IBM Z Digital Integration Hub

CICS Insight Series

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Industry shifts require agile interaction with core systems

Real-time and event-based flows

How to share info at scale

Faster integration with cloud apps

Standards based & self-serve

Increased inquiry traffic & unpredictability

Optimization for query handling

Focus on digital and mobile channels

Ensure consistency of info

Digital transformation

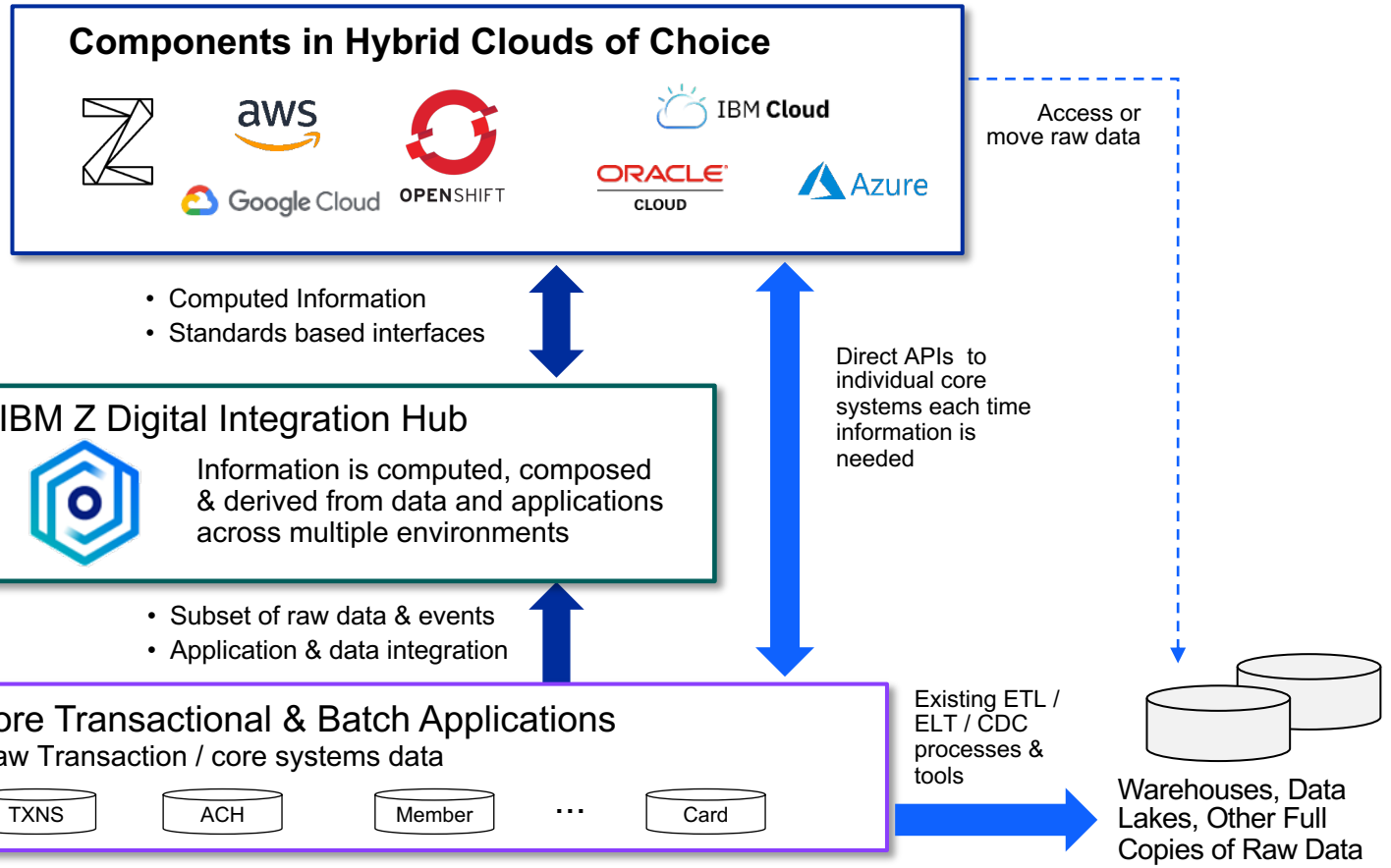
Purpose-based modernization

Ecosystem expansion

Landscape for handling increased SOR interaction

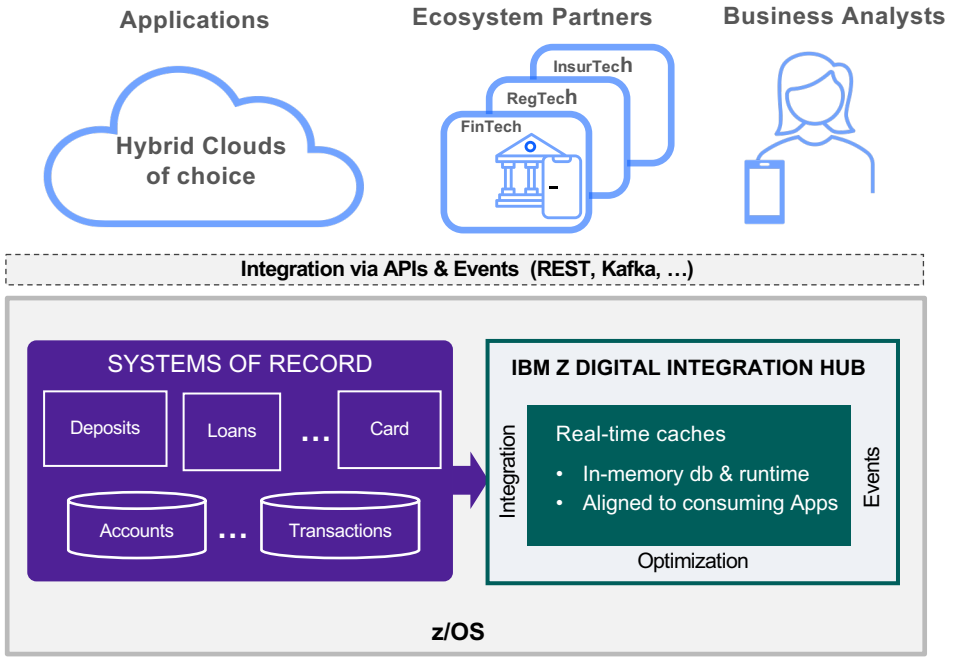
Gaps:
- Stale information
- Spikey SOR impacts
- Limited eventing
- Inability to separate query & update traffic
- Cannot get needed info
- Ordered information (e.g. for transactions)

zDIH provides:
- Real-time information
- SOR protection from unpredictable inquiries
- Flexible info model
- Composed & ordered information
- TCO advantage



IBM Z Digital Integration Hub (zDIH) for Systems of Record

- **Real-time information flow** at scale between Systems of Record and hybrid cloud or end users
- **Faster development** of hybrid cloud applications due to decoupling with Systems of Record
- Accelerated **core systems integration** across the enterprise
- Incremental **application modernization** while avoiding disruption to core systems
- **Self-service** for business analysts without impacting core systems
- **Cost optimization** through separation of query processing from core transactions

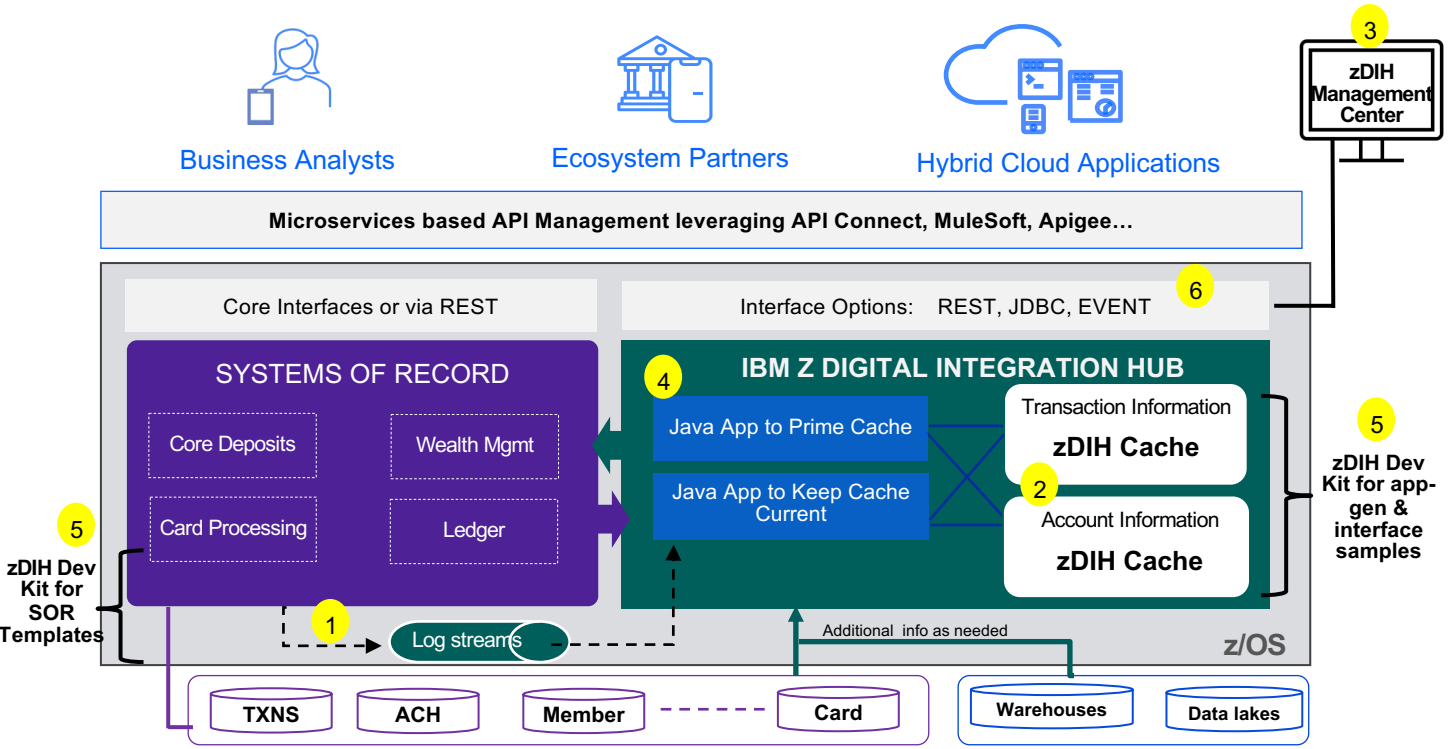


Gain faster ROI through hybrid cloud integration

Create new channels with expanded ecosystems

Leverage high-value investments

IBM zDIH technical overview



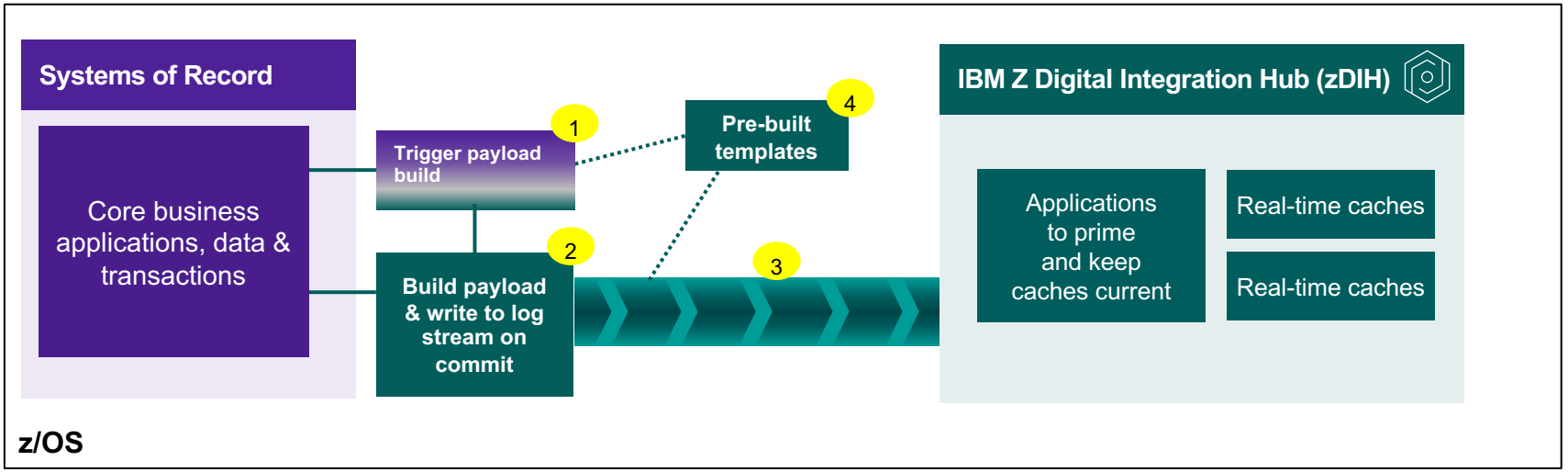
IBM zDH Components

1. Efficient core systems integration with z/OS log streams and optionally parallel sysplex
2. In-memory caches to accelerate processing
3. Management Center for monitoring zDIH
4. Java applications to leverage available skills
5. zDIH Developer Kit reduces code effort:
   - Auto Application Generator
   - SOR integration templates
   - Interface samples (REST, Kafka)
6. Standard interfaces

Options for cache currency:

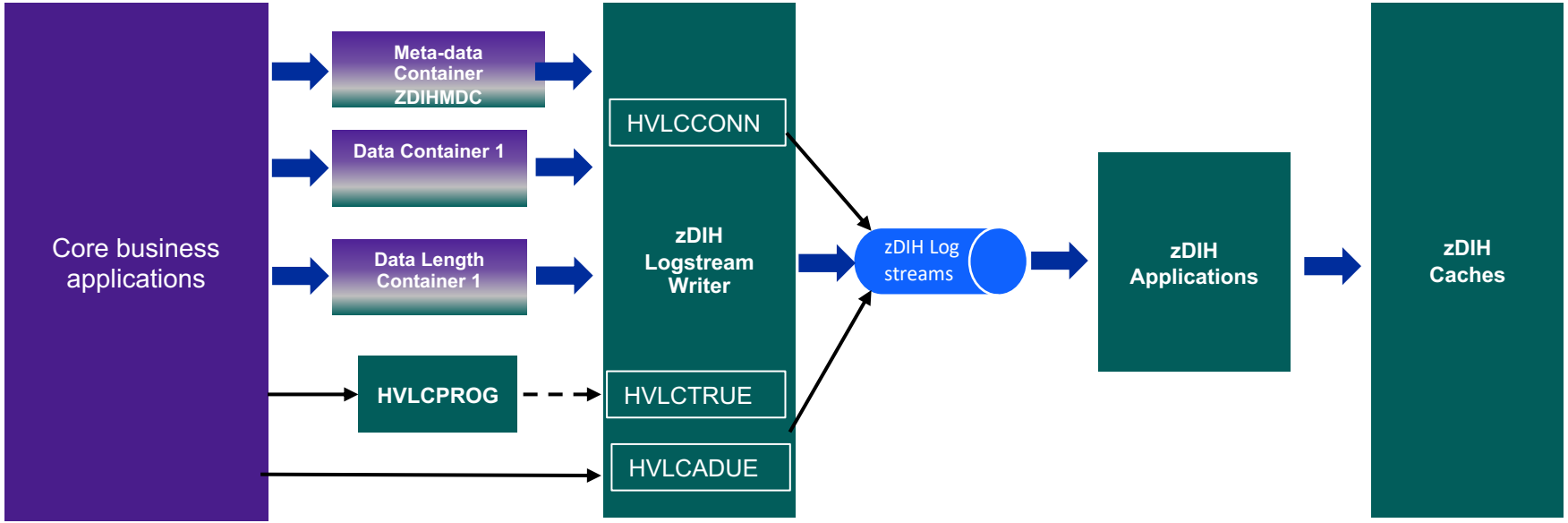
- App exits + log streams
- CICS write with Websphere Liberty
- App exits + MQ z/OS

System of Record Integration using zDIH log streams



1. At completion of select logical units of work (LUOW) within application, trigger a zDIH 'exit' to build the complete payload to be shared with zDIH – use facilities such as CICS TS queues or CICS containers
2. At syncpoint COMMIT time: leverage built-in capabilities such as CICS Task Related User Exit (TRUE) to write payload to zDIH log streams (if ROLLBACK, do not write to log stream)
3. The zDIH log streams are managed by the System Logger component of z/OS and offer high throughput, low latency, ordered communication
4. zDIH pre-built templates to accelerate system of record integration, build payloads and write to zDIH log streams with adaptability for IMS applications and batch.

CICS Application Integration with zDIH log streams



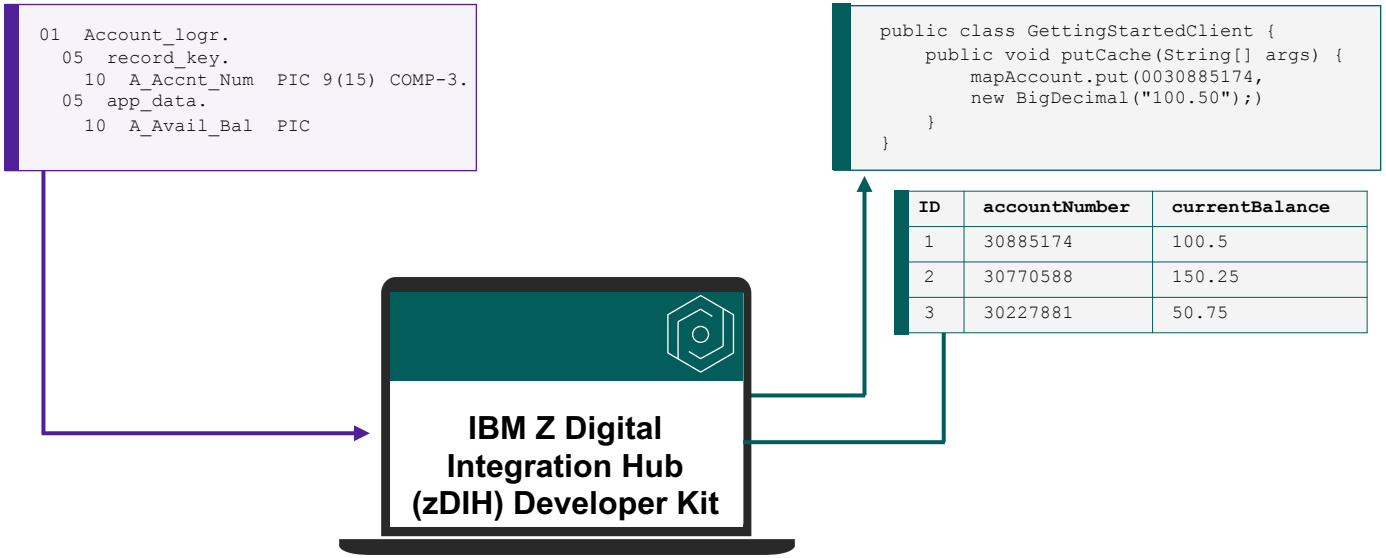
HVLCPROG - Registering HVLCTRUE to a CICS region
HVLCCONN - Connecting to a log stream
HVLCTRUE - Writing to a log stream from a CICS task-related user exit
HVLCADUE - Writing to a log stream directly from a CICS user exit

ZDIHMDC – Meta Data Container

- To share data container name, data length container and log stream name with zDIH log stream writers

Low code approach

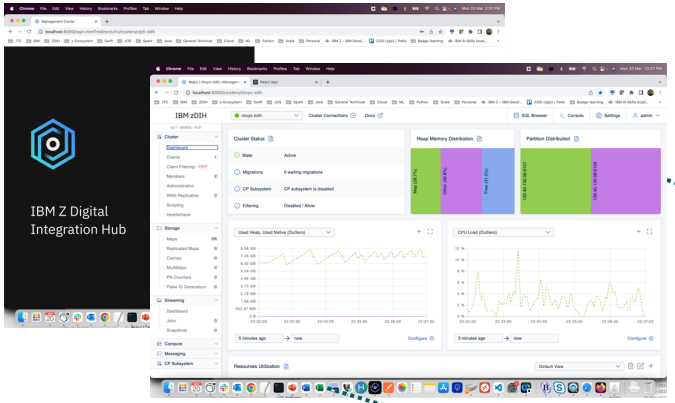
Create IBM Z Digital Integration Hub applications and caches in minutes with the IBM zDIH Developer Kit

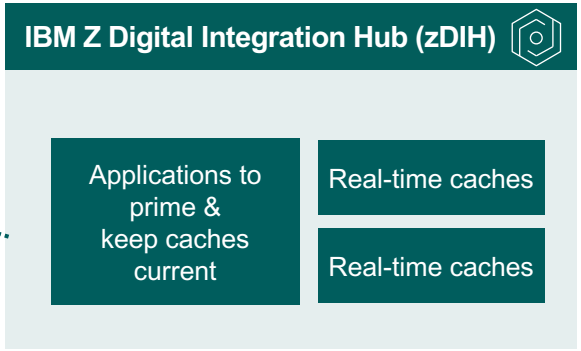


- Create zDIH applications and caches based on COBOL copybooks of the systems of record information to be shared with zDIH (e.g. zDIH log stream copybook formats)
- Robust customization parameters for flexibility and ease of use
- Resulting Maven Java project can be imported into IDE of choice for integration with DevOps pipelines

Monitoring

Monitor IBM Z Digital Integration Hub clusters, Java environment, and z/OS resources for optimal performance





- IBM Z Digital Integration Hub Management Center shows cache entries, memory and heap utilization, node configurations and status
- Use tools such as Java Garbage Collection Memory Visualizer (GCMV), Java Health Center and IBM OMEGAMON for JVM on z/OS to monitor performance and function of the JVMs used by IBM zDIH
- Monitor z/OS resources used by IBM zDIH with standard IBM z/OS tooling (SMF records, RMF, SYSLOG, etc.)
- For more information see: IBM zDIH Product Documentation: Monitoring zDIH

M&T Bank

How do banks make accurate business decisions in real-time?

M&T Bank was searching for a faster, more efficient way to share core banking information with hybrid cloud applications—without impacting production systems.

M&T collaborated with IBM on a Z Digital Integration Hub (zDIH) engagement to modernize and better integrate their z/OS® applications with downstream consumers.

With zDIH, the bank mitigates risk and potential fraud by providing hybrid cloud applications with sub-second current information from systems of record. M&T also improves time to value up to 40% for data-driven applications and enables business analysts to respond customer issues.

Agile integration and real-time information flow at scale between Systems of Record and hybrid cloud applications

"Without this pilot and collaborative approach, our collective organizations would not have achieved the great outcomes we did."

Russell Plew

Technology Senior Manager, M&T Bank

Solution Components

- IBM z15
- IBM Z Digital Integration Hub

Read the full story

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Example customer results with zDIH

Previously	With zDIH
Application Performance − Currency: 3+hr old − Increased compliance risk window	Application performance + Currency: sub-second + Significant mitigation of risk
Hybrid Cloud Development − Specific data extracts, leads to elongated new app development cycles − No self-serve for BAs, leads to longer time to service customer issues	Hybrid Cloud Development + 40% faster time-to-value for data-driven hybrid cloud apps + Full self-serve for BAs, reduces customer issue servicing time
Price performance − Minimal use of specialty cores (cost disadvantage)	Price performance + 95+% use of specialty cores (cost advantage)

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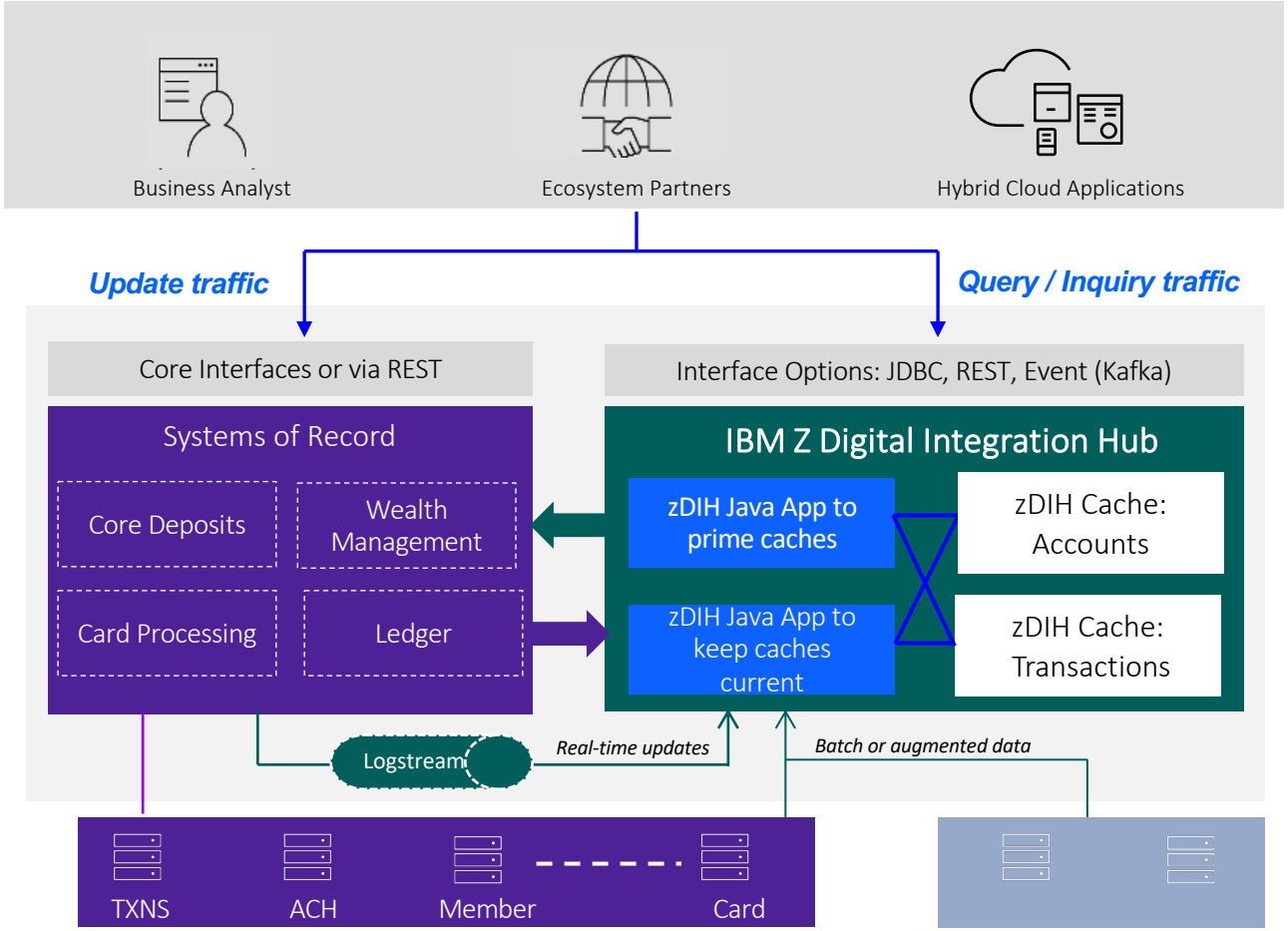
Optimized Command-Query Responsibility Separation (CQRS)



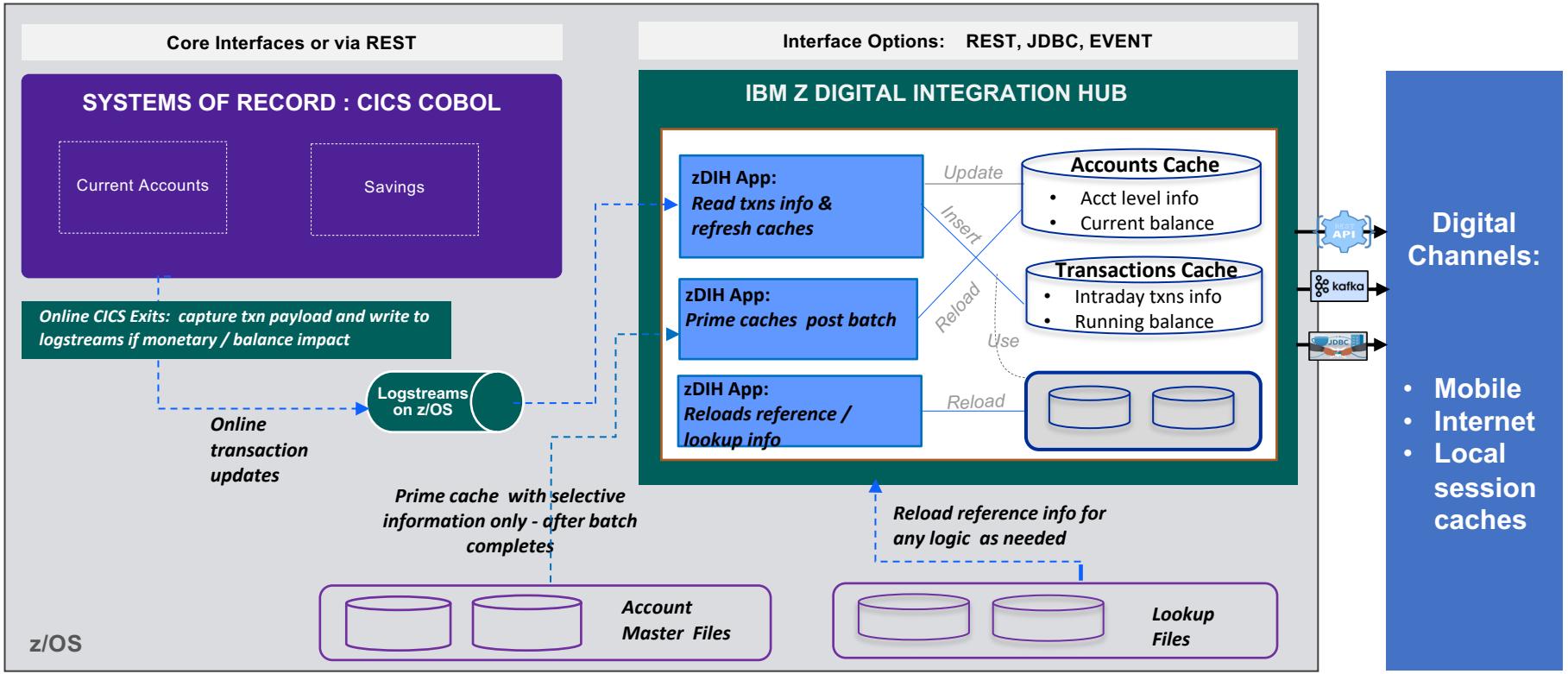
Use case examples:

- Optimized inquiry of intraday balances for current accounts and savings
- Real-time information about wholesale or retail payment entities
- Credit/debit card activity

Benefits:

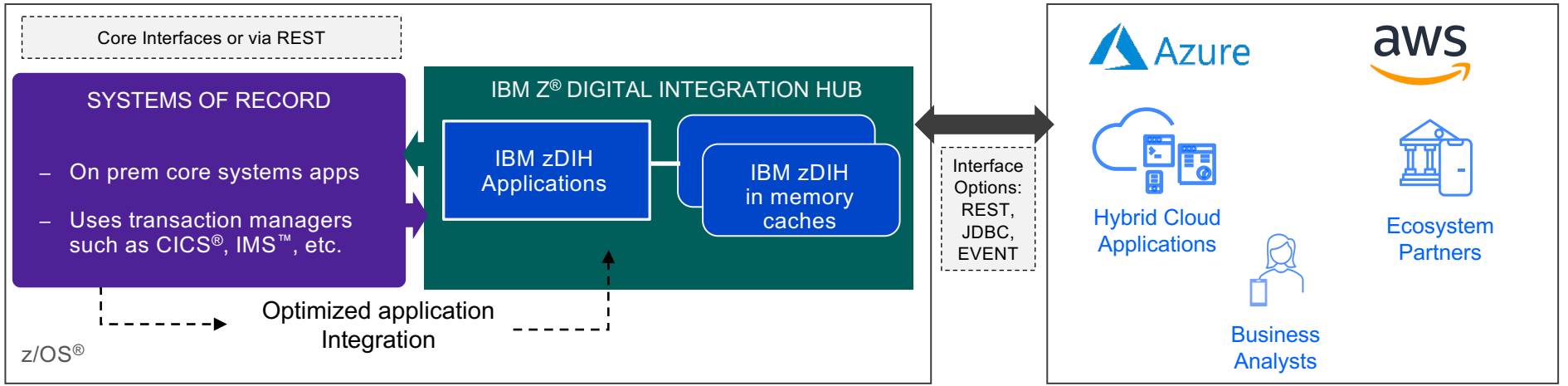
- SoR not impacted
- Real-time at scale
- Events: proactive updates
- Consumable information
- Standards based interaction
- Composed info (e.g. balances)
- TCO advantage
- Selectivity about information shared

IBM zDIH use case: share intra-day running balances



- The exits identify when composted information such as real-time balances should be re-computed and added to the payload
- Avoids duplication of business logic since existing computations derive the composed information (e.g. compute balances)
- Use this approach for information that is frequently queried or highly valuable

Real-time information sharing between z/OS core systems & Public Cloud



- Aggregated, curated / composed real-time information from core systems of record
- Efficient integration between core on premise z/OS systems applications and cloud native applications
- Minimal impact to mission critical application environments
- Standards based interaction enabling flexibility and decoupling from specific data contexts & data access formats

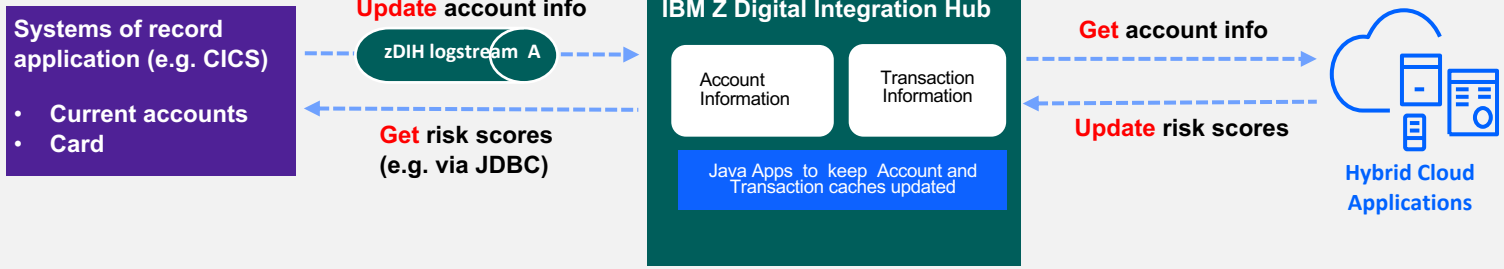
Azure (pattern 3): https://techcommunity.microsoft.com/t5/azure-migration-and/accelerate-mainframe-application-modernization-with-ibm-and/ba-p/3691322

AWS (pattern 2): https://aws.amazon.com/blogs/apn/modernize-mainframe-applications-for-hybrid-cloud-with-ibm-and-aws/

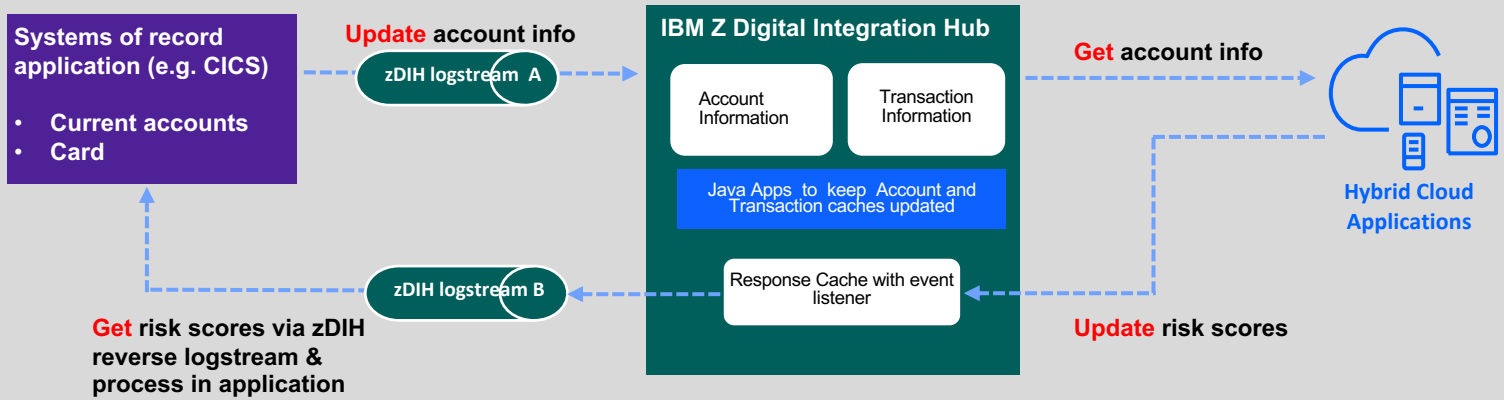
IBM zDIH use case: 2-Way communication to/from cloud apps

- Asynchronous communication back *from* cloud apps
- SoRs can retrieve the necessary information non-disruptively – either via JDBC or pulling from reverse zDIH logstream

SOR app retrieves enriched info from caches via JDBC

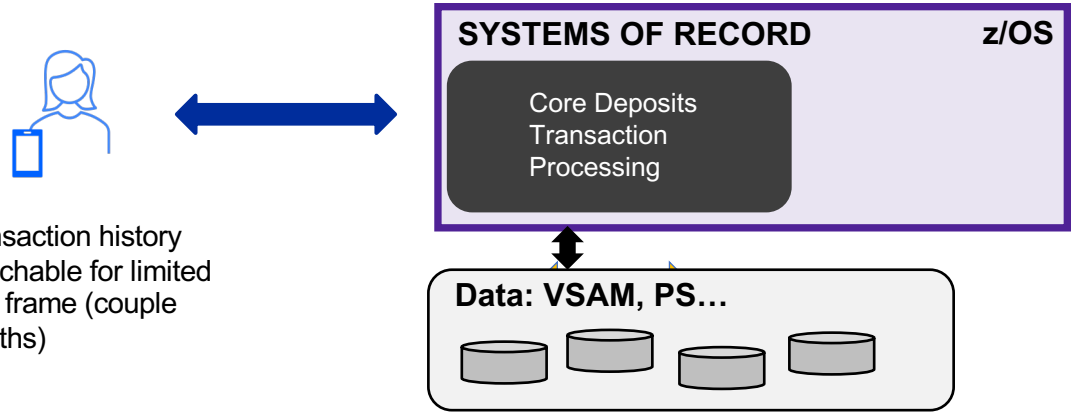


SOR app retrieves info continuously via zDIH reverse logstream



IBM zDIH use case: enhanced transaction history

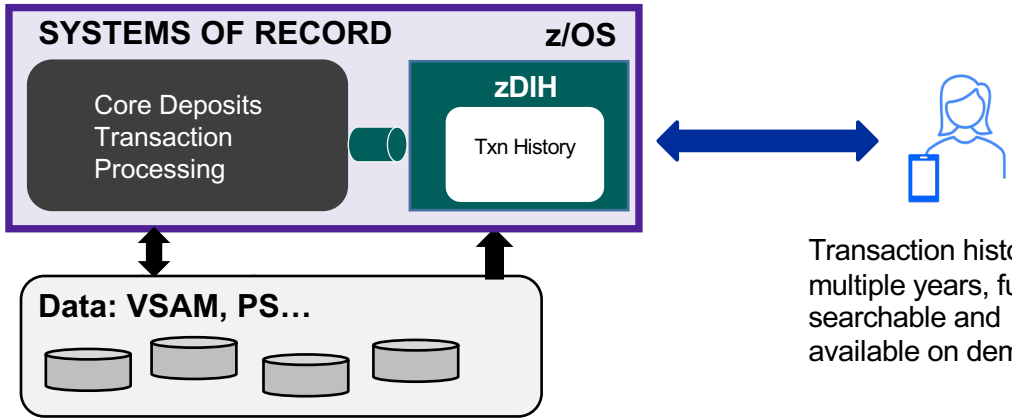
Without zDIH



Transaction history searchable for limited time frame (couple months)

- Customers often request access to more history than available
- Results in custom work per request and longer time to satisfy client needs

With zDIH



Transaction history over multiple years, fully searchable and available on demand

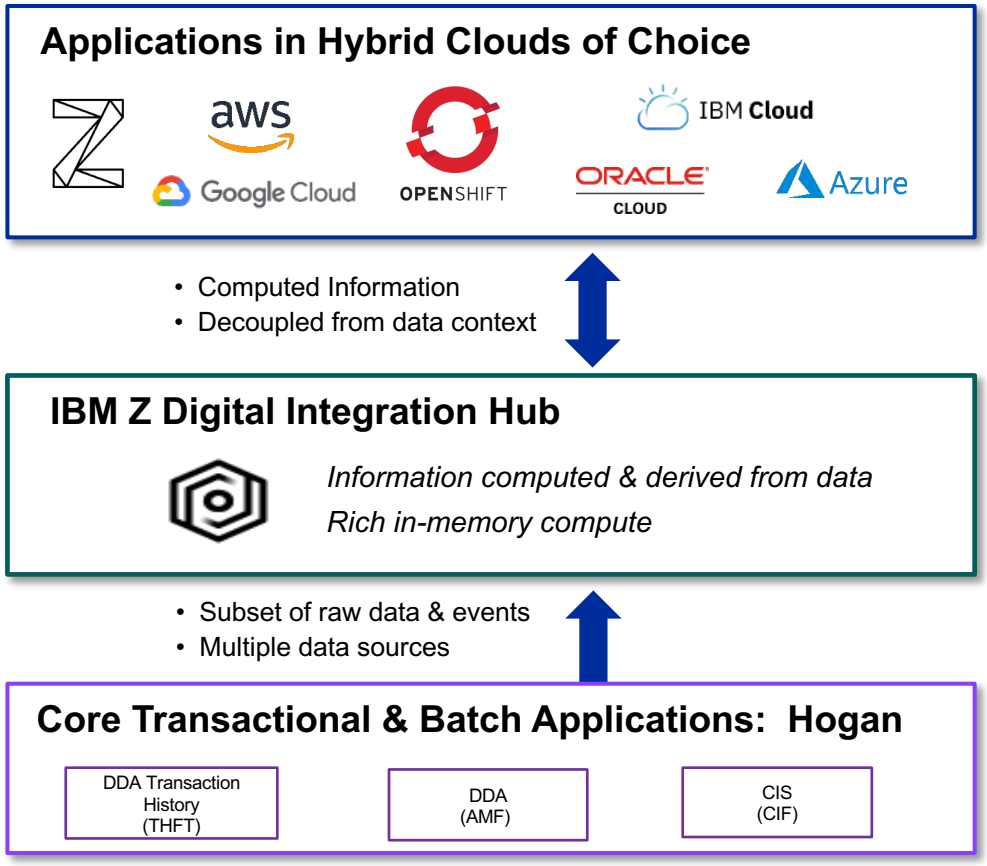
- Extended history can be made available, on-demand and fully searchable at speed
- Keep only relevant attributes in cache
- Both in-memory and native persistence leveraged, transparent to consumers

Example Core Systems Integration with zDIH: DXC Hogan

IBM Z Digital Integration Hub (zDIH) creates flexible, efficient, real-time information flow between multiple existing systems of record and cloud environments.

The IBM zDIH rich in-memory compute engine coupled with java applications consume Hogan information as well as other SoR info via logstream z/OS and populate intra-day real-time caches.

DXC Hogan Integration Framework for zDIH provides optimized real-time integration of Hogan transactions & batch updates with Z Digital Integration Hub.



Examples **good fit** use cases:

- ❑ Surface information which is composed / aggregated as opposed to all raw data
- ❑ Implementing optimized CQRS (separating inquiry and update interactions) for downstream consumers
- ❑ Hybrid cloud application has latent information, and needs real-time or more current info
- ❑ Transition to more event-driven approach for information flow from systems of record
- ❑ Create desired information from combination of batch & online
- ❑ Efficient information sharing across multiple z/OS applications
- ❑ Re-use composed information by multiple cloud consuming applications

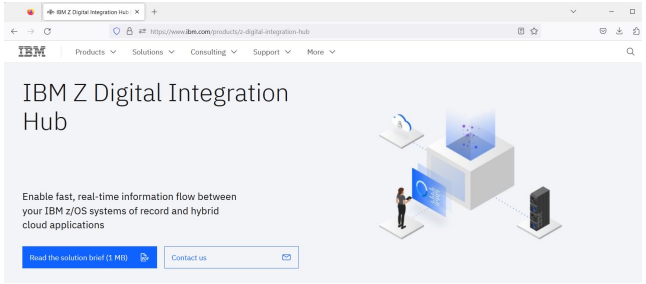
Examples **not good fit** use cases:

- ❑ Move all z/OS core systems data to the cloud or another environment
- ❑ Access to all core systems of record data for adhoc query interaction
- ❑ Stream all data off the platform
- ❑ Cache all data from a system of record in zDIH
- ❑ AI / ML model training that requires access to granular raw data
- ❑ As a replacement for core systems transaction manager or database (e.g. DB2 for z/OS, CICS, IMS, etc.)

For more information about selecting an initial use case for zDIH, see: IBM zDIH Product Documentation: Selecting Initial Use Case

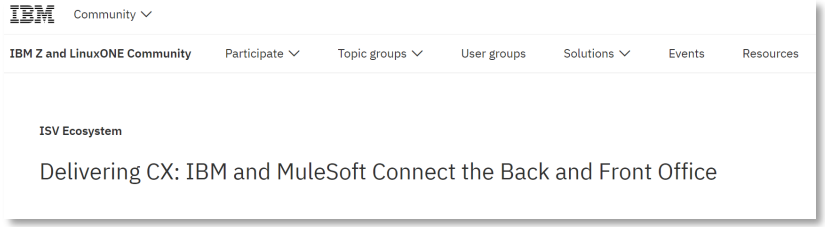
Additional IBM Z Digital Integration Hub resources

Z Digital Integration Hub landing page



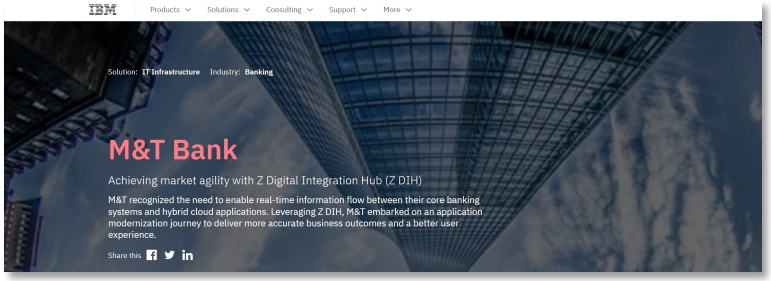
zDIH Product Page

Enterprise API management



MuleSoft integration with zDIH

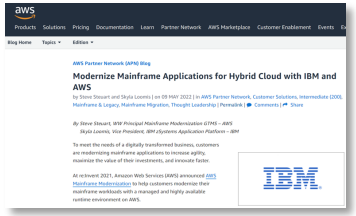
M&T Bank

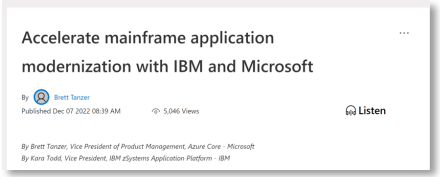


zDIH case study and reference

Modernize mainframe applications

Hybrid Cloud with IBM, AWS, and Azure

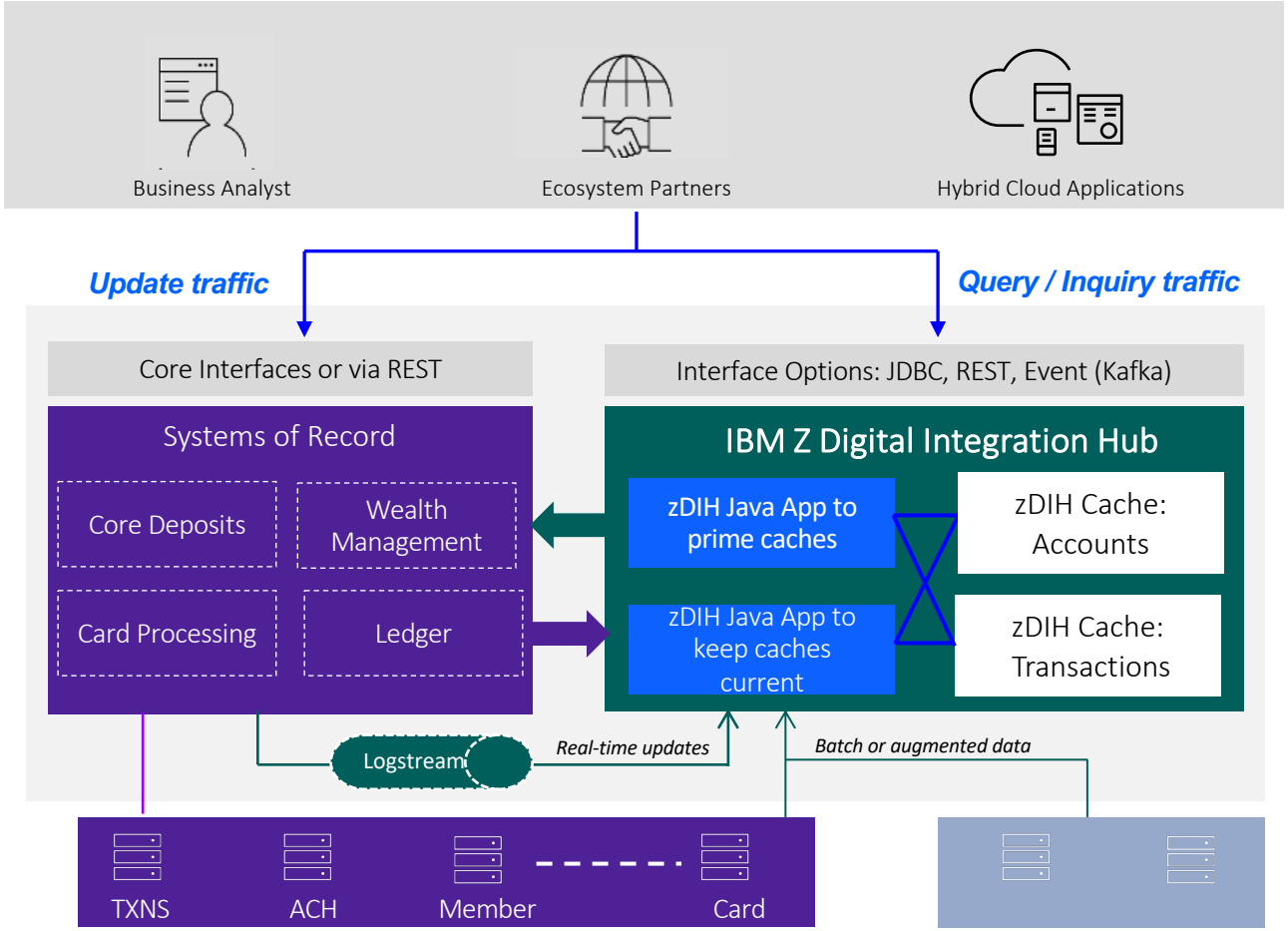




AWS: Pattern 2

Azure: Pattern 3

Optimized Command-Query Responsibility Separation (CQRS) Demo



- Integrating CICS application with IBM zDIH for real-time information sharing
- A typical demand deposit retail banking scenario
- Multiple methods to invoke the CICS transactions for create, update or delete operations:
  - CICS screen application
  - Invocation of CICS transaction using z/OS Connect.
- Using zDIH for querying real-time information
- Standard interfaces to consume information from zDIH caches:
  - SQL client
  - REST interface
  - Kafka connector

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