



AZURE INTEGRATION SERVICES – CONNECTIVITY EVERYWHERE

Abstract

Many companies have reoriented their IT strategy to take advantage of the public cloud, or are in the process of doing so. Systems that require huge, vertically scaled infrastructure are subject to catastrophic failures with long recovery times and have a target on them for modernization or replacement. This applies to integration middleware as much as other technologies.

In this whitepaper, we will take a look at how Azure Integration Services can fully uplift your Azure Ecosystem, curated modern integration functional and technical architecture patterns, its implementation using Azure Integration Services and best practices.

“Just in time cloud integration at web scale is at core for rapidly changing business drivers & digital priorities”

“Worldwide public cloud revenue to grow 17.3 percent in 2019”
- Gartner

“Investment in PaaS will grow from 32% in 2016 to 56% in 2019, making it the fastest-growing sector of cloud platforms”
- KPMG

“Cloud-based Integration is a critical component of Modernized Integration Strategy. iPaaS adoption is growing at 22%”
- CAGR

“Cloud-first, and even cloud-only, is replacing the defensive no-cloud stance that dominated many large providers in recent years”
- Gartner

Enterprise is changing...

Rapidly evolving, fast-moving and adaptable Enterprise is the trend to sustain in the highly pervasive digital ecosystem and these changes are driven by Enterprise business, their digital priorities and IT challenges.

Business Drivers

- Enable data for business decision at the speed of market
- Adapting to diverse Enterprise system

- Unleash and reuse the legacy systems
- Utilize the power of the digital ecosystem

Digital Priorities

- Move applications to cloud and Digitizing Integration Platform
- Evolve digital integration at scale and speed
- Fast-paced innovation in Customer/ Partner engagement

IT Challenges

- Enable pervasive integration
- Share core data with Partner securely
- Unlock digital systems for digital readiness
- Connect seamlessly diverse systems, cloud and data islands
- Integration on-demand



Overview

Integration continues to be at the heart of the overall IT landscape. From point to point to application integration to process and digital, it still plays a critical role for organizations in unlocking the value.

As the world is moving towards digital and cloud, integration is evolving to stay relevant. The data centers are moving to cloud, ERP/CRM applications adopted as SaaS, new trends around API, Big Data,

Consolidation and acquisition of the business, cost optimization all present its challenges to Integration either in existing A2A, B2B or new API, Data use cases.

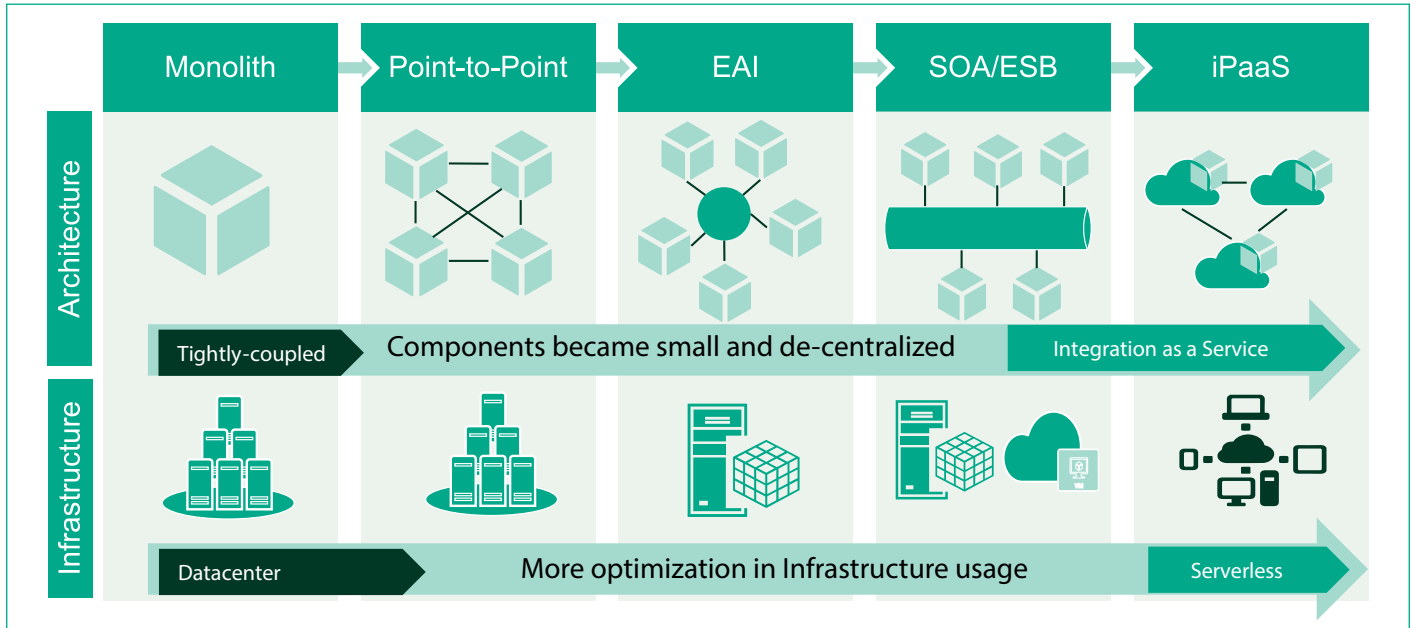


Figure 1: Integration Evolution

Infosys Enterprise Application Integration and Services has been delivering value to our clients for over 20 years by unlocking Integration puzzle with various tools & technologies. We strongly believe

Integration is pivotal in the world of new digital age and the cloud Ecosystem, but it has to evolve with speed and scale, there are plenty of opportunities and untapped potential to unleash. Any evolution will

have its challenges but overcoming them will present us with great rewards. Integration is no different!



Microsoft's contribution to the Integration space

Microsoft is a long-term player in Integration space. Microsoft BizTalk Server continues to be a leading Integration Powerhouse and is adopted by many clients across the globe for EAI, B2B use cases with excellent capabilities around messaging, orchestration, business rules and partner management.

Microsoft is also a frontrunner in cloud and is continuously evolving its products. Microsoft Azure is a leading Cloud Platform catering to every organizations needs

providing IaaS, PaaS and SaaS offerings and more recently an ePaaS with Azure Integration Services.

Azure Integration Services

- AIS combines the power of 4 Key Azure Services namely
- API Management – For Digital Exposure
- Logic Apps – Workflow, Routing and Orchestration with 200+ Connectors
- Service Bus – Publish/Subscribe and Reliable Messaging

- Event Grid – Capture and Deliver Events. Trigger instead of Poll

Pre-Integrated with other Azure Services

AIS also works very well with other Azure Services such as Azure Functions, Azure Web Apps to provide custom add-ons on top of the standard functionality provided by AIS, also with Storage Accounts, App Insights, etc. As we will see in the next sections, AIS can truly uplift your Integration with its all-terrain capabilities.

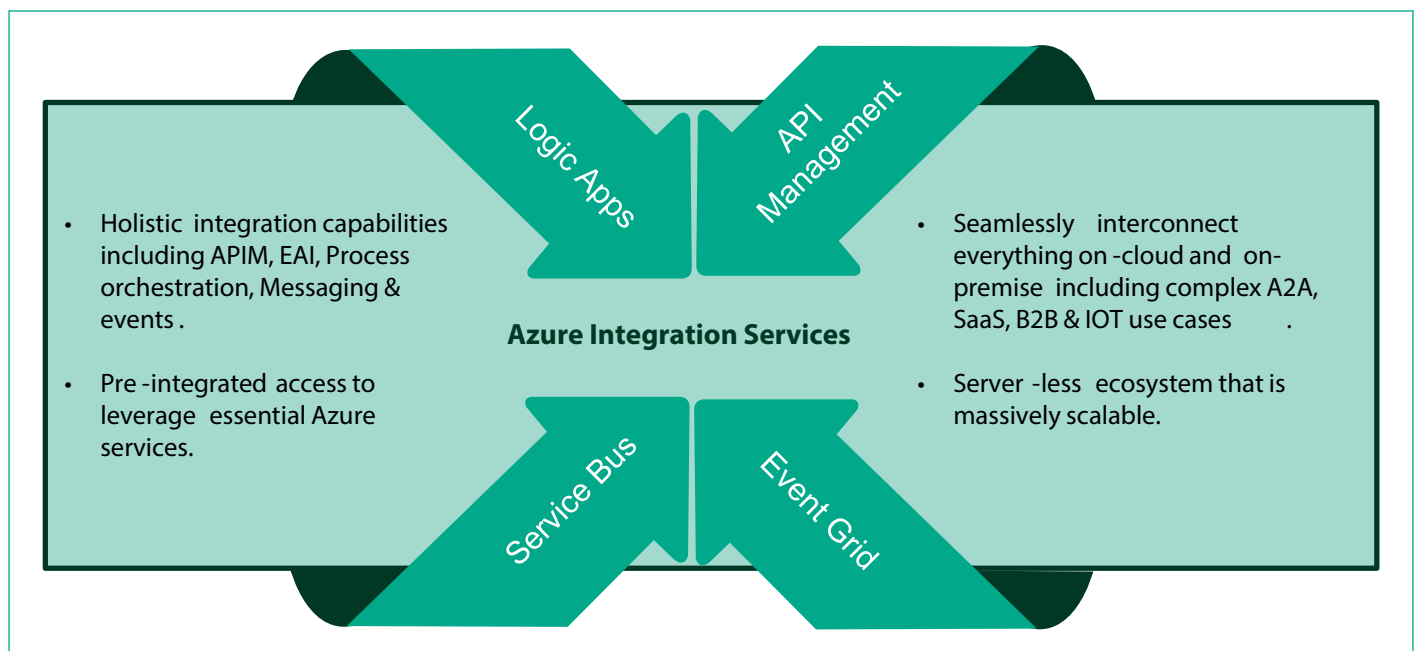


Figure 2: Azure Integration Services

Why Azure Integration Services

Business Agility – Increase agility by making new capabilities available to the organization

Cost Effective – Increase reusability and reduce cost

Security – Increase system and network security

Operation – Responsive operation capability and increased maintainability

Abstraction – Provide a level of abstraction between systems which

reduces impact of change in the IT landscape

Automation – Automate business process

TURBOCHARGE WITH AZURE INTEGRATION SERVICES – SEAMLESSLY INTEGRATE BETWEEN “ON CLOUD” AND “ON PREMISE” WITH ENDLESS POSSIBILITIES...

Integration Platform-as-a-Service: Functional Patterns using Azure Integration Services

- SaaS Integration to enable digital ecosystem
- Unleash core data from Legacy systems
- API-First integration
- Plug in existing on-premise systems to cloud
- Engage with Customer and Partners
- Event driven complex integration

SaaS Integration to enable digital ecosystem

More and more enterprises are moving to cloud, migrating the workload to PaaS or replacing it with SaaS systems. Enabling SaaS helps enterprise enable digital ecosystem rapidly.

This ecosystem requires de-centralized and distributed integration with multiple SaaS systems as well as enterprise on-premise systems.

AIS helps to enable this integration.

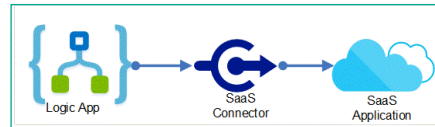


Figure 4: SaaS Integration

Specifically, Azure Logic Apps provides 100s of SaaS connectors that can be used readily to connect to disparate SaaS systems retaining business focus instead of technical connectivity.

Unleash core data from Legacy systems

In legacy modernization, it's imperative to build a set of functionalities to abstract business capabilities and make it available to the customers, partners, internal stakeholders. This abstraction helps the business to shield the internal systems enabling rapid innovation, standard interface to the outer world at the same time releasing new capability to the markets.

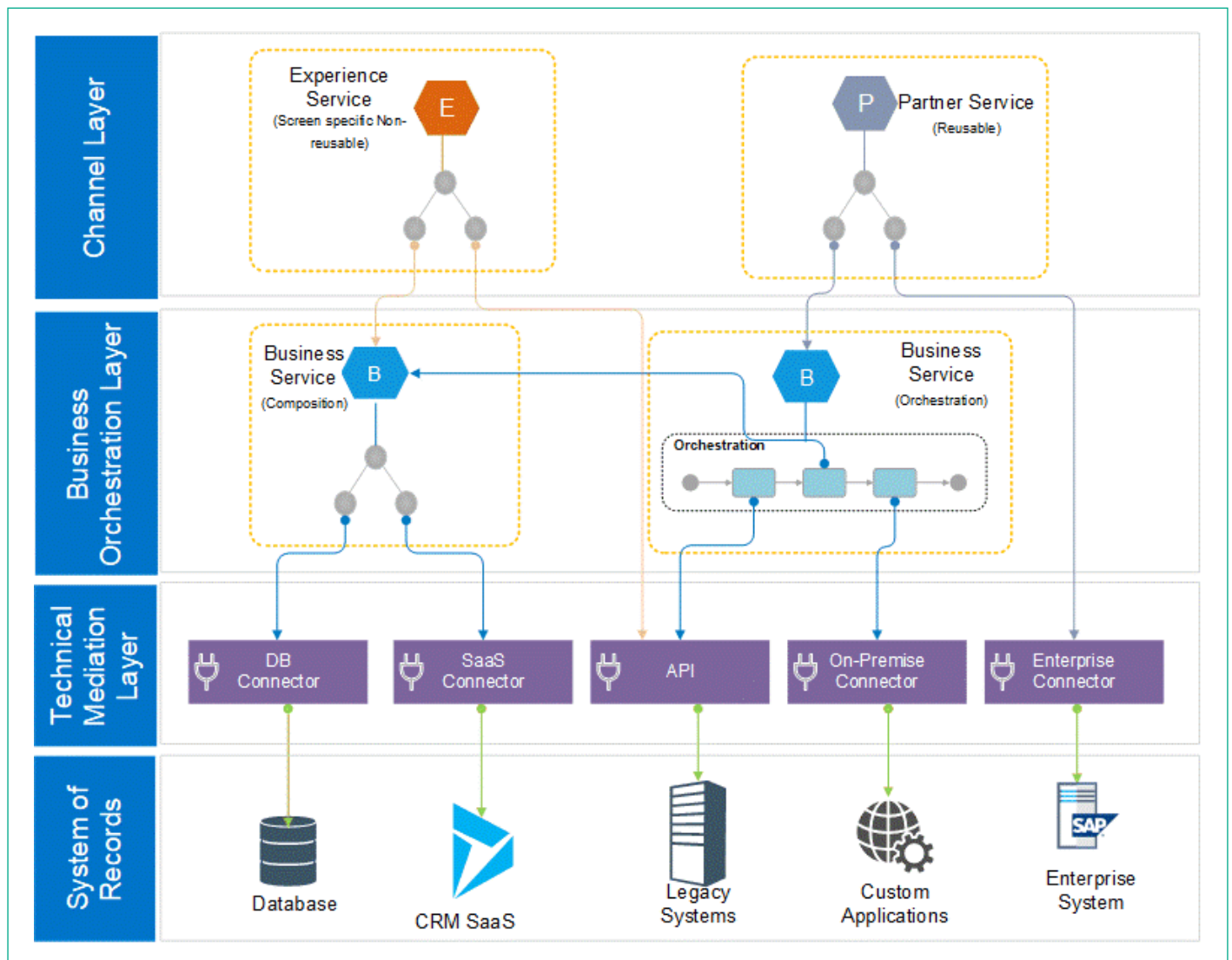


Figure 3: Integration Design

Core capabilities exposed as Independent functionalities or services can be then consumed by an orchestrator to form a specific business process.

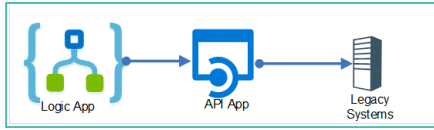


Figure 5: Legacy System Integration

AIS can abstract this integration with low-code and higher configuration.

API-First Integration

For real-time and synchronous integration, where the web or mobile channel integrates with other systems through API, building integration as an API first makes more sense. API-First approach helps collaboration with multiple stakeholders to build integration solution using Headless architecture essentially decoupling service providers and consumers.

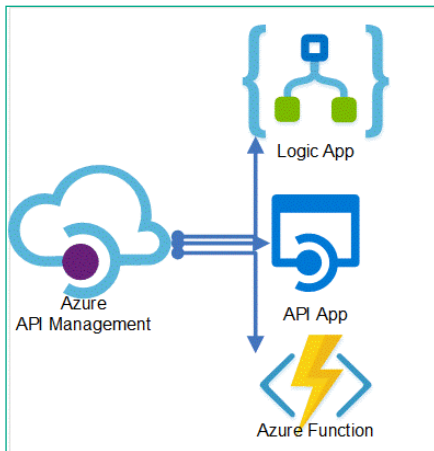


Figure 6: API-First Integration

It's essentially achieved by creating API contract in terms of OpenAPI specification which can be then shared with multiple stakeholders.

Azure Logic Apps and Azure API Management can either be a consumer or provider. Each Logic Apps can be exposed as an API using HTTP trigger and published to Azure API Management. Developers from different teams can onboard and socialize the API in Developer Portal. Similarly, Logic App can also consume a Swagger based API.

Plug-in on-premise systems to cloud

We know Enterprise cannot move to the cloud completely. Even today, mission-critical applications are in own Data Centers. However, to enable the digital journey these on-premise systems need to be integrated with cloud systems. Idea is to re-use existing on-premise applications and enable it for cloud systems.

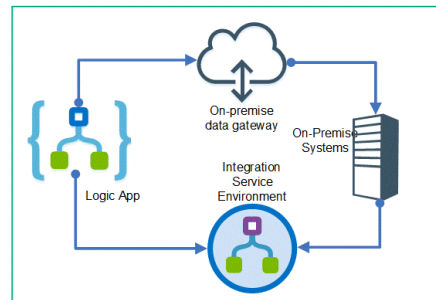


Figure 7: On-Premise System Integration

Performance and Security are an important factor while building integration. Azure Logic Apps along with on-premise

data gateway and Integration Service Environment will help address these problems.

In the above diagram, a gateway will be on-premise which creates a relay to Azure cloud with minimum security hurdles. For critical latency scenarios, Express route can also be considered for direct integration to Logic Apps without the Data Gateways.

Engage with Partners

Organizations need a way to share the data to their partners to increase business horizons and also gain benefits in terms of digitizing the current workload to gain market share. Ability to onboard a partner and manage their Integration Lifecycle is a critical capability of B2B integration.

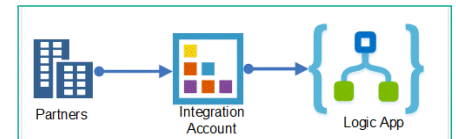


Figure 8: Partner Integration

Azure Integration Service comes with Integration Account where Partners can be on-boarded and also all digital certificates, maps, agreements related with Partners can be stored and with Logic Apps 200+ connectors you can connect to your partner no matter where they are.

Event driven complex Integration

Event driven architecture is crucial in today's highly distributed landscape, more than ever before as real-time data flow increasing every day. For systems to cope up its essential to decouple the ingestion and the processing part, so it's natural for organizations to leverage event based loosely coupled pattern to build complex integrations.



Figure 9: Event Driven Integration

AIS supports both Service Bus and Event Grid for reliable messaging and Eventing. Consider logic app to serve as a LEGO block which does one specific thing and forwards to the next using queues promoting reuse.



Integration Platform-as-a-Service: Cloud Design Patterns using Azure Integration Services

- Claim Check
- Anti-Corruption Layer
- Bulkhead
- Pipe and Filters
- Compensating Transaction
- Queue-Based Load Leveling
- Publish-Subscriber
- Logging and Exception Handling
- Gateway Routing

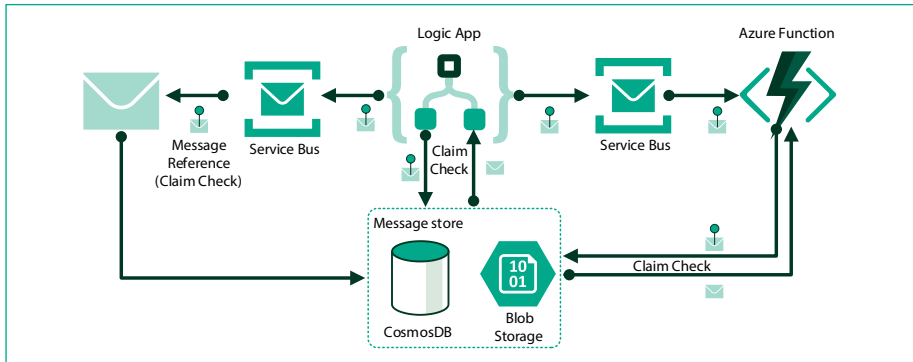


Figure 10: Claim Check

Claim Check

For large message processing, it is recommended to store the message to external service and use the reference of that message further processing. This will reduce the consumption of resources and make the solution cost effective. This also helps when particular service has a limit on message size.

Blob storage can be used as payload store and logic apps or any other client interested to process the message can get the message based on reference instead of the actual payload.

Anti-Corruption Layer

When integrating with legacy applications, features, technologies or message format can vary between the systems resulting in interoperability issues due to lack of connectors or message format or message structure mismatch. Anti-Corruption layer pattern helps to reduce the dependency on legacy systems which will create an abstract layer on top which is easily understood by other system or integration layer. Canonical Data Model is other pattern to reduce dependency.

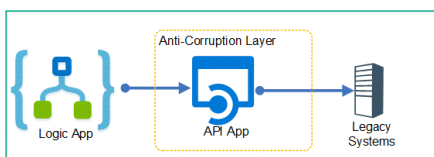


Figure 11: Anti-Corruption Layer

Bulkhead

Overloading or failures of components involving key agnostic processes such as databases or parsing failures or storage services or failure in target systems due to heavy load can lead to failure of the source systems. This can be addressed by isolating failure-prone components from overall architecture making architecture more robust and also future-proof.

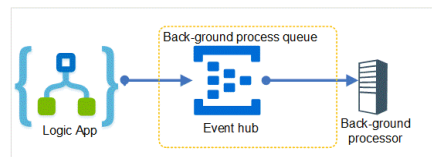


Figure 12: Bulkhead

Azure Event Hub & Service Bus can be used for isolating backend process from other systems by using highly available queue mechanism.

Pipe and Filters

For highly distributed architecture and complex scenarios, it's imperative to build microservice-like components in integration to make it individually scalable and independently deployable. Message processing, ingestion processes need to cater to various types of data/event sources so it makes sense to develop them in such pattern.

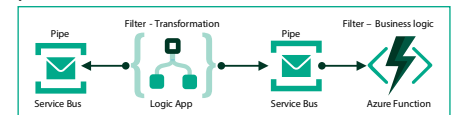
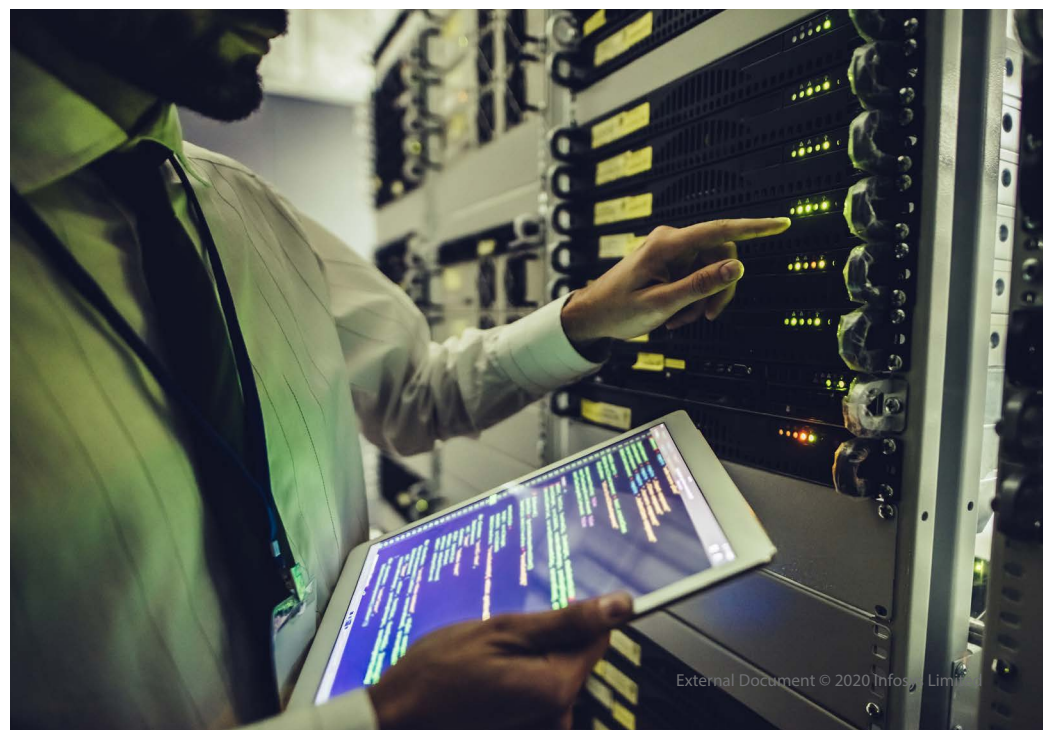


Figure 13: Pipe and Filters

Each source needs to be parsed, transformed and stored into target format with different logic. The integration components can be decomposed into discrete tasks to include parsing and storage, as well as error handling. These components are highly configurable, allowing for use-case based parsing, transformation and storage or business services.



Compensating Transaction

In case of complex business process or workflow, when or if any error occurs there is most likely a requirement to reverse the effects of previously executed steps, compensating transaction pattern comes in handy.

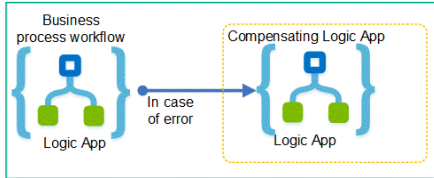


Figure 14: Compensating Transaction

The compensating component will reverse it to the state by overwriting the changes with the original state. Azure Logic Apps can do compensation in case of any error in the workflow.

Queue-based Load Leveling

It is common for a target system to not be able to cope up with the heavy load from

the source system. This can cause reliability and performance issues in the overall integration solution.

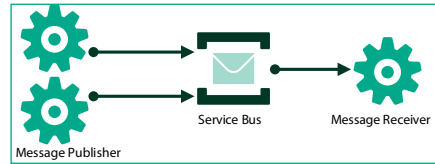


Figure 15: Queue-based Load Leveling

Having queue in between the source and the target systems will level the load, queues can help with throttle and load distribution. Target system can retrieve the message at its own space. While addressing the reliability and performance issues this also results in a scalable solution.

Publish-Subscriber

In Event-based asynchronous integration, it is very common to have many interested consumers for the same message. In this case, it's not good practice to have a queue for each consumer. Rather consider loosely

coupled architecture, so that publisher can send the message without knowing who will subscribe the message, at the same time subscriber doesn't need to know the sender's identity.

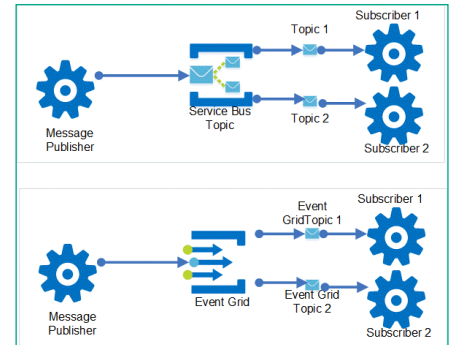


Figure 16: Publish-Subscriber

This will decouple the systems for communication and improves scalability.



Gateway Routing

When a client needs to consume multiple services which has its end-points, it becomes unmanageable for the client.

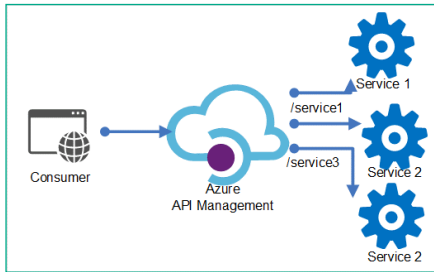


Figure 17: Gateway Routing

Instead, it is recommended to use the gateway in front of all these services and route based on the path to the correct service.



Logging and Exception Handling

There are multiple moving parts in integration for example, source, target, middleware, and other peripheral systems. In case of errors or any exception, it is troublesome to identify or pinpoint the exact component which threw error if logging is not implemented correctly.

Try enabling Azure Diagnostics for the Application Components which will push the logs to a log analytics workspace and then use Azure Monitor out of the box features to either create an Alert or pin it to Azure Application Insights Dashboard. **Tip:** Use a common Correlation id to identify all logs for the corresponding message flow.

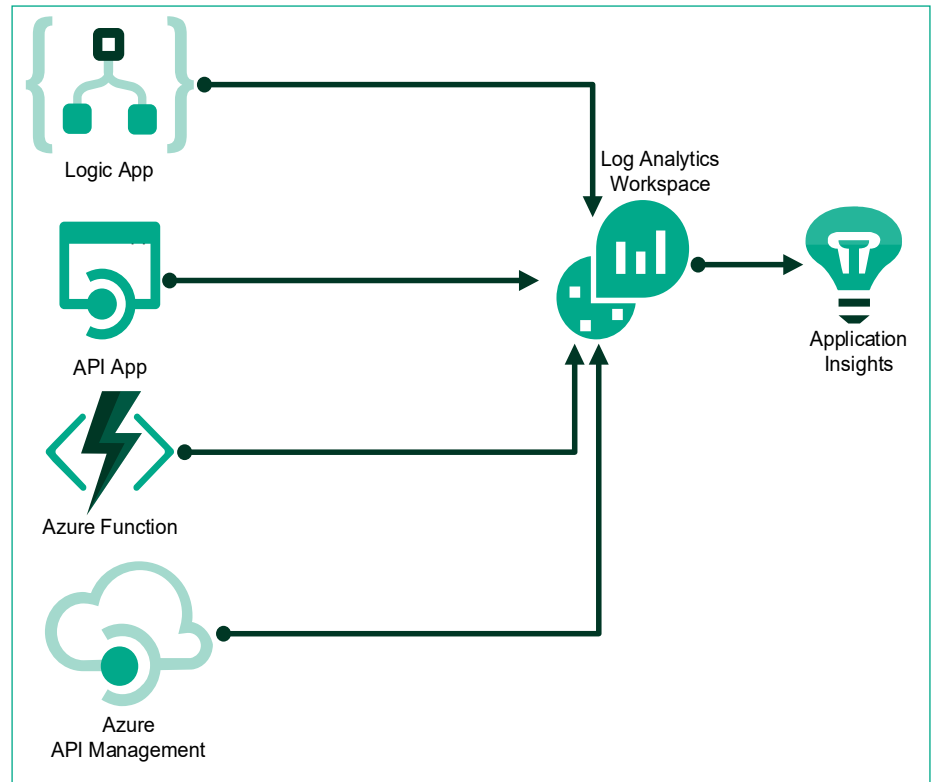


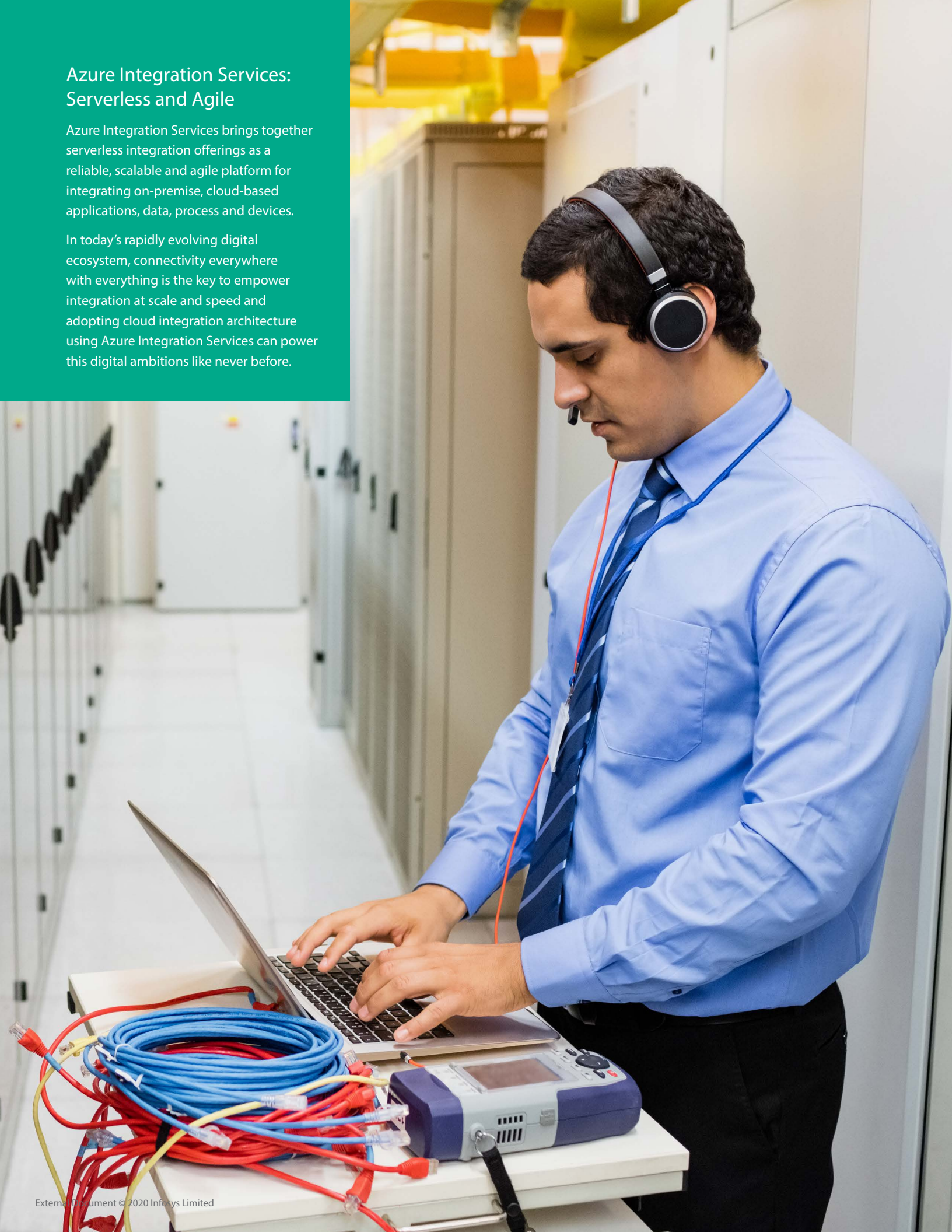
Figure 18: Logging and Exception Handling



Azure Integration Services: Serverless and Agile

Azure Integration Services brings together serverless integration offerings as a reliable, scalable and agile platform for integrating on-premise, cloud-based applications, data, process and devices.

In today's rapidly evolving digital ecosystem, connectivity everywhere with everything is the key to empower integration at scale and speed and adopting cloud integration architecture using Azure Integration Services can power this digital ambitions like never before.



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References

<https://docs.microsoft.com/en-us/azure/architecture/patterns/>

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