Open Source Cloud-based Enterprise Integration

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Table of Contents

- Concept
- Purpose
- Value Prop
- Pros and Cons
- Core Functions
- Usage Scenarios
- Integration Approaches
- Integration Solutions
- Market Landscape: 5-tier
- Open Source Solutions for Integration Functions
- Key Industry Leaders
- Challenges
- Trending
- Best Practices
- Case Study

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What is Enterprise Integration?

- The use of software or hardware to integrate a set of internal and external enterprise applications and services by applying the architectural principles and patterns for computer systems.

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Purpose

Data consistence	• Ensures that information in multiple systems is kept consistent with data integrity.
Service interactions	• Enable inter-system or inter-application communications
Product independence	• Extracts business policies or rules from applications and implements them in the integration system, so that even if one of the business applications is replaced with a different vendor's application, the business rules do not have to be re-implemented.
Common facade	• An integration system can front-end a cluster of applications, providing a single consistent access interface to these applications and shielding users from having to learn to use different software packages.

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Value Prop

- Simplify and automate business processes
- Avoid having to make sweeping changes to the existing applications or data structures.
- Unrestricted sharing of data and business processes among any connected application or data sources in the enterprise.
- Reduce the inter-dependency and tight coupling among applications

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Pros and Cons

Advantages	Disadvantages
• Real time information access among systems • Streamlines business processes and helps improve organizational efficiency • Maintains information integrity across multiple applications • Ease of development and maintenance	• High initial development costs, especially for small and mid-sized businesses (SMBs) • Require a fair amount of up-front business design, which many managers are not able to envision or not willing to invest in. • Fairly steep learning curve for inexperienced teams to get on board

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Core Functions

Connection	messaging formats, communications protocols, connectivity alternatives
Mediation	dynamic provisioning, transformation, mapping, transaction management, policy enforcement, registry, SLA
Orchestration	BPMN, BPEL, long-running process
Quality of services	fault tolerance, HA, scalability, throughput, topology, and extensibility
Change and control	lifecycle management, monitoring, design tools, security

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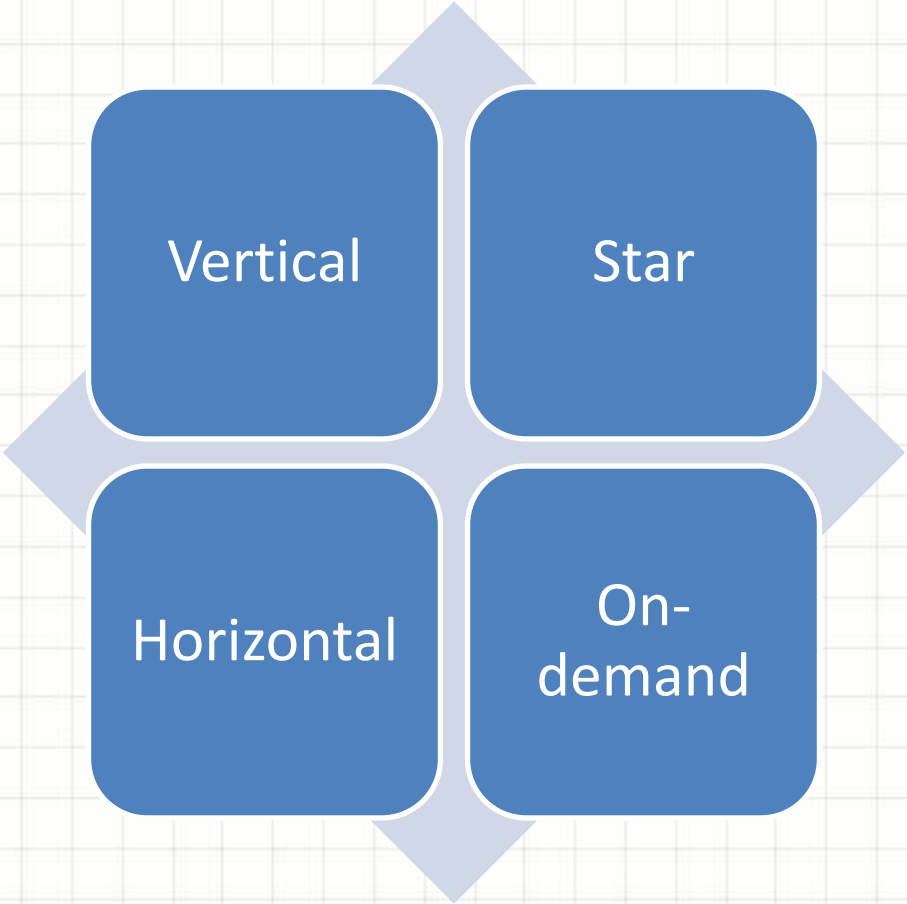
Integration Approach



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Comparison of Integration Approaches

Method	Description	Strength	Weakness	Implementation	Note
Vertical	Integrate susbsystems	Fast integration -> cheaper cost in short term	Poor maintainability	OOP, RMI	Silos inhibiting reuse
Star	interconnecting	Flexibility of reuse of functionality	Rising cost for heterogeneous platforms and proprietary interfaces	MQ, MB, Pub/Sub, WS SOAP/REST, JSON	Point to point connectivity
Horizontal	Specialized engine	Significantly cut the number of interfaces	Overheads and platform dependency	ESB, integration engine, EII	Loosely coupled
On-demand	Dynamically bound to available services in the pool or discovered on the fly	Choose best-of-breed services with best cost-effectiveness	Unreliable SLA and security concerns	Integration Platform as a Service (IPaaS)	Emerging and maturing

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Integration Solutions

Patterns	Topology	Techniques	Communication Styles
• Mediation (intra-communication) • Federation (inter-communication) • Access (sync vs async) • Duration (short-lived vs long-running)	• 1 to 1 • Hub and spoke • Bus	• Pipe • Adapter • Data format transformation • Pub/Sub • Transaction (1-phase and 2-phase commit) • Share-nothing	• Central broker • Canonical data model • Connector • API • Driver • Shared memory • Cache

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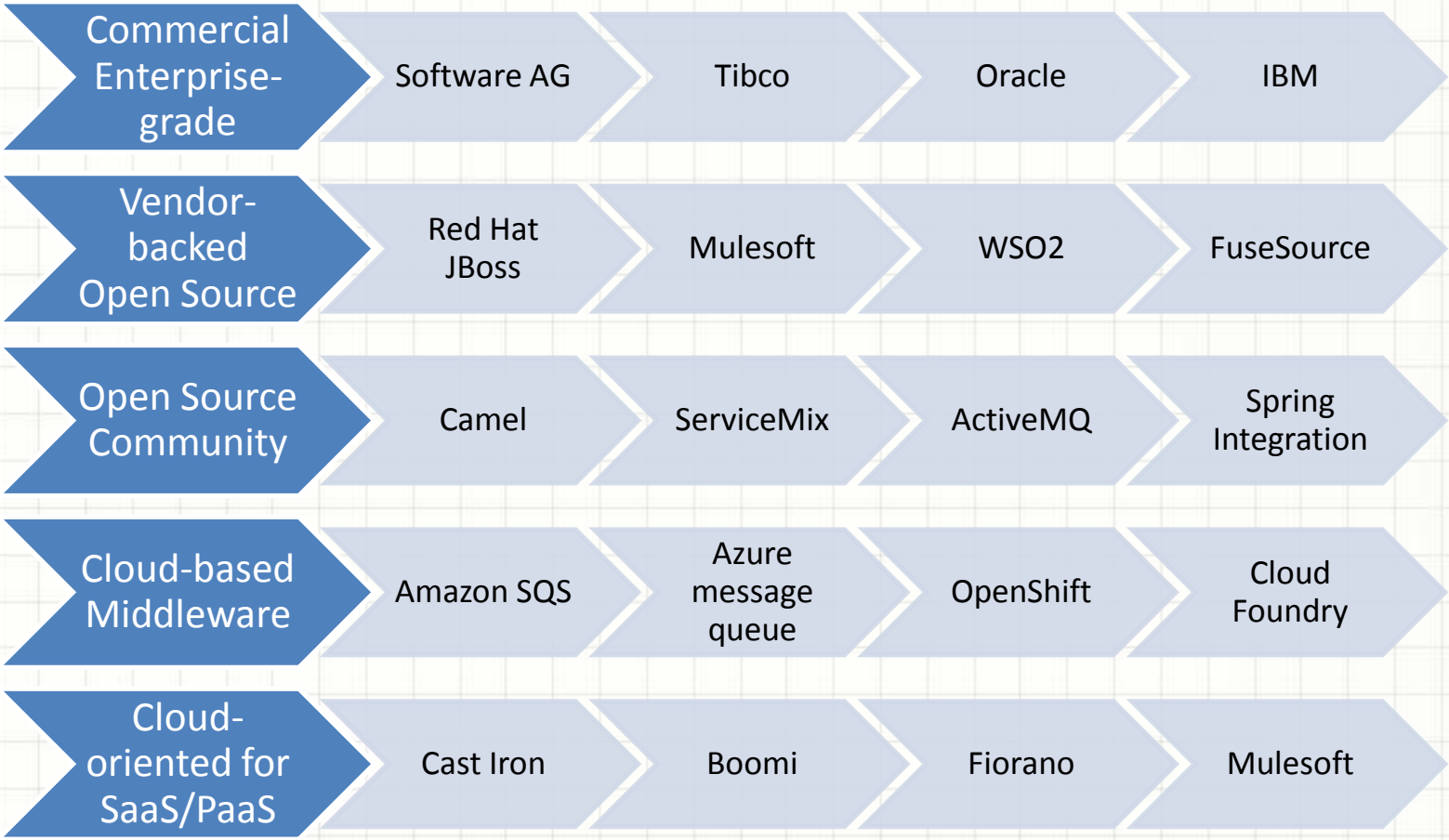
Market Landscape: 5-Tier



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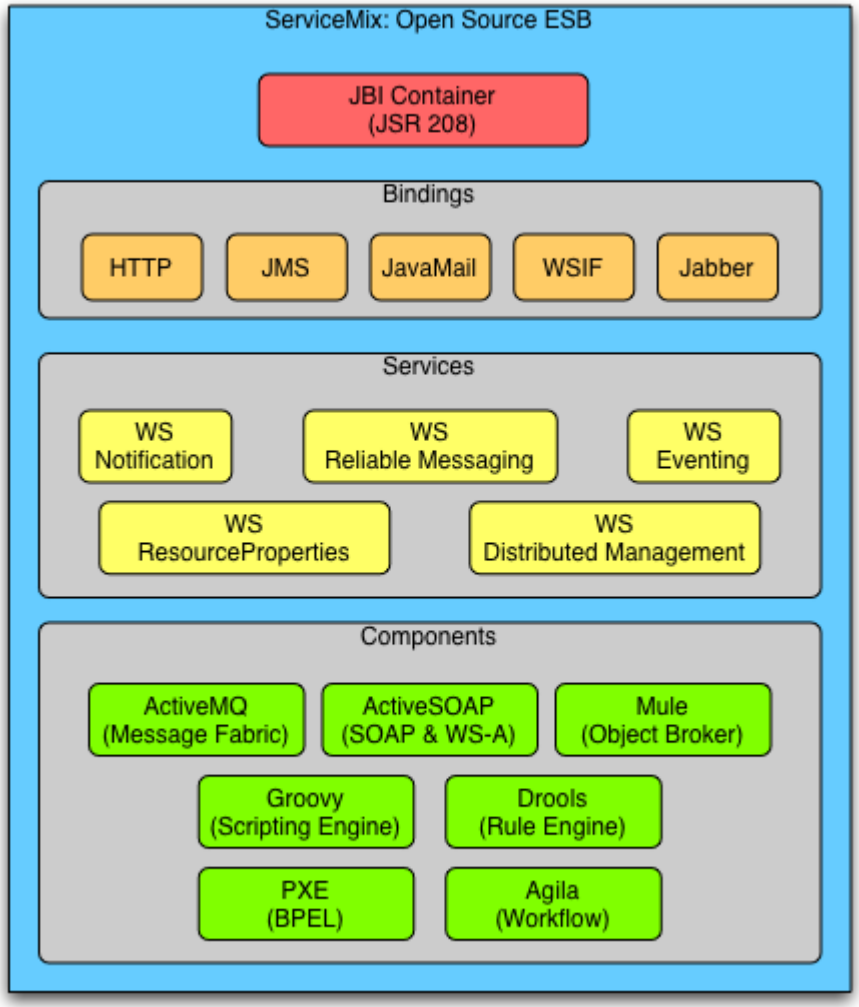
Open Source Solutions for Integration Functions

Broker	• ActiveMQ
Mediation Router	• Camel
Web Services	• CFX
ESB	• ServiceMix
OSGi Container	• Karaf
Business Process	• ODE
Ajax	• JQuery



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Key Industry Leaders

Vendor	Solution	Notes
Software AG	webMethods product has long history. Bundle with CentraSite registry/repository	Largest number of ESB installations. Integrate with ARIS BPM.
Tibco	ActiveMatrix widely used – over 3000 installations	Integrate with BusinessWorks
Oracle	Rooted from BEA AquaLogic product	More than 2600 implementations
Progress	Based on SonicMQ and Sonic ESB	Integrate with CIS and BPM solutions
FuseSource	Spin-out from Progress, based on Iona	Combine Apache integration solutions
WSO2	Lean middleware	Used in eBay for 1B transactions per day
IBM	Websphere Message Broker, ESB, ESB Registry, Datapower Appliance	3 ESB products – 1 from Datapower and 2 from traditional middleware
MuleSoft	2500 deployments in production	Tcat for Enterprise Tomcat
Red Hat	JBoss ESB and SOA Platform	Data virtualization – aggregate data sources into a single view

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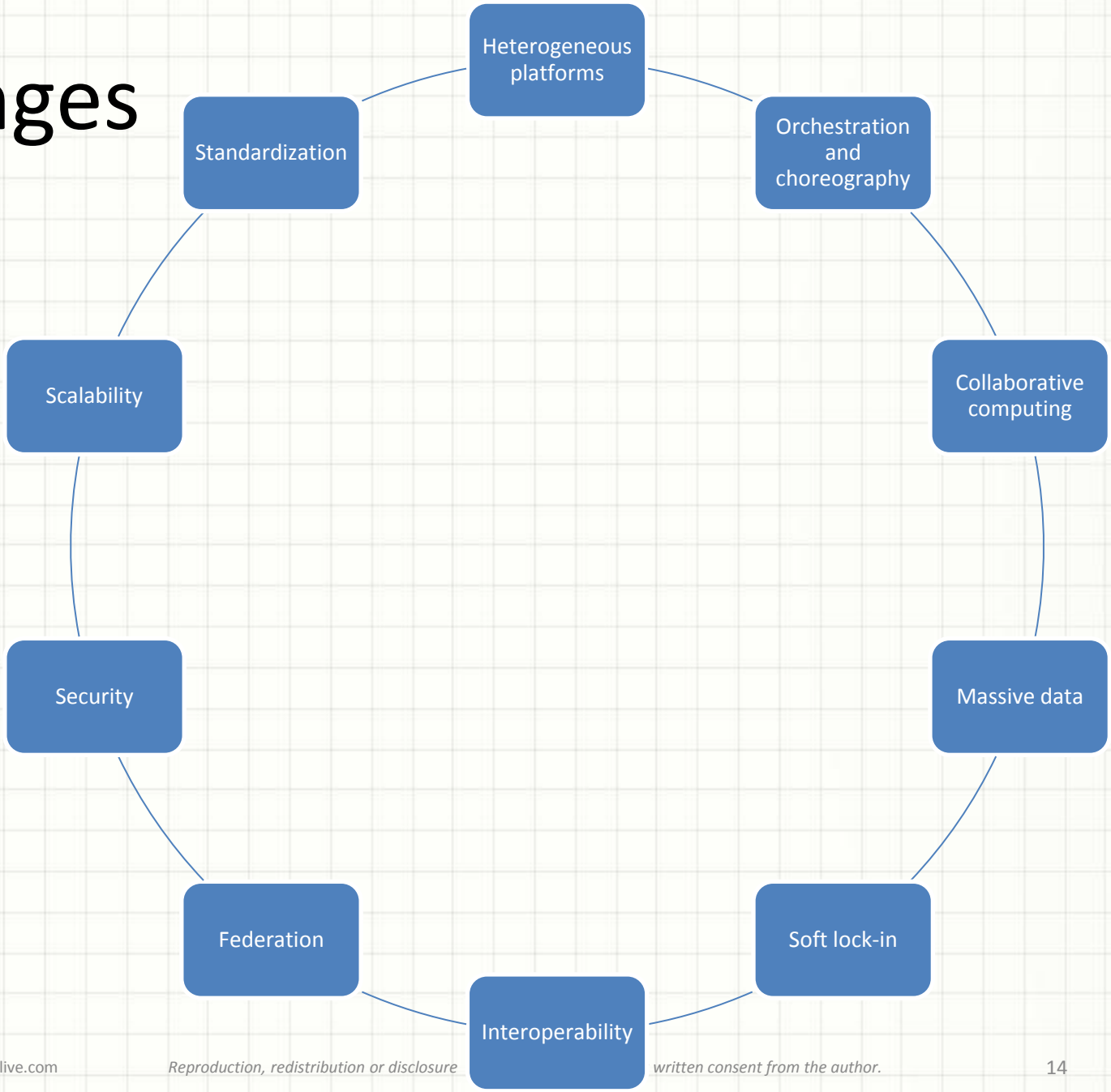
Challenges



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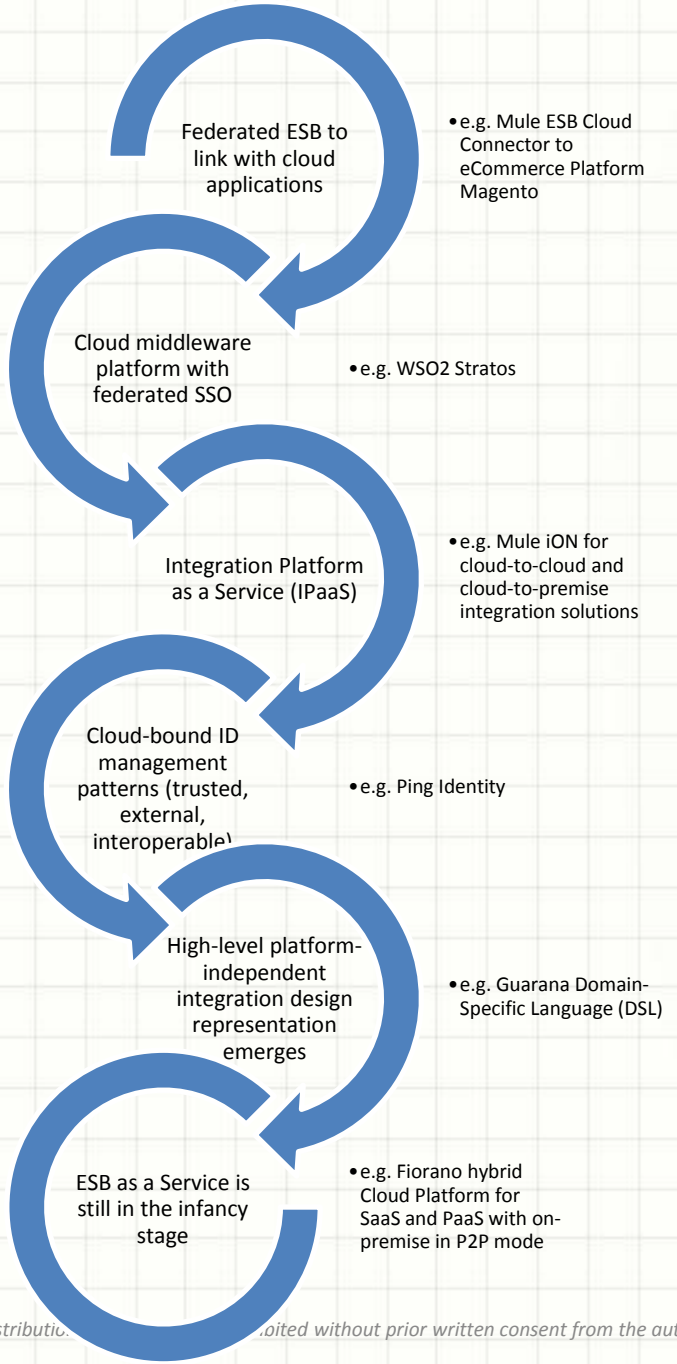
Trending



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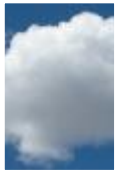
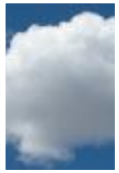
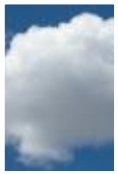
Best Practices

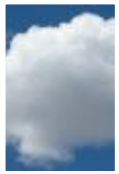
Identify commonalities of business and technology integration needs


Decouple application linkage to reduce mutual awareness

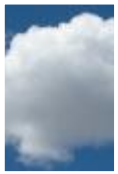

Consider asynchronous communications (MOM and pub/sub)

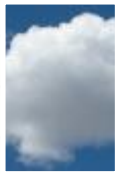
Leverage integration patterns and styles


Start with a lower-cost and out-of-box integration solution

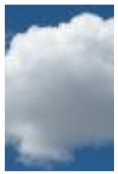

Explore the potential of open source ESB

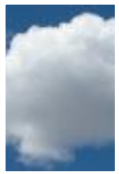
Upgrade to a more robust solution as needs grow


Look into cloud alternatives


Drive two-prong cloud integration strategies

Take a hybrid deployment approach


Treat security as a cross-cutting concern


Scale end-to-end

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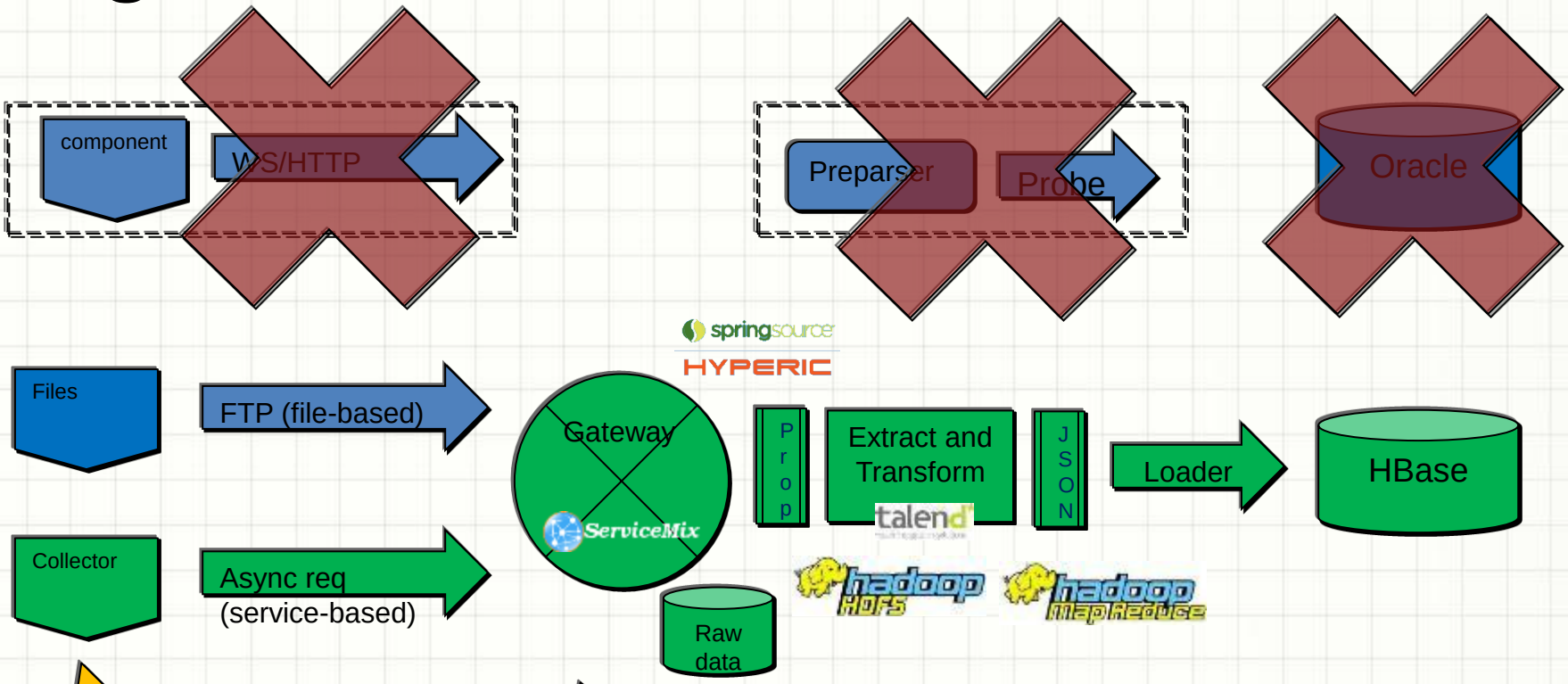
Case Study: Integration for Big Data Ingestion



- Small batch
- Near real-time
- Streaming
- Javabeans, ActiveX, .Net
- Open source
- SDK

- Staging
- Queue
- Management
- Secure comm
- ESB
- ServiceMix/ FuseSource

- Monitoring
- Security
- Error handling
- Notification
- Talend
- Hyperic HQ

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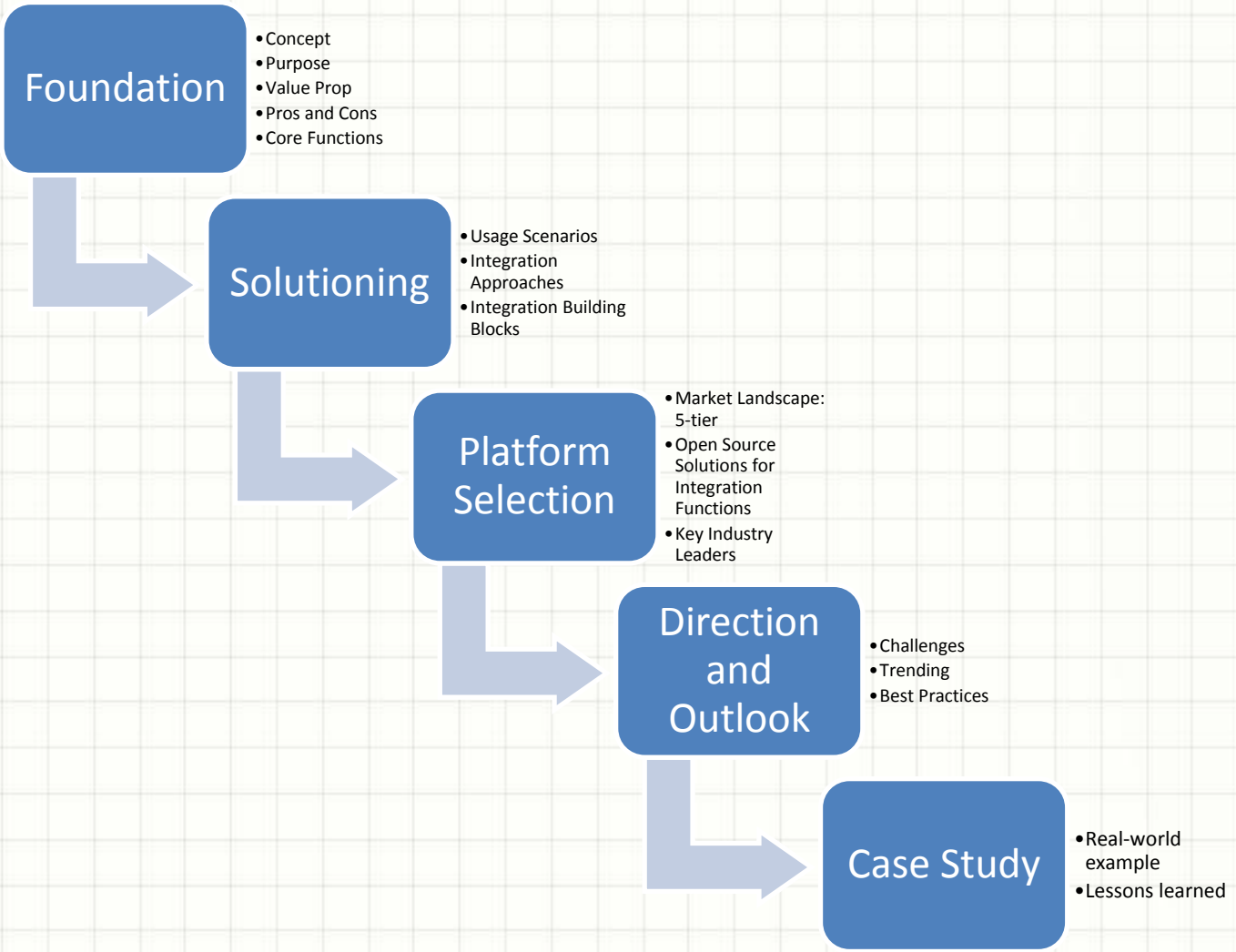
Summary



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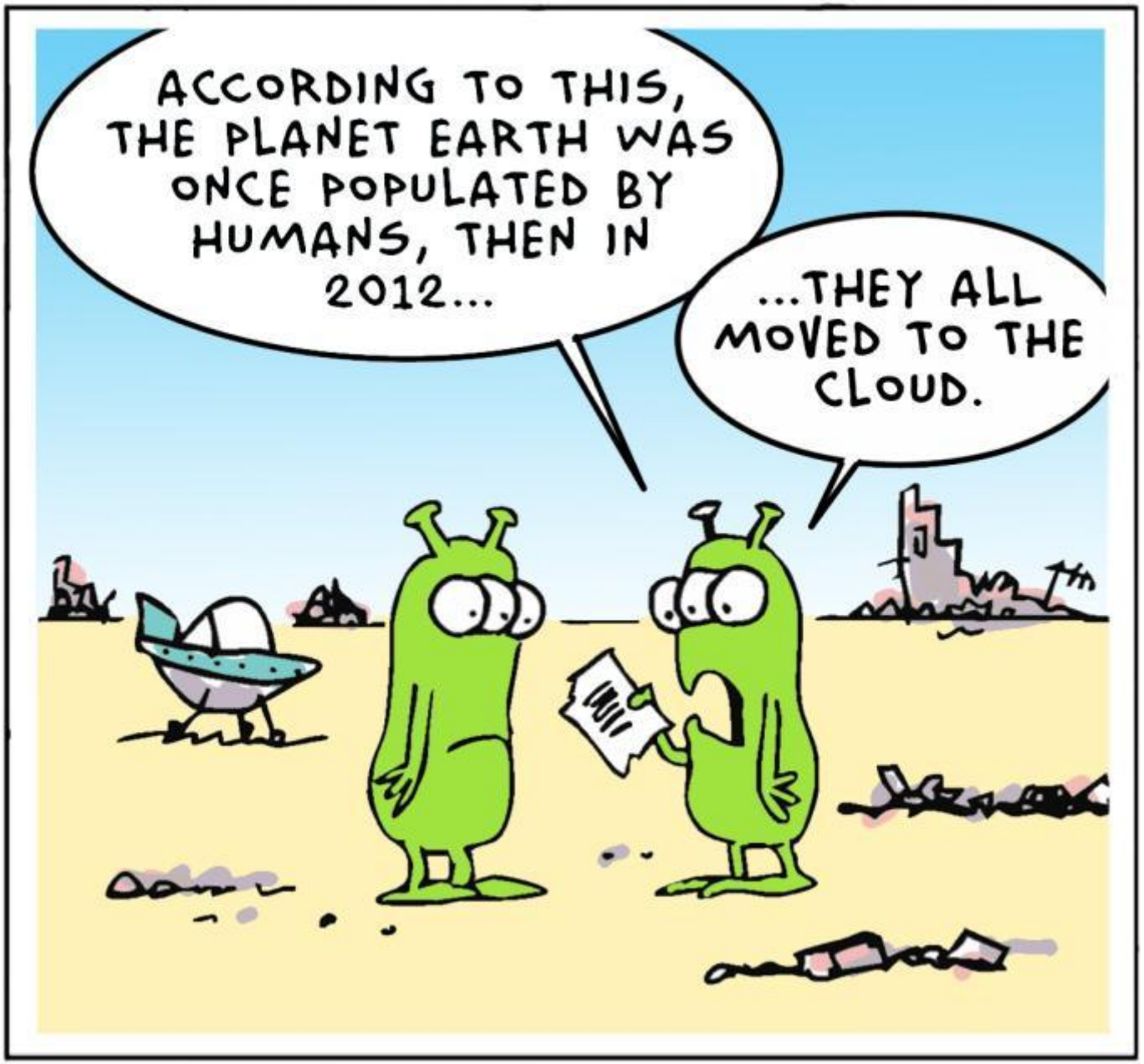

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Hindi

Спасибо
Russian

多謝
Traditional Chinese

多谢
Simplified Chinese

ขอบคุณ
Thai

شكرا
Arabic

Thank You

Obrigado
Brazilian Portuguese

ありがとうございました
Japanese

Grazie
Italian

Danke
German

감사합니다
Korean

Gracias
Spanish

Multumesc
Romanian

Merci
French