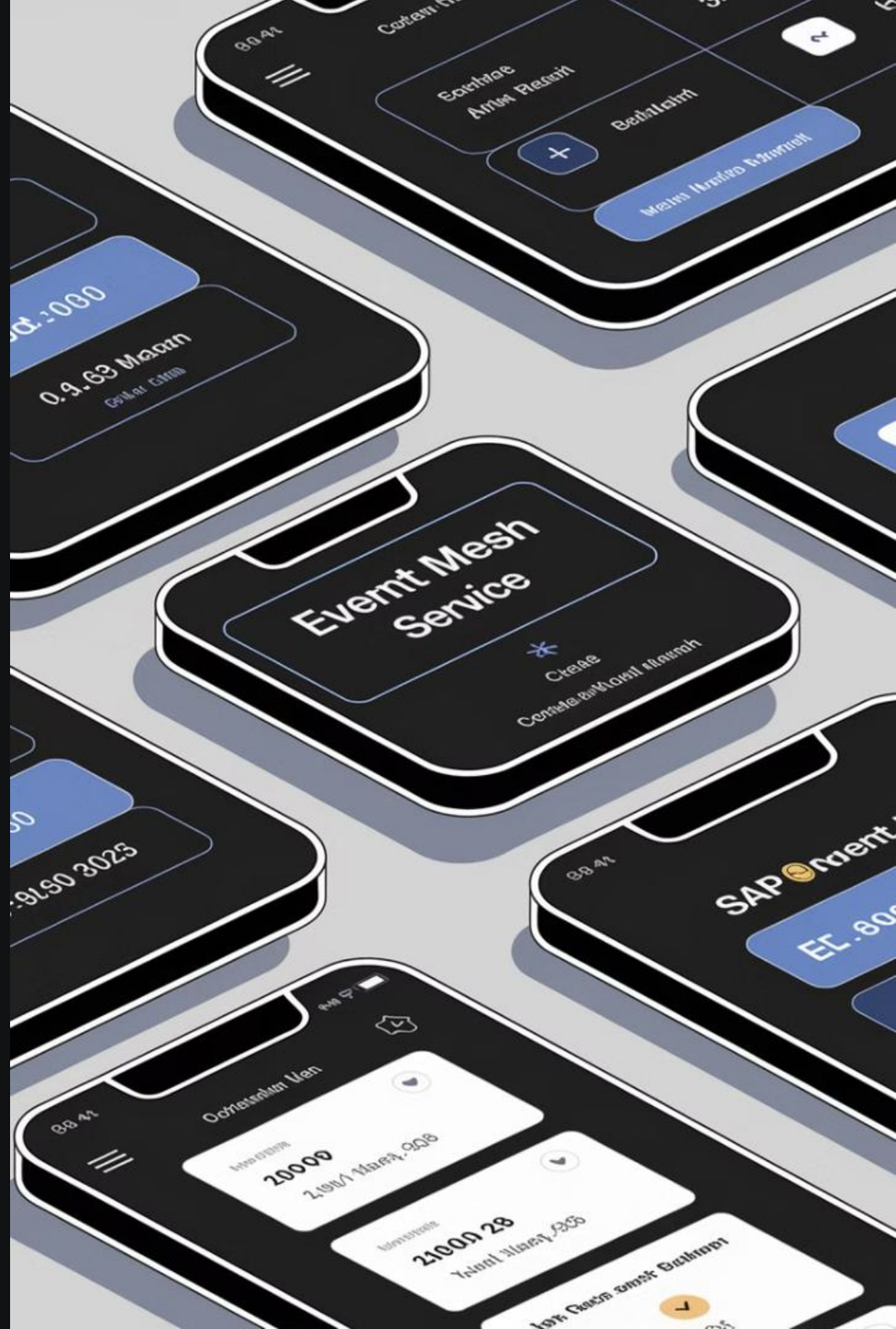
SAP handles all infrastructure management, allowing you to focus on your business logic.

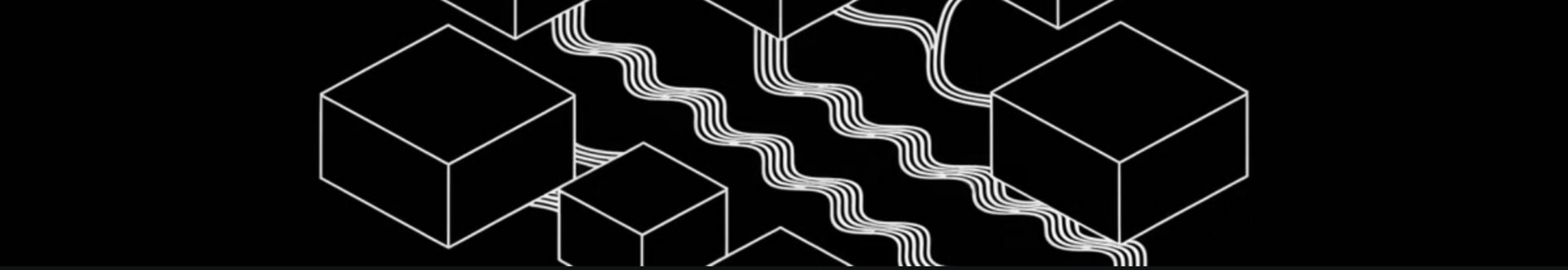
Integration

Seamlessly connects with SAP and non-SAP applications across your landscape.

Scalable

Designed to handle enterprise-level event volumes with consistent performance.





Key Capabilities of SAP Event Mesh

SAP Event Mesh provides essential capabilities for implementing event-driven architectures within your enterprise landscape, enabling seamless communication between applications.

Event-Driven Integration

Facilitates event-driven integration and extensibility of applications, allowing them to communicate through standardized events.

Decoupled Communication

Enables decoupled asynchronous event communication between services, reducing dependencies and improving system resilience.

Digital Core Extension

Provides seamless connectivity to extend your digital core applications through events, enabling real-time business processes.

Industry Standards

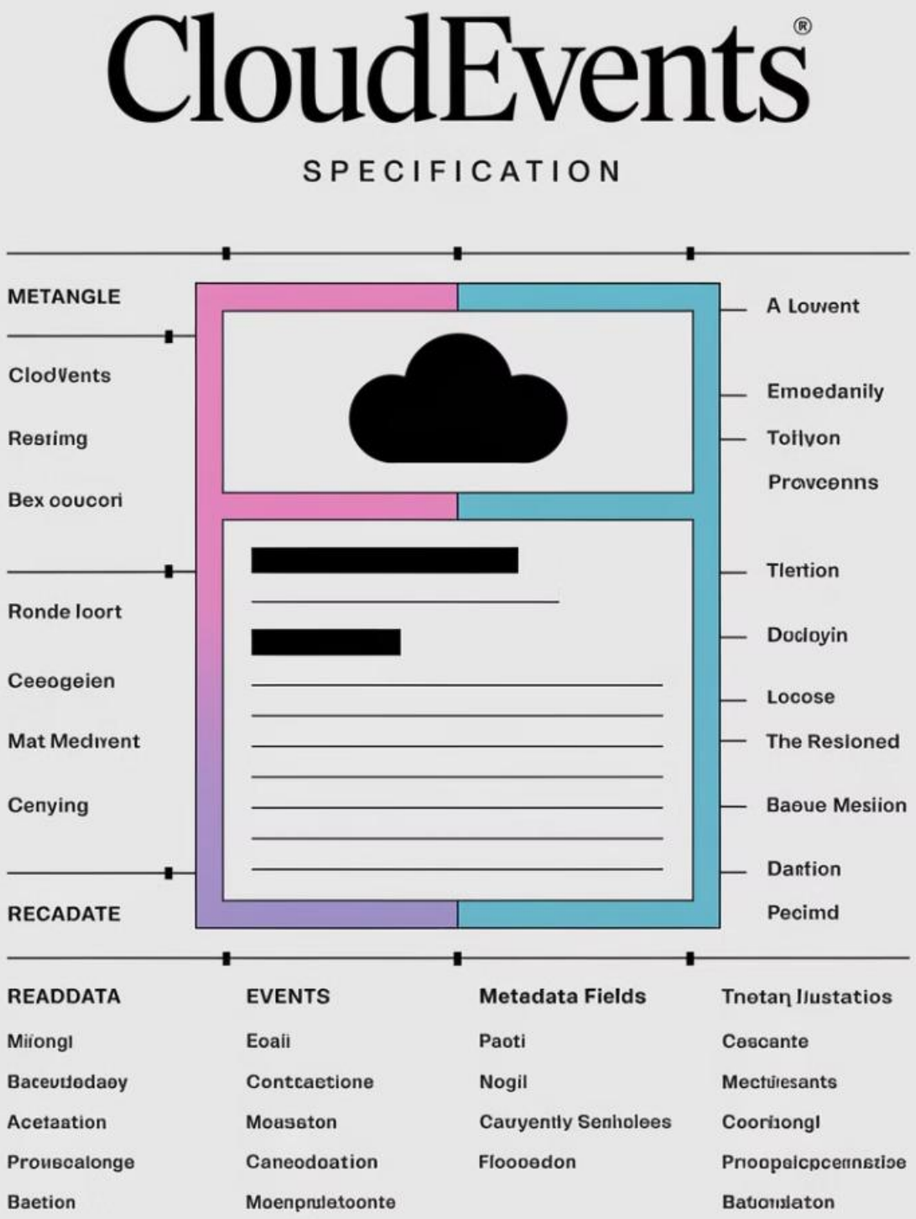
Supports industry-standard event specifications (*CloudEvents*), ensuring compatibility with various systems and platforms.

Limitations of SAP Event Mesh

SAP Event Mesh has some essential limitations to keep in mind when planning your event-driven architecture implementation.

Limitation	Description
Maximum message size	1 MB; larger messages close AMQP or MQTT WebSocket connections
Maximum storage for all messages	10 GB
Maximum message throughput/subaccount	250 KB/s

These resources are measured in **Resource Units (RUs)** and allocated per subaccount at SAP BTP subaccount level, with specific limitations for connections, endpoints, consumers, producers, and queue subscriptions.



CloudEvents Specification

Modern distributed cloud applications may span diverse platforms and service providers. To maintain consistent and standardized event handling capabilities, SAP Event Mesh adheres to the industry-standard CloudEvents specification.

CloudEvents define a common and platform-agnostic way of representing event data, ensuring portability, consistency, and accessibility of events across different clouds or other event-enabled platforms.

```
{
  "specversion": "1.0",
  "type": "com.github.pull_request.opened",
  "source": "https://github.com/cloudevents/spec/pull",
  "subject": "123",
  "id": "A234-1234-1234",
  "time": "2018-04-05T17:31:00Z",
  "comexampleextension1": "value",
  "comexampleothervalue": 5,
  "datacontenttype": "text/xml",
  "data": ""
}
```

SAP Integration Suite, Advanced Event Mesh

The **SAP Integration Suite, Advanced Event Mesh** provides a more robust, enterprise-grade event mesh platform under the SAP Integration Suite umbrella. It encompasses advanced event streaming, event management, and monitoring capabilities optimized for complex event-driven scenarios.

Event Streaming

Powerful publish-subscribe messaging, queuing, event replay, and request-reply patterns.

Event Management

Comprehensive lifecycle management with AsyncAPI 2.0.0 specification compliance.

Monitoring & Insights

Dedicated dashboard for visualizing metrics and configuring custom monitoring capabilities.

Event Streaming and Management

Advanced Event Mesh incorporates powerful event streaming services that enhance your event-driven architecture implementation.

Publish-Subscribe

Efficient message distribution to multiple subscribers

Queuing

Reliable message delivery with persistence

Request-Reply

Synchronous-like interactions when needed

Event Replay

Access to historical events for recovery

SAP handles operational complexities such as dynamic deployment, seamless upgrades, patches, and runtime management within various cloud environments or even on-premises deployments.

Event Management and Monitoring

SAP Advanced Event Mesh provides an event portal for comprehensive lifecycle management of your event-driven solutions.

Event Portal

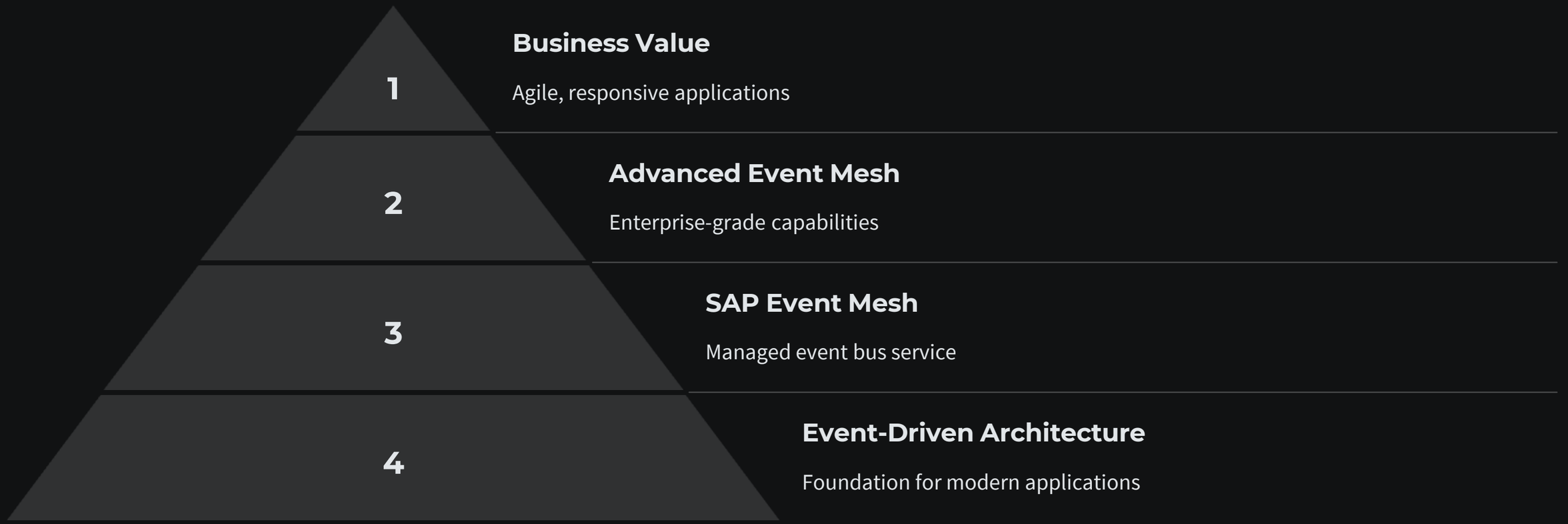
- Create, design, share, and manage event-driven solutions centrally
- Compliant with AsyncAPI 2.0.0 specification
- Generate documentation and validate events
- Apply API management policies for precise control

Monitoring Dashboard

- Visualize historical and real-time metrics
- Configure custom monitoring capabilities
- Set automated notifications and alerts
- Immediate awareness of critical conditions

Summary and Conclusion

Event-driven architecture promotes decoupled, scalable, and real-time oriented interaction between services, making it a natural choice for cloud-native, microservice, and serverless architectures.



SAP supports event-driven architectures with its SAP Event Mesh service and the robust capabilities of SAP Integration Suite, Advanced Event Mesh. Both adhere strictly to widely adopted standards like CloudEvents and AsyncAPI, ensuring cross-platform compatibility and future-proof event integration strategies.