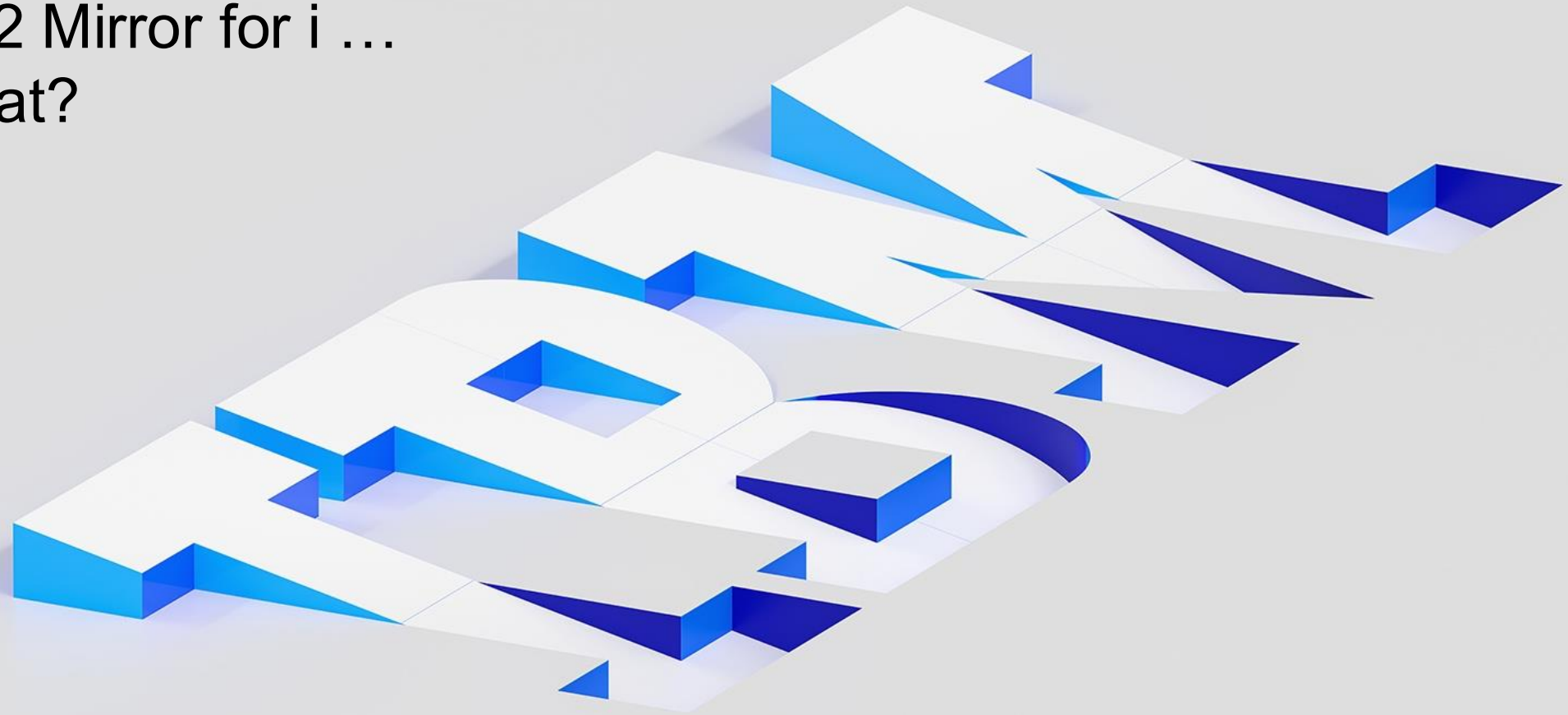
I’m interested in deploying IBM Db2 Mirror for i … now what?



Kris Whitney

whitneyk@us.ibm.com

June 2026

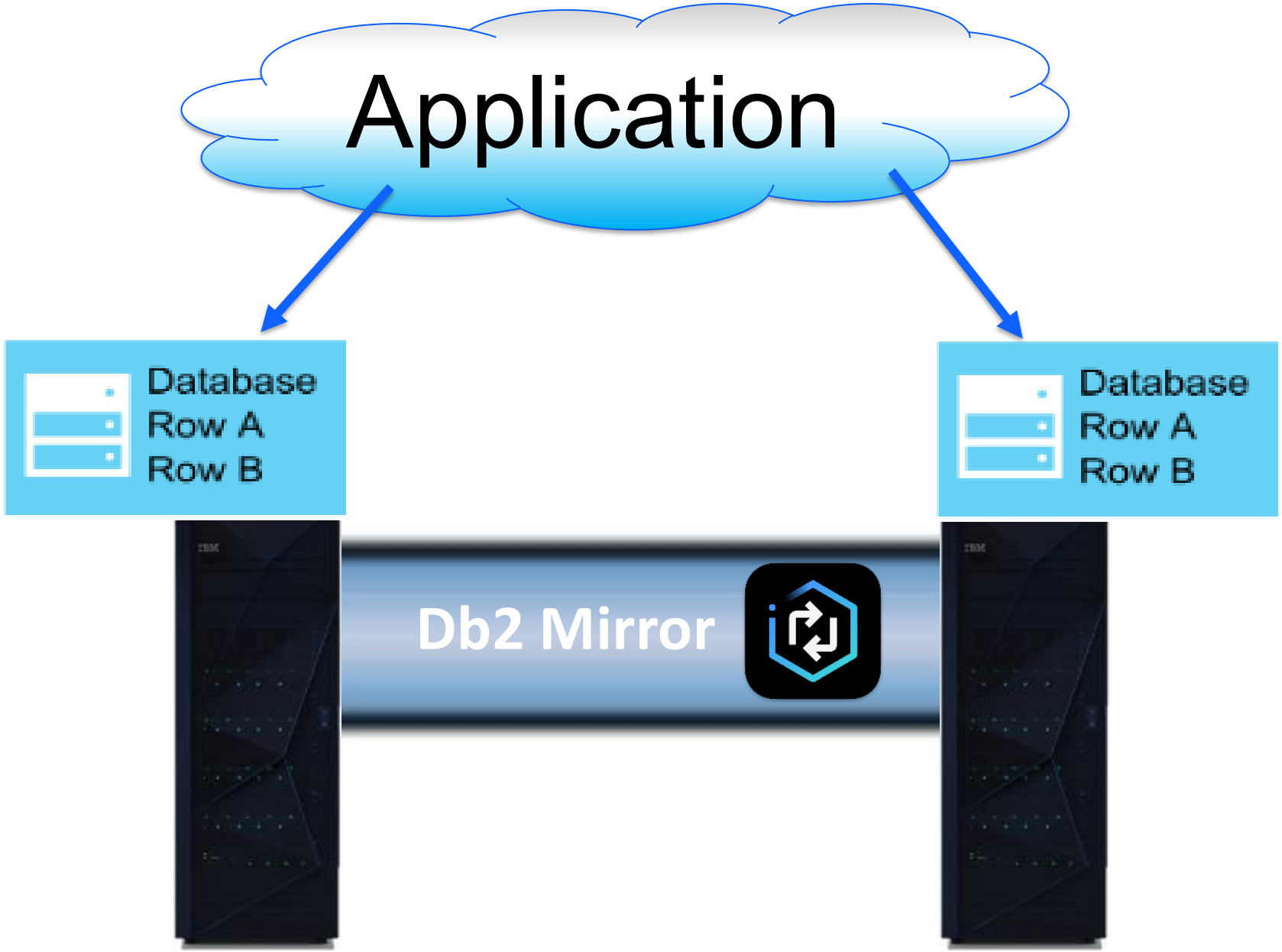
Guide / Agenda

1. Define the goals of your business (RTO/RPO)
2. Determine your replication requirements
   - Active/Active or Active/Passive
   - IASPs
   - Defining replication rules
   - Object replication eligibility
3. Plan your environment
   - Requirements
   - Redundancy
   - Disaster Recovery (DR)
4. Plan for application switching
5. Make application changes
6. Deploy a test environment
7. Deploy Db2 Mirror in production

#1 Define the goals of your business

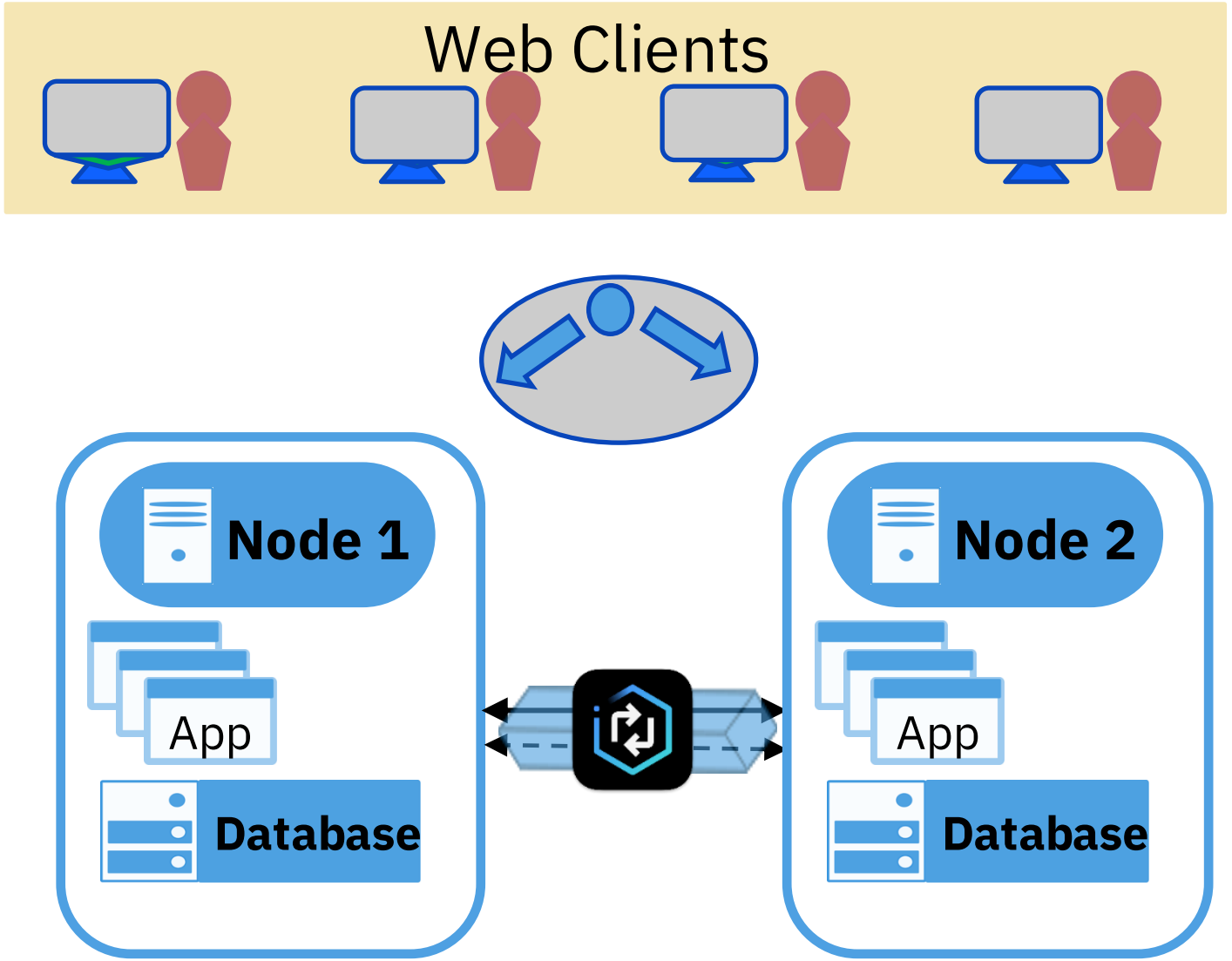
- **Uptime requirement:** the total amount of time that an application must be available, typically expressed as a percent of working hours
- **Recovery Time Objective (RTO):** the maximum acceptable length of time that it takes to recover from an outage and resume normal operations for an application
- **Recovery Point Objective (RPO):** the acceptable amount of data loss after an unplanned outage, expressed as an amount of time
- **Outage coverage:** what types of outages are you trying to protect against

#2 Determine your replication requirements



Active/Active Applications

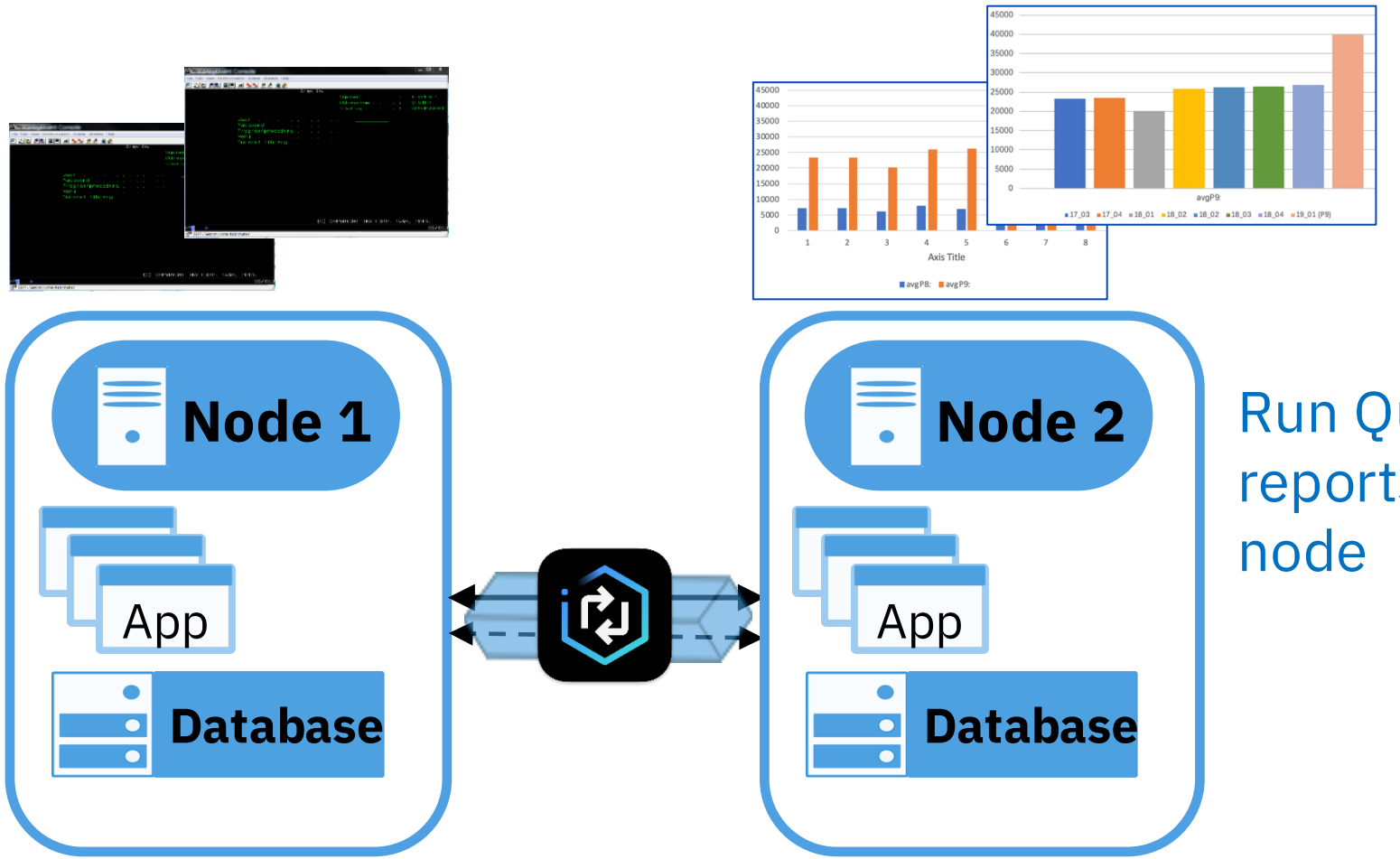
Application layer connects with either JDBC or Load Balancer



Active/Active Applications
Active/Active Database

Active/Passive Applications

Run Production Workloads on this node

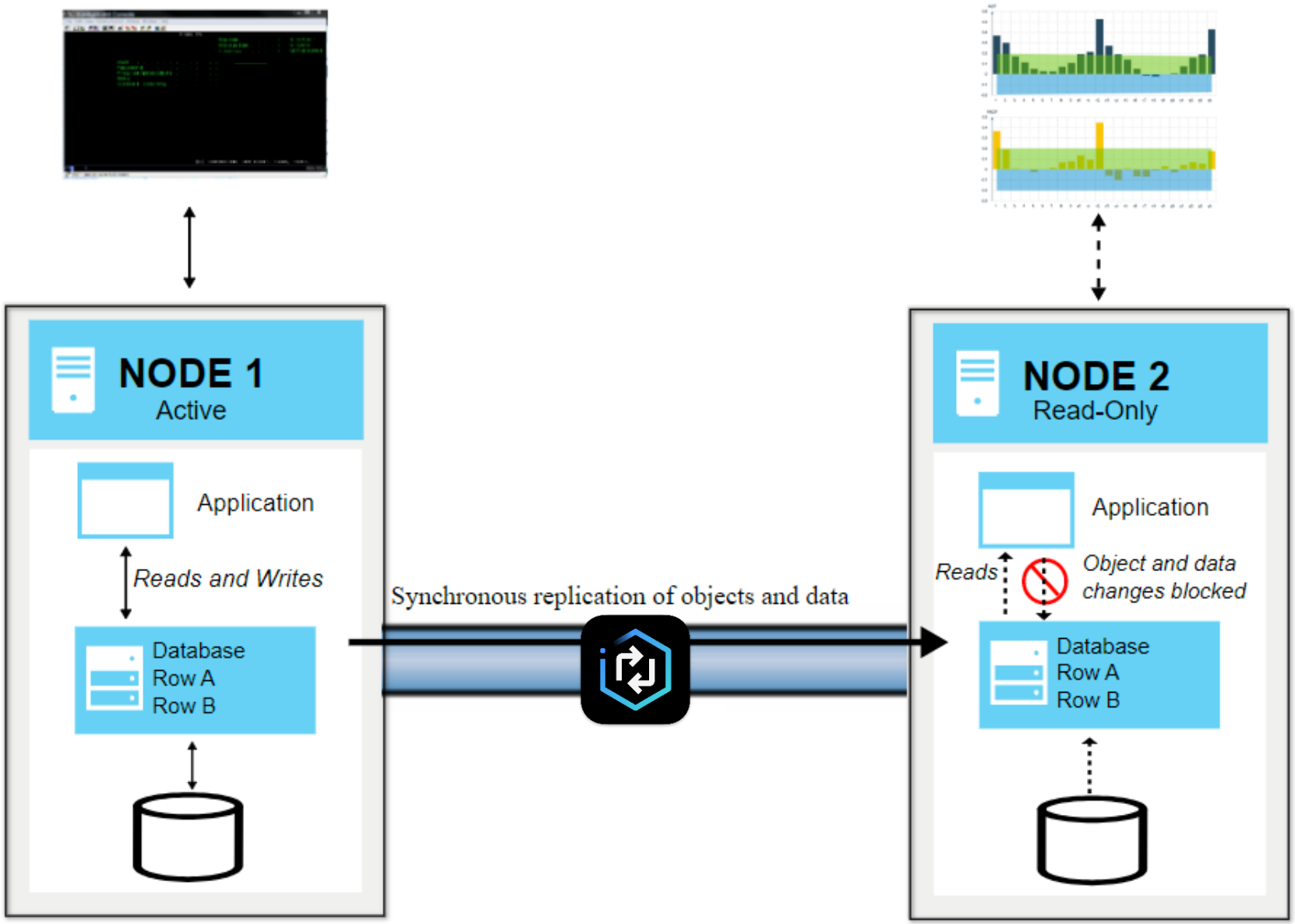


Run Queries and reports on this node

Active/Active Database

Active/Read-only Db2 Mirror

Run Production Workloads on this node



Run Queries and reports on this node

Independent Auxiliary Storage Pools (IASPs)

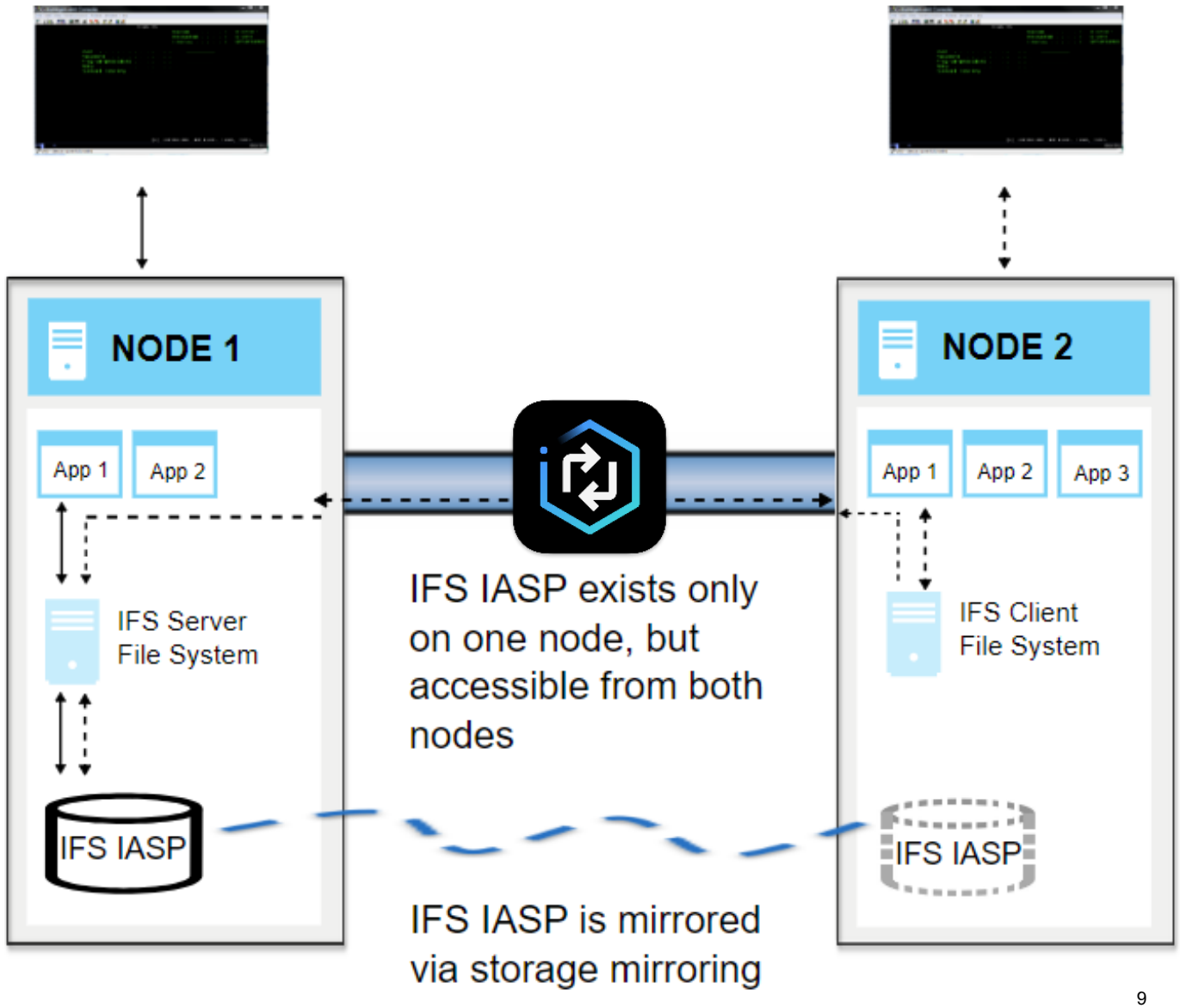
Database IASP
Db2 Mirror will synchronously replicate eligible database and system objects in an IASP between the two nodes.

Integrated File System (IFS) IASP
Db2 Mirror enables both nodes to access IFS objects in an IASP that is varied on to only one node.

- IASPs are optional for database data
- IASPs are required for IFS data
- Only one type of data can be made highly available when an IASP contains both types

Db2 Mirror IFS data

- IFS objects are made available on both nodes using a new IFS technology called Mutable File System
- All IFS objects within an IASP are made accessible on both nodes
- Hardware replication or LUN-level switching managed by PowerHA is used to make the IASP switchable
- Geographic Mirroring (without PowerHA) can also be used to make the IASP switchable



Migrating IFS objects to an IASP

- Create the IASP
  - CFGDEVASP
  - Can be either an UDFS IASP or a Primary IASP if journaling is desired

- Vary on the IASP
  - WRKCFGSTS <IASPNAME> or VRYCFG

- Copy IFS data that should be available on both nodes into the new directory inside the IASP.
  - CPY or MOV command
  - Integrated File System interface within ACS

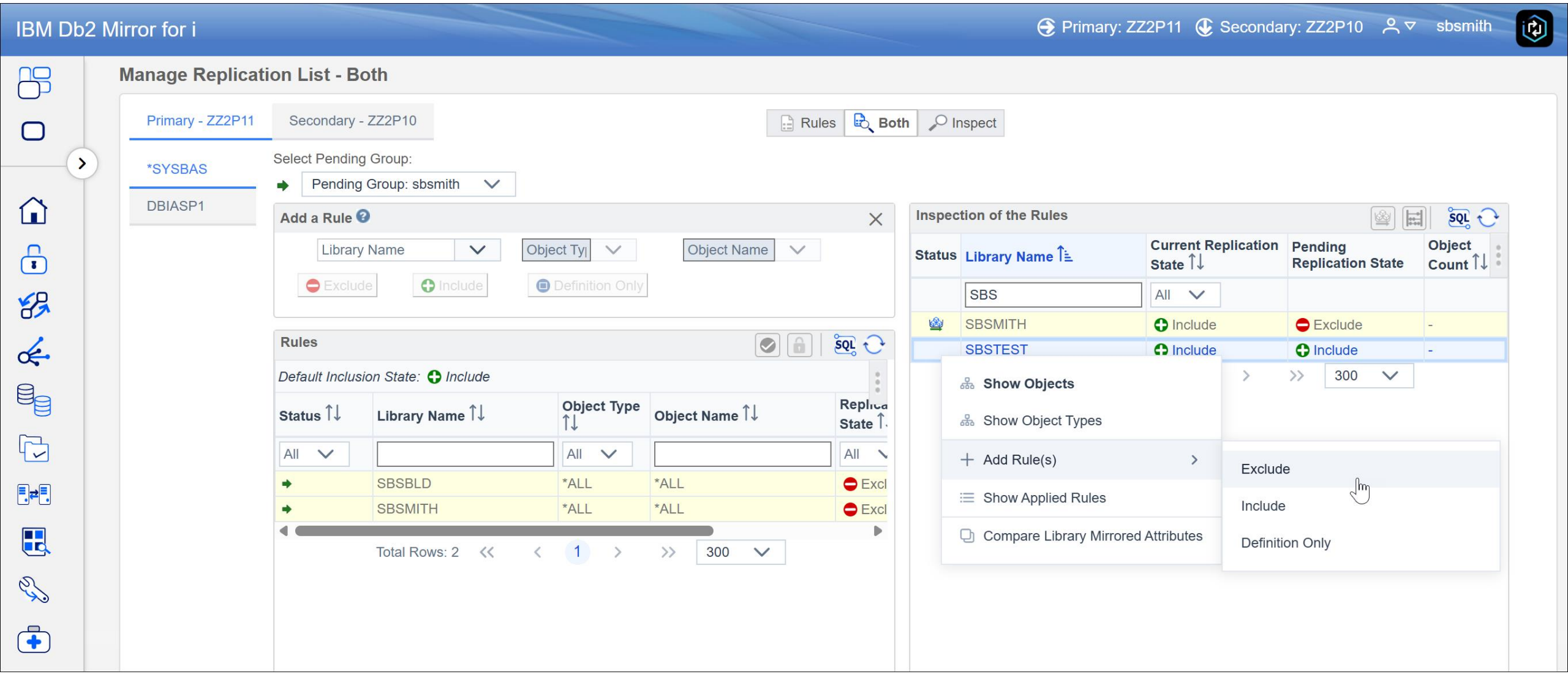
- Delete the original IFS data and create symbolic links that redirect access from the old directories to the new directories in the IASP
  - ADDLNK OBJ(newobjpath) NEWLNK(originalobjectpath) LINKTYPE(*SYMBOLIC)

Defining your replication rules

- **Replication Criteria List (RCL):** A hierarchical set of rules that define the objects that are to be replicated.

- **Default inclusion state:** the highest-level rule
  - EXCLUDE
    - No objects are replicated by default
    - Rules identify the objects to be included in replication
  - INCLUDE
    - All eligible objects are replicated by default
    - Rules identify the objects to be excluded from replication

Managing replication rules in the Db2 Mirror GUI



What objects are eligible for replication?

Database replication eligible objects

Native:

- Database Physical & Logical File

SQL:

- Alias
- Function
- Global Variable
- Index
- Procedure
- Schema
- Sequence
- SQL Package
- Table
- Trigger
- User Defined Type
- View
- XML Schema Repository

DDS / Record Level Access

SQL / Set Based Access

Replicated Objects can be in **SYSBAS** or **IASPs**

Additional replication eligible objects:

- Environment Variables (System Level)
- Programs / Service Programs
- Data Areas
- Data Queues
- User Spaces
- User Indexes
- System Values
- Libraries
- Job Descriptions
- Journals
- Output Queues / Spooled Files
  - Replication Interval
- Job Queues
  - Definition only

Replication of Security Implementation

Security changes are always replicated:

- User Profiles
- Public & Private Authorities
- Function Usage
- Ownership
- Security Attributes
- Authorization Lists
- Security related System Values

Synchronous replication of Security Implementation is built into Db2 Mirror

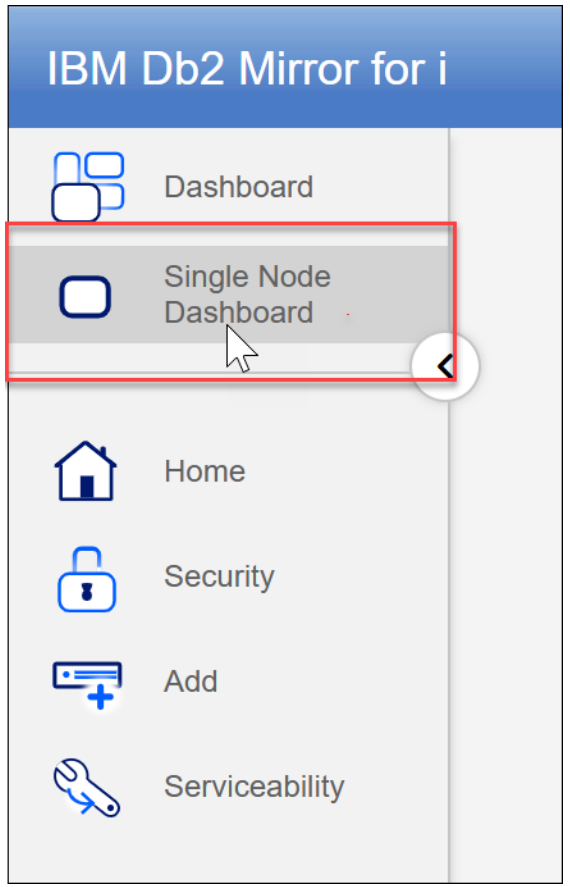
Determining Replication Eligibility

- Use Application Evaluation tool built into the Db2 Mirror GUI

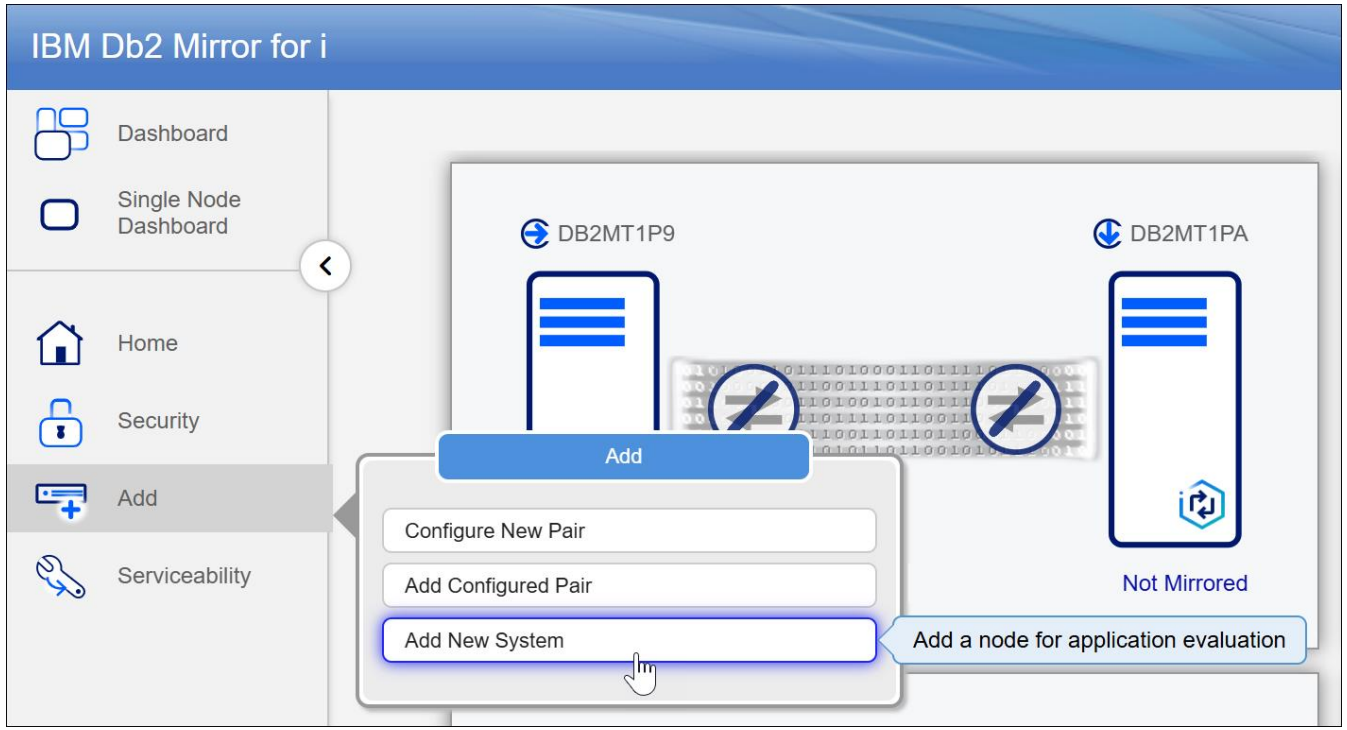
- Db2 Mirror GUI
  - 5770DBM *BASE – **No charge LPP**
  - Runs in the ADMIN3 server
  - Connect via a browser:
    http://<IBMi-System>:2001/Db2Mirror/

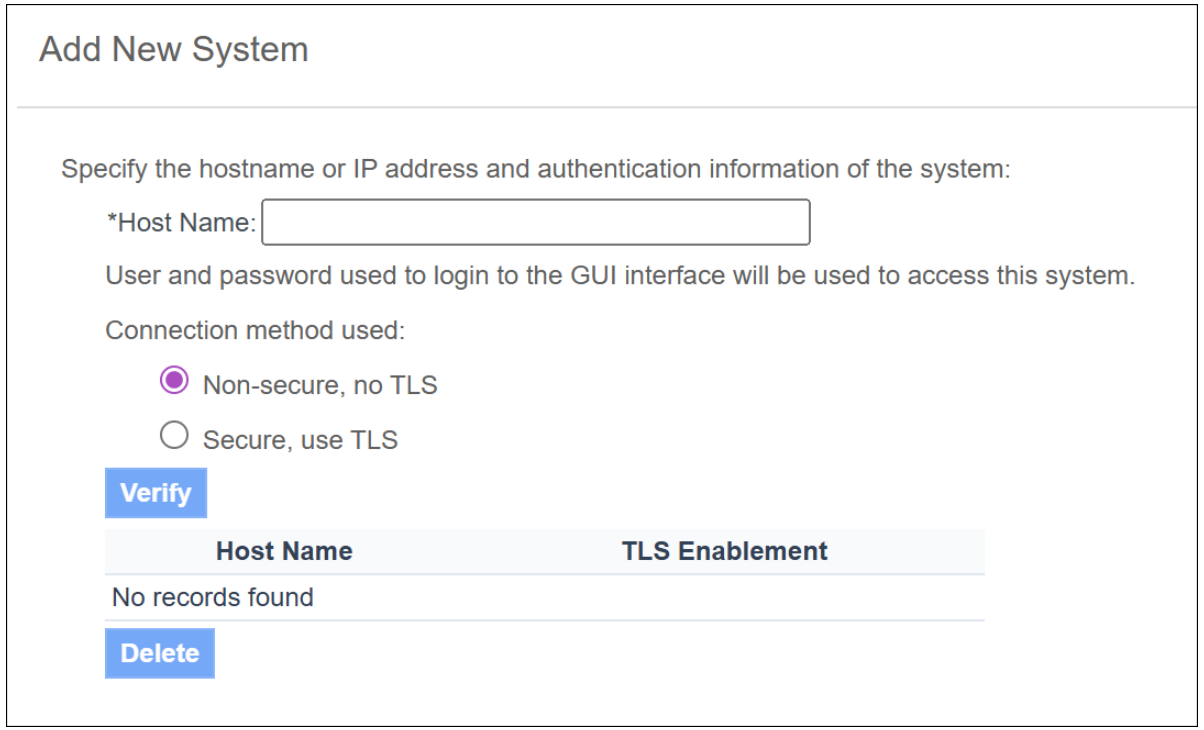
- Db2 Mirror GUI runs on IBM i 7.4, 7.5, or 7.6 but Application Evaluation can evaluate any IBM i at 7.2 or later

- Install LPP & then latest Db2 Mirror PTF group level for latest and greatest App Eval features

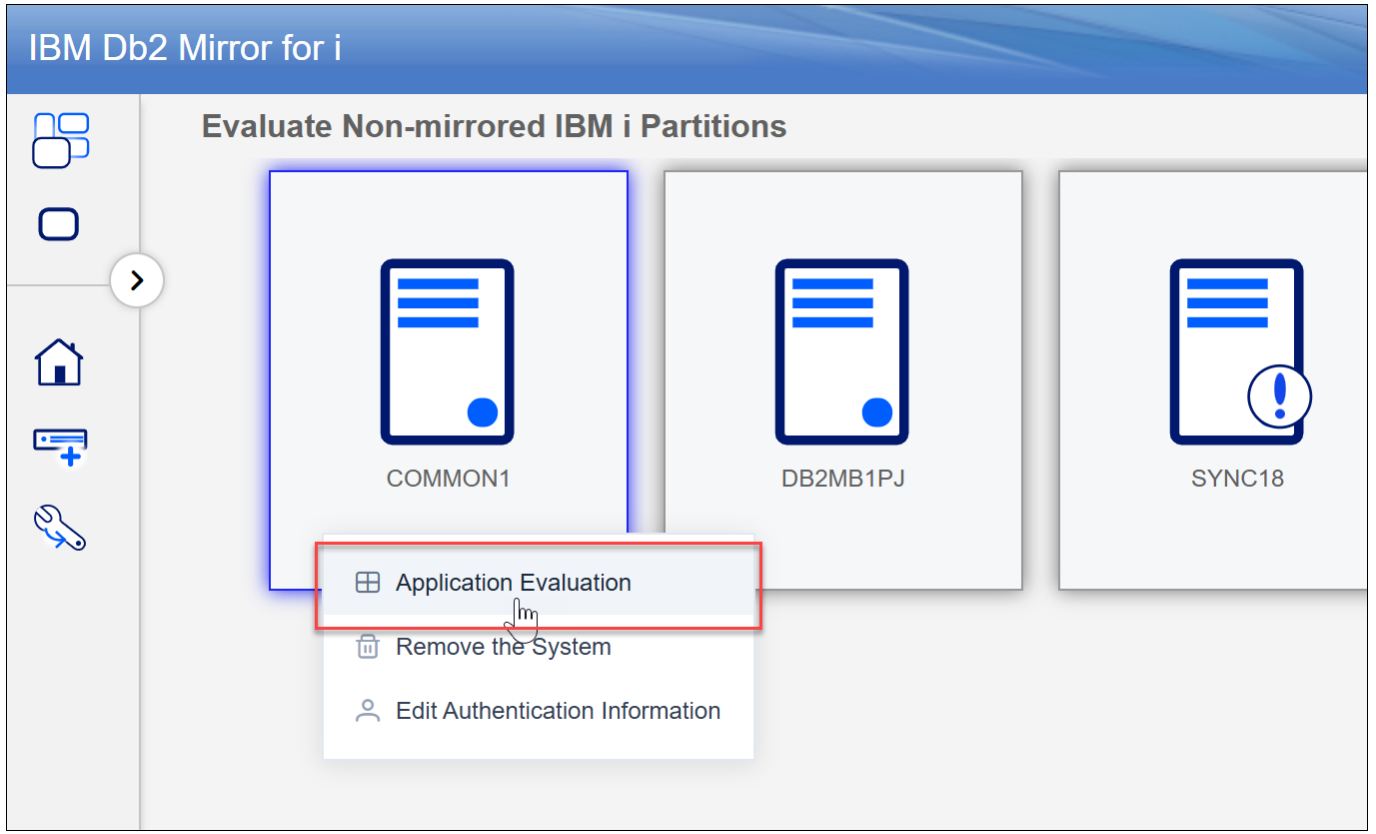


Add a non-mirrored IBM i to evaluate

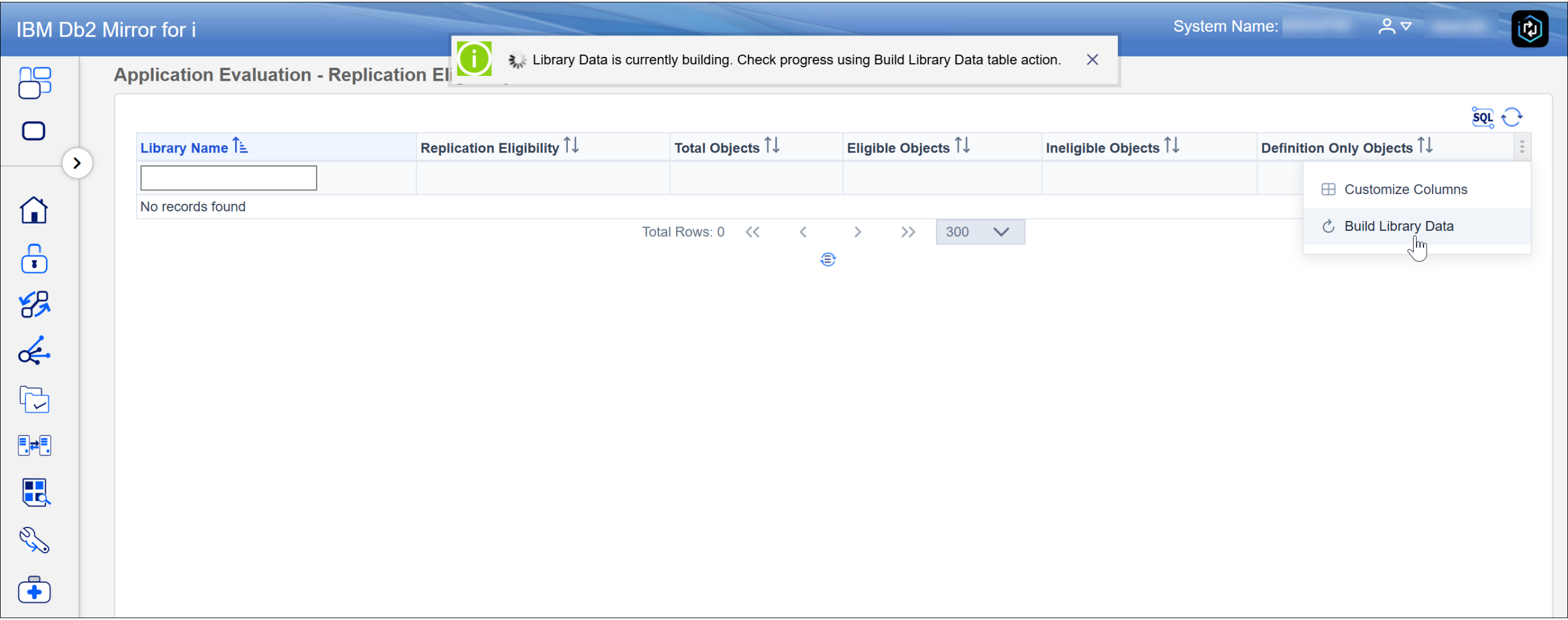




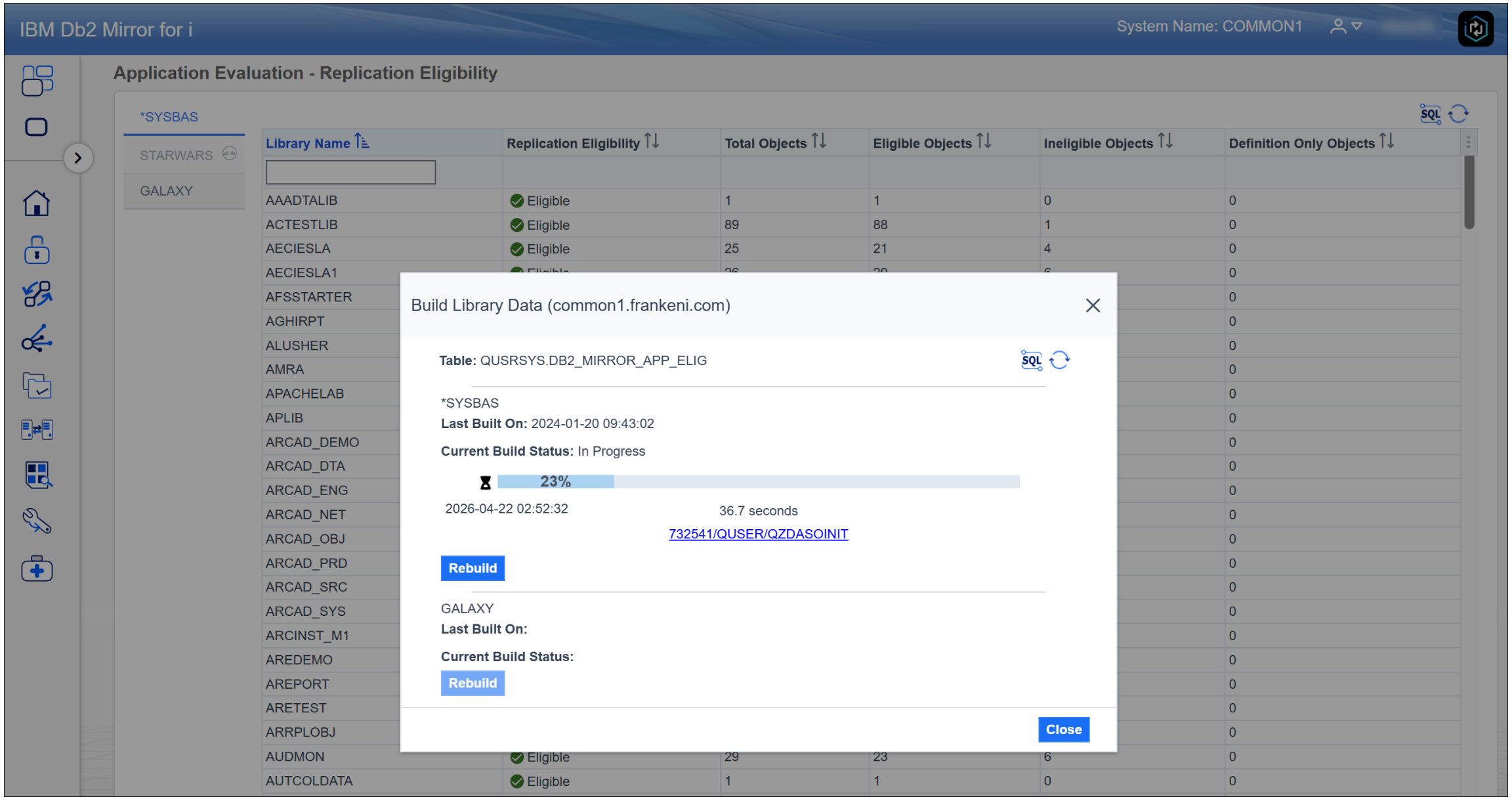
Launch Application Evaluation



Application Evaluation – First time in

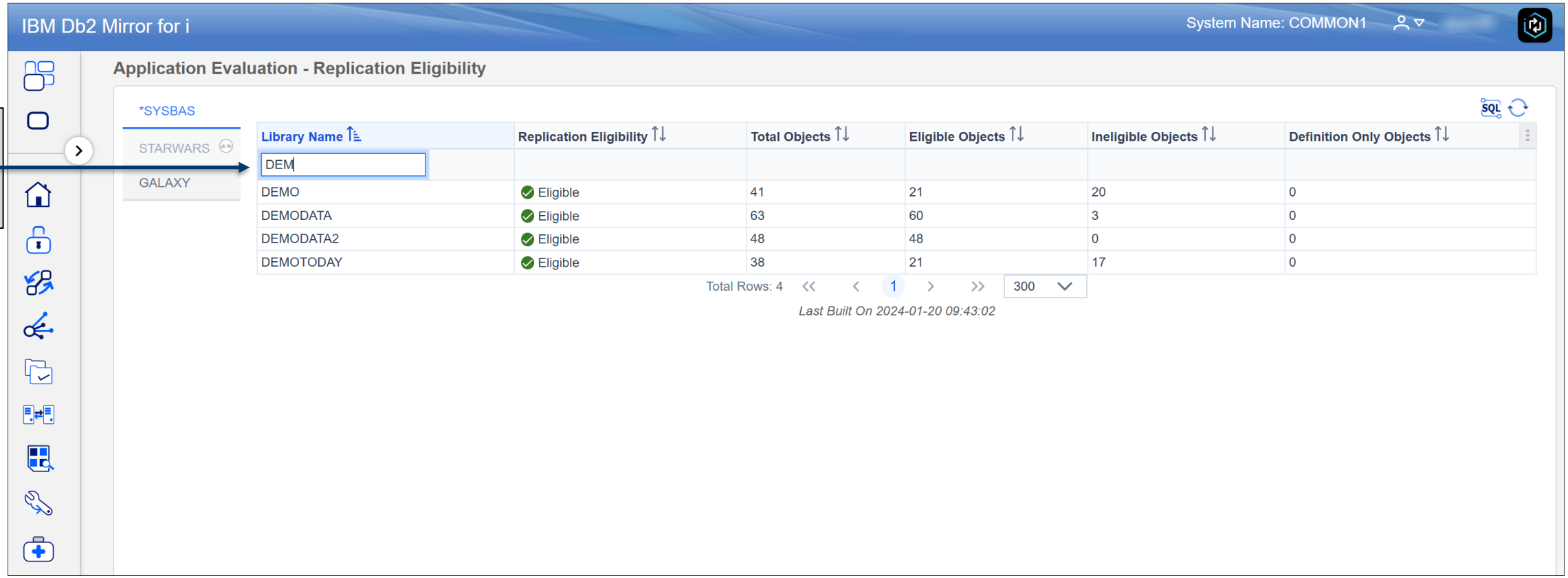


Application Evaluation – Build Library Data

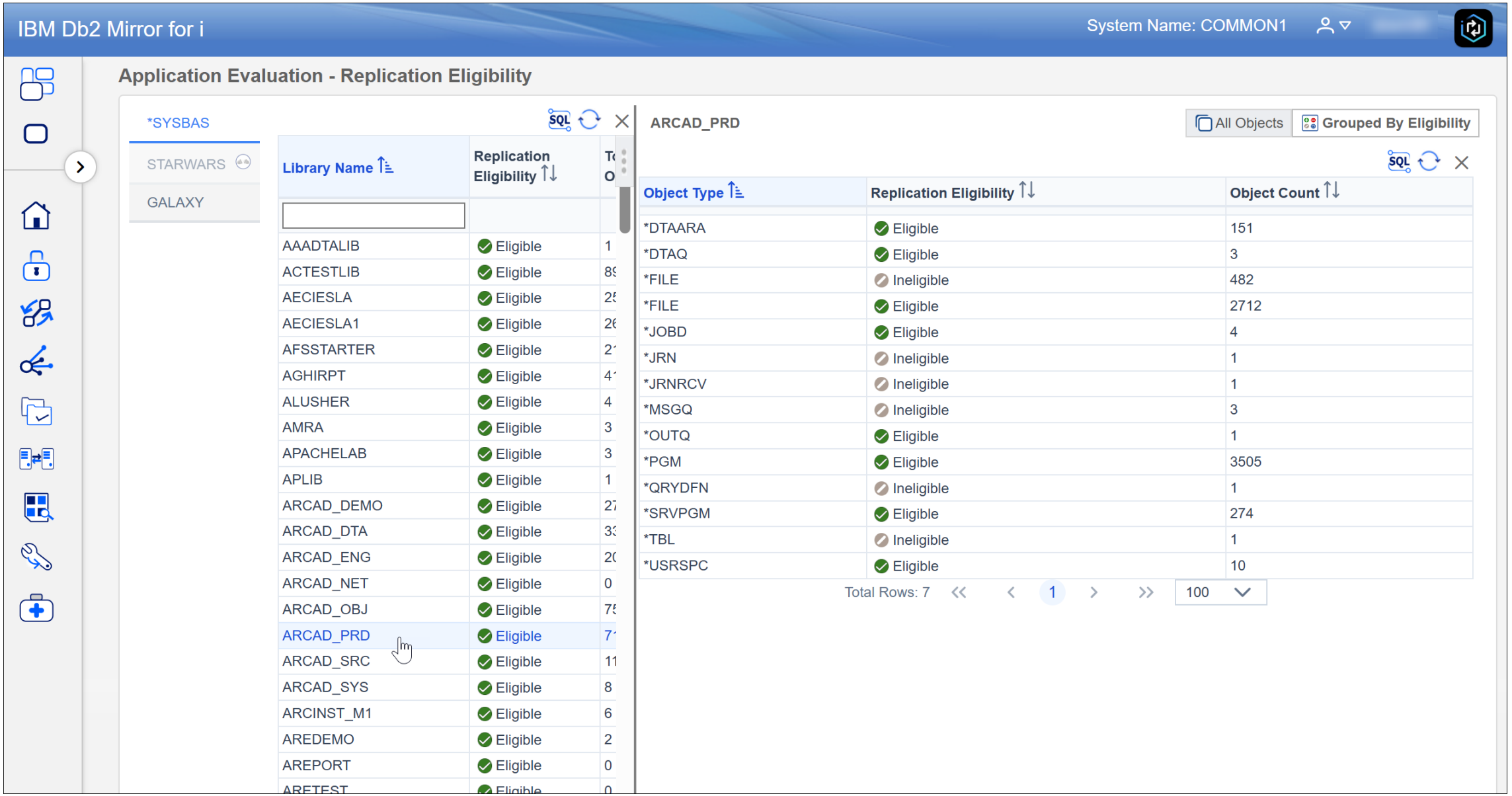


Application Evaluation – Library level view

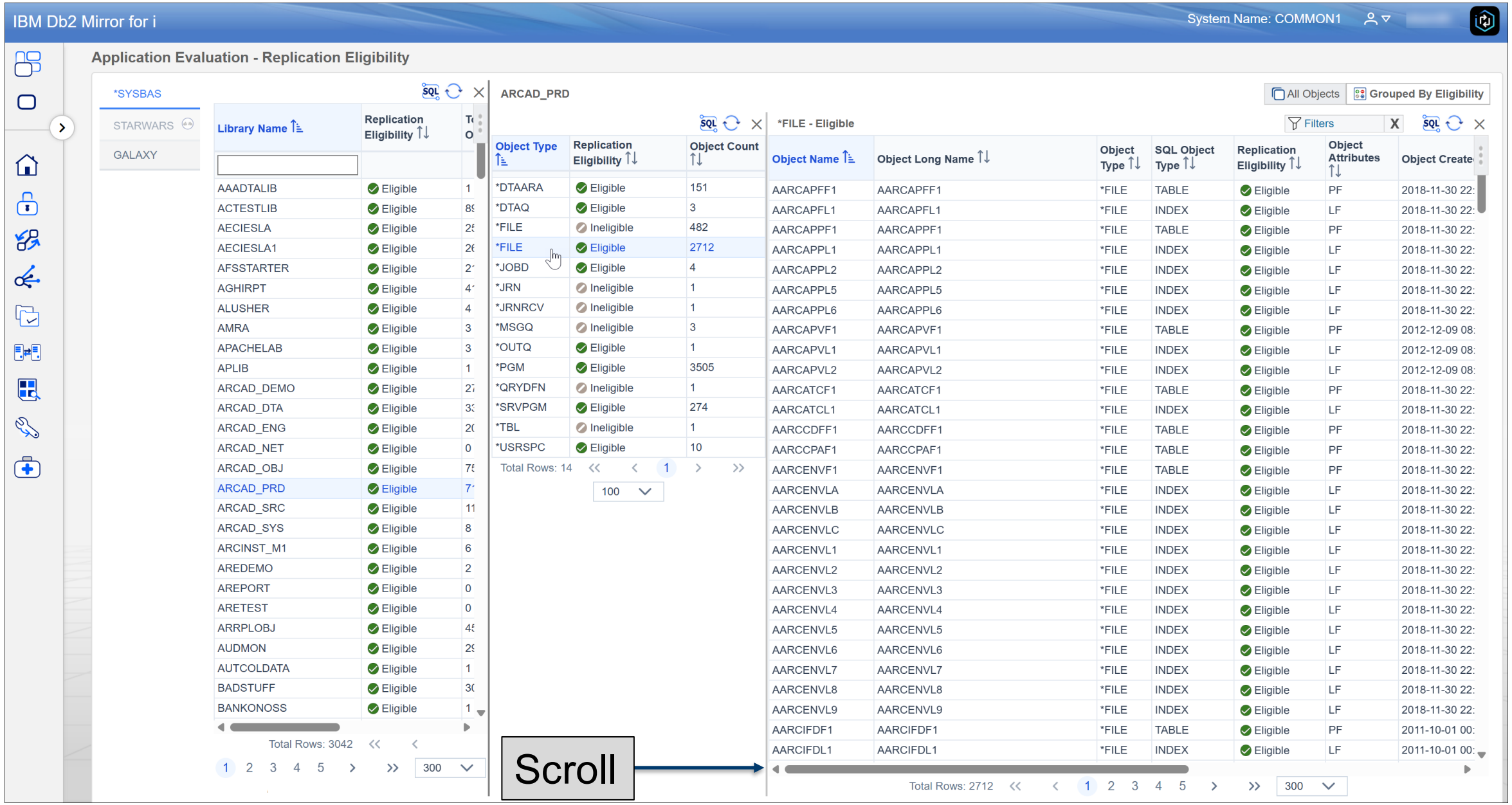
Use for filtering



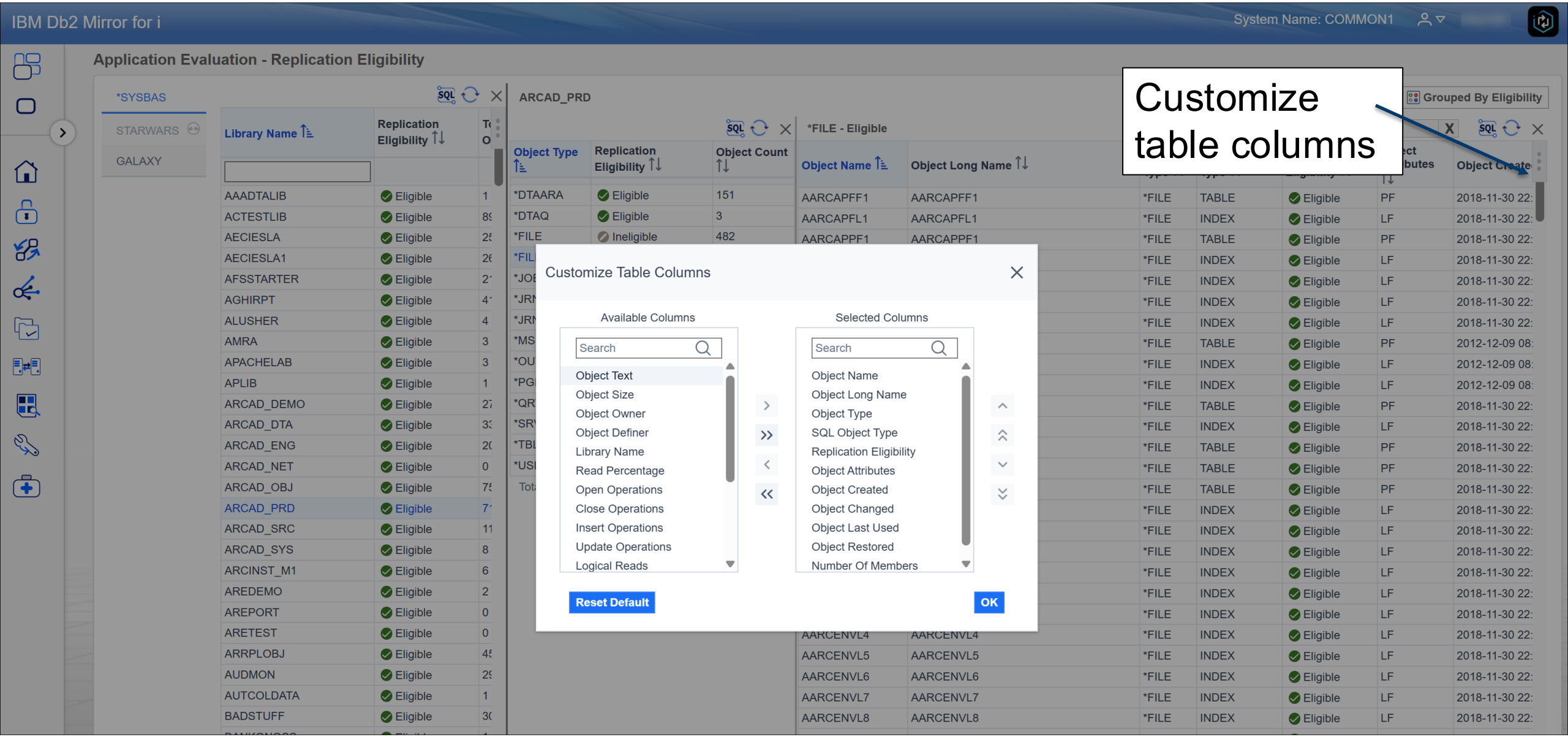
Application Evaluation – Double click to drill down



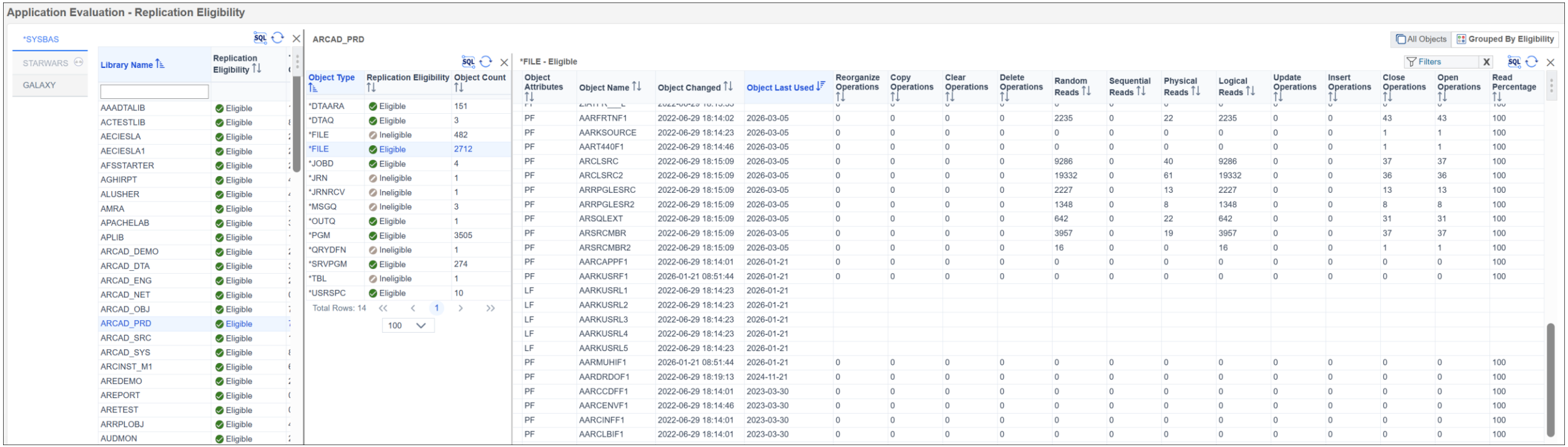
Application Evaluation – Drill down further



Application Evaluation – Customize table columns



Application Evaluation – Runtime statistics



#3 Plan your environment

- Requirements
- Plan for redundancy
- Plan for disaster recovery

Db2 Mirror Environment Requirements

Hardware Requirements

- POWER8, POWER9, Power10, or Power11 servers
- Remote Direct Memory Access (RDMA) over Converged Ethernet (RoCE) network adapters

LPAR Management Requirements

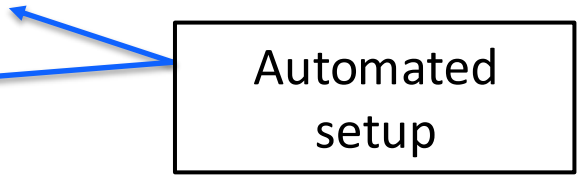
- Hardware Management Console (HMC)

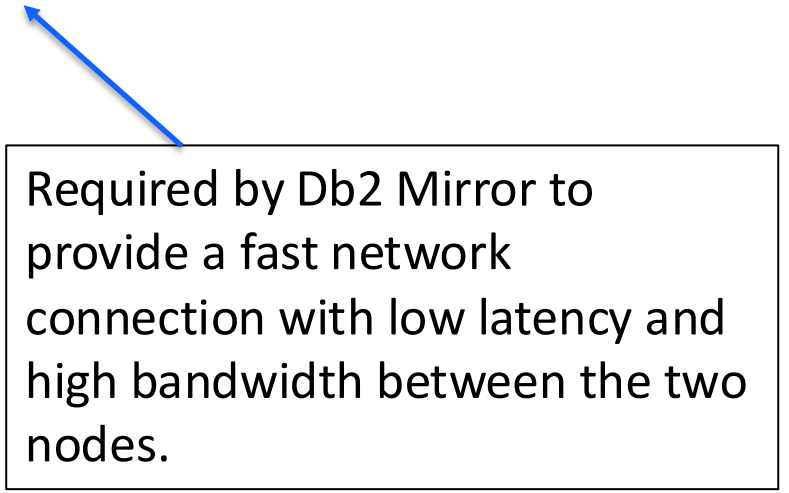
Software Requirements

- IBM i operating system 7.4 or 7.5 or 7.6
- IBM i options and products
- Open-source packages (RPMs)

Storage

- IBM System Storage DS8000
- IBM Storage FlashSystem
- Internal disks

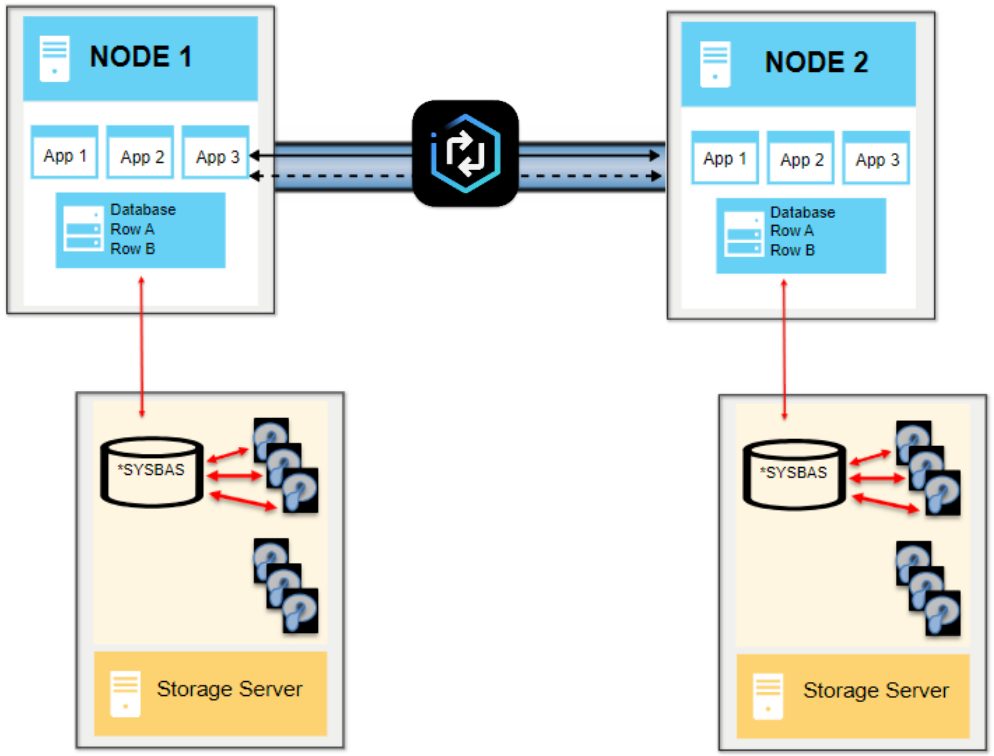




IBM Storage Requirements for automated setup

Host and volume planning

- Must have same number of storage hosts
- Must have the same number and size of volumes



IBM System Storage DS8000

- Firmware V9.2.0 or higher is required
- No space efficient volumes
- REST service on DS8000 HMC is started
- User ID role of Administrator or Copy Services operator
- IBM Copy Services Manager (CSM) required for remote cloning

IBM Storage FlashSystem (powered by IBM Storage Virtualize)

- SSH used for communication
  - 5733SC1 *BASE & Option 1 required on managing node
- User ID role of Administrator
- User ID configured for sign on with SSH key

https://www.ibm.com/docs/en/ssw_ibm_i_76/db2mi/db2mplanningstorageibm.htm

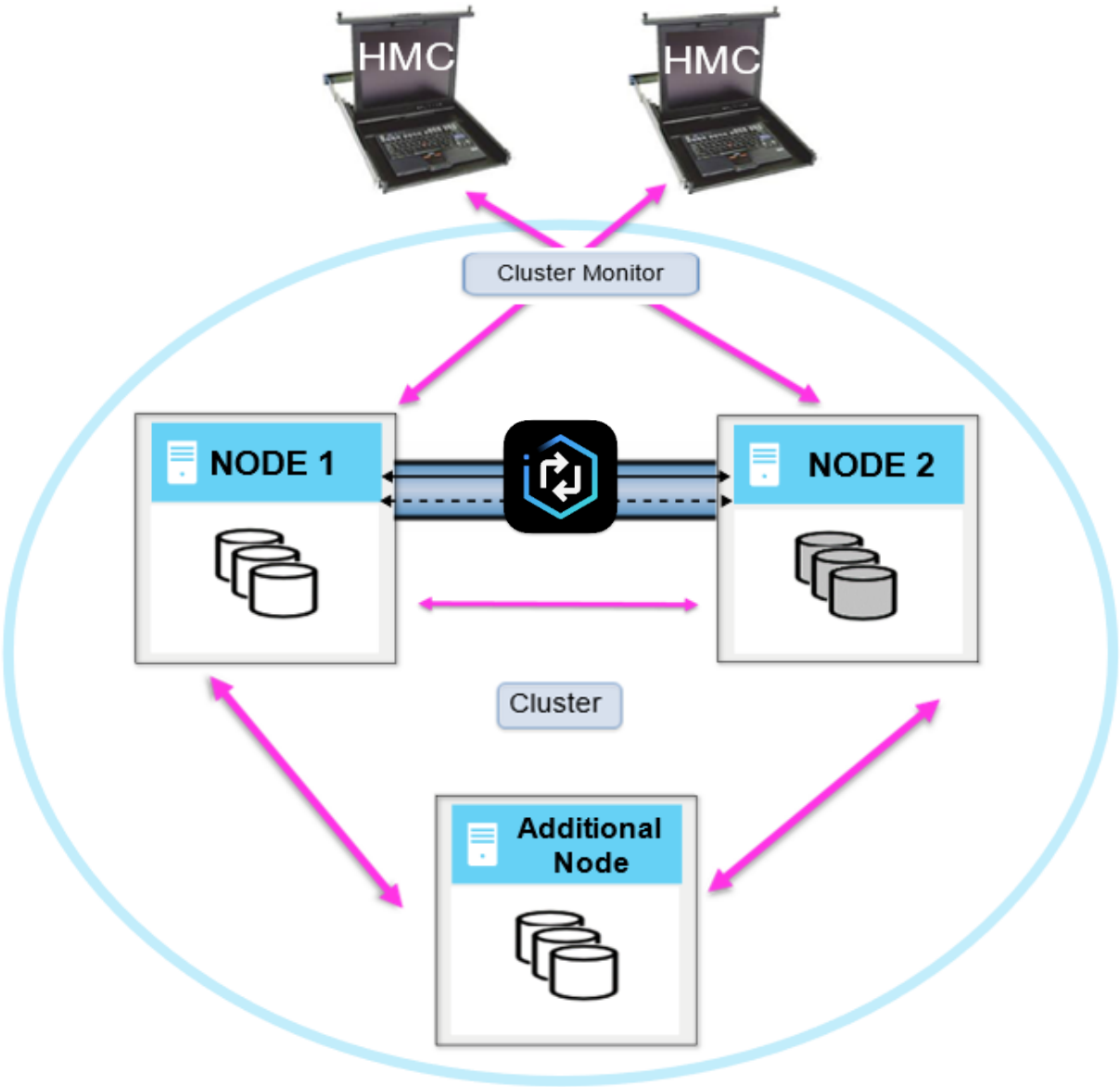
Db2 Mirror & Clustering

Clustering is used by Db2 Mirror for:

- IASP management
- maintaining quorum data
- advanced node failure detection

Details:

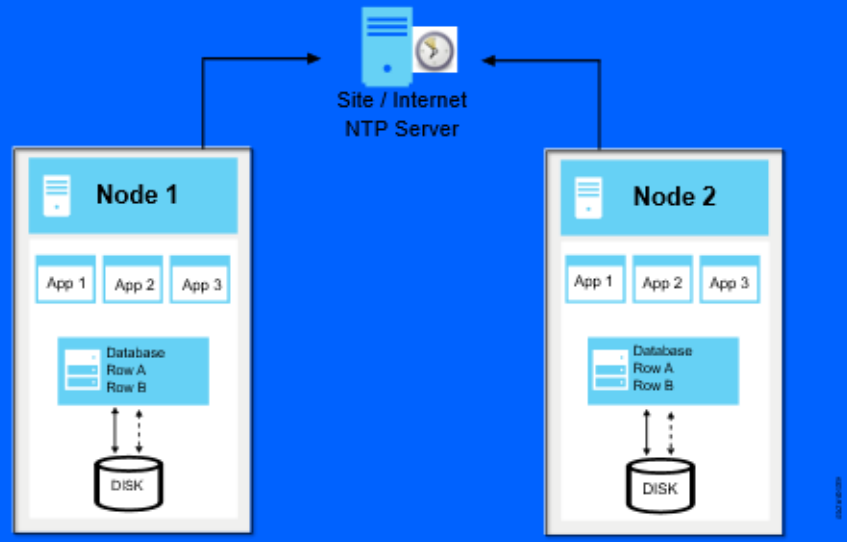
- New or existing cluster
- Cluster version 9 or higher required
- Cluster monitors are required
- Additional quorum node optional



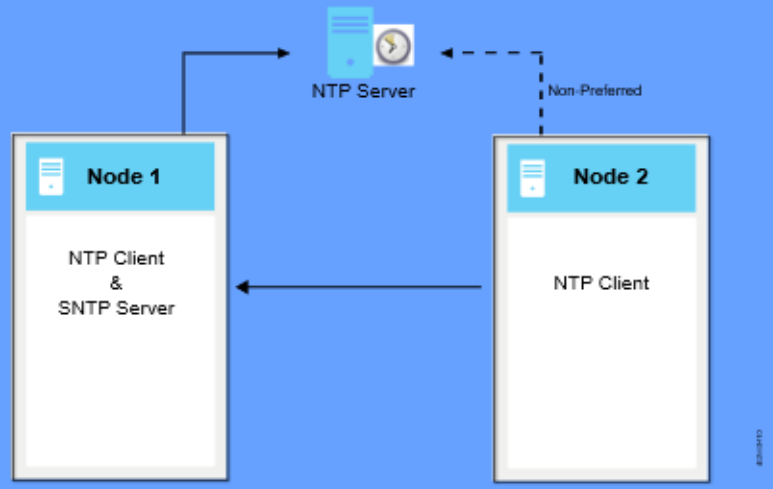
Time synchronization using NTP

The Network Time Protocol (NTP) client must be used to keep the system clocks synchronized.

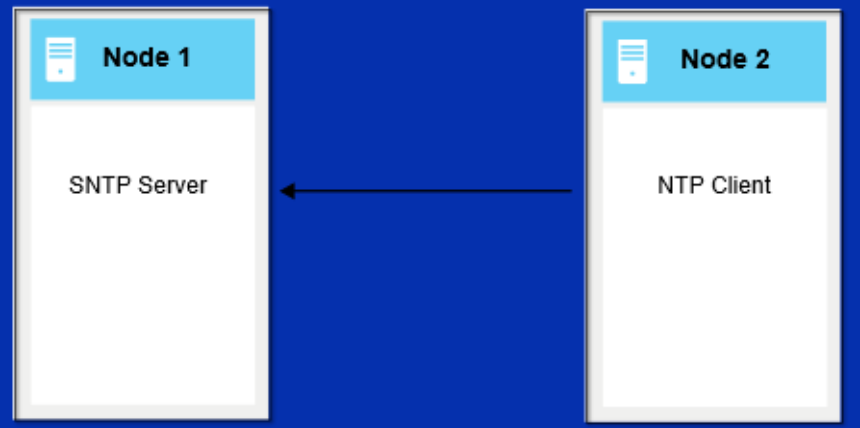
External Time Server



Chained Time Server



Peer Time Server



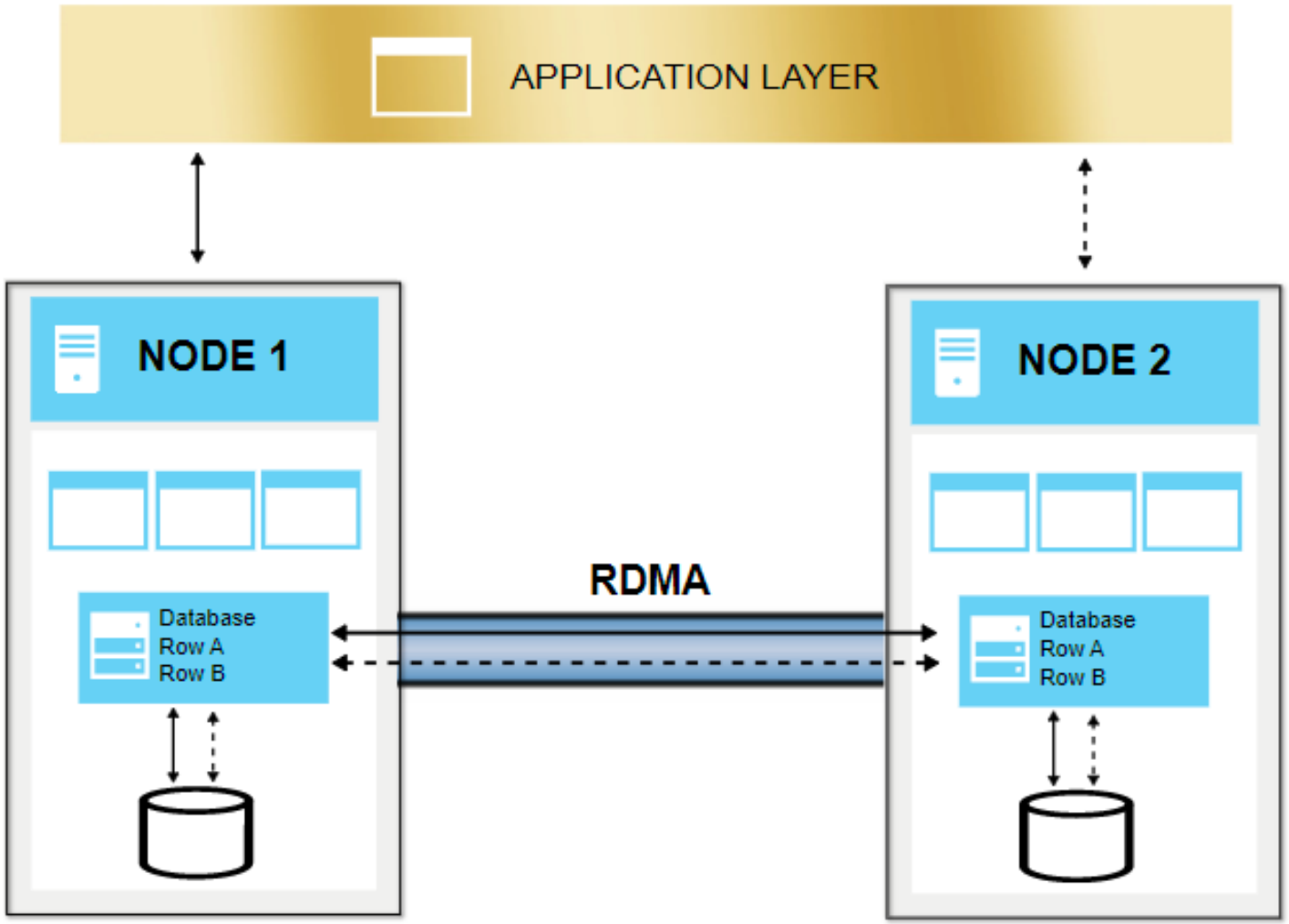
Plan for hardware redundancy

When planning to implement Db2 Mirror, it’s important to understand your environment and your options for redundancy at the hardware level.

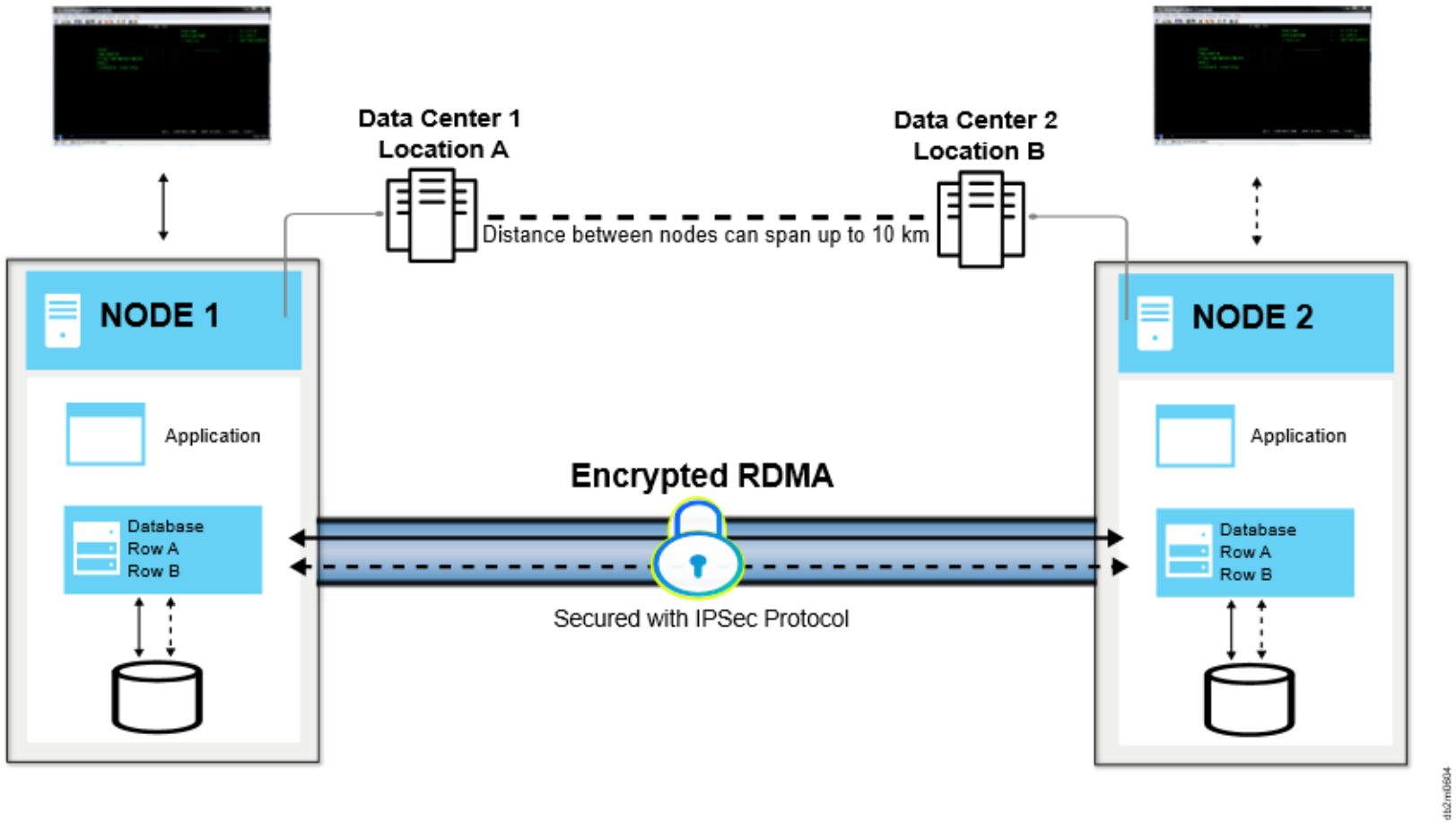
- Network
- Server
- Storage

Synchronous Replication Network Architecture

- Remote Direct Memory Access (RDMA)
- RDMA over Converged Ethernet (RoCE)
- Maximum distance of 200m for unencrypted RDMA



Synchronous Replication Network Architecture

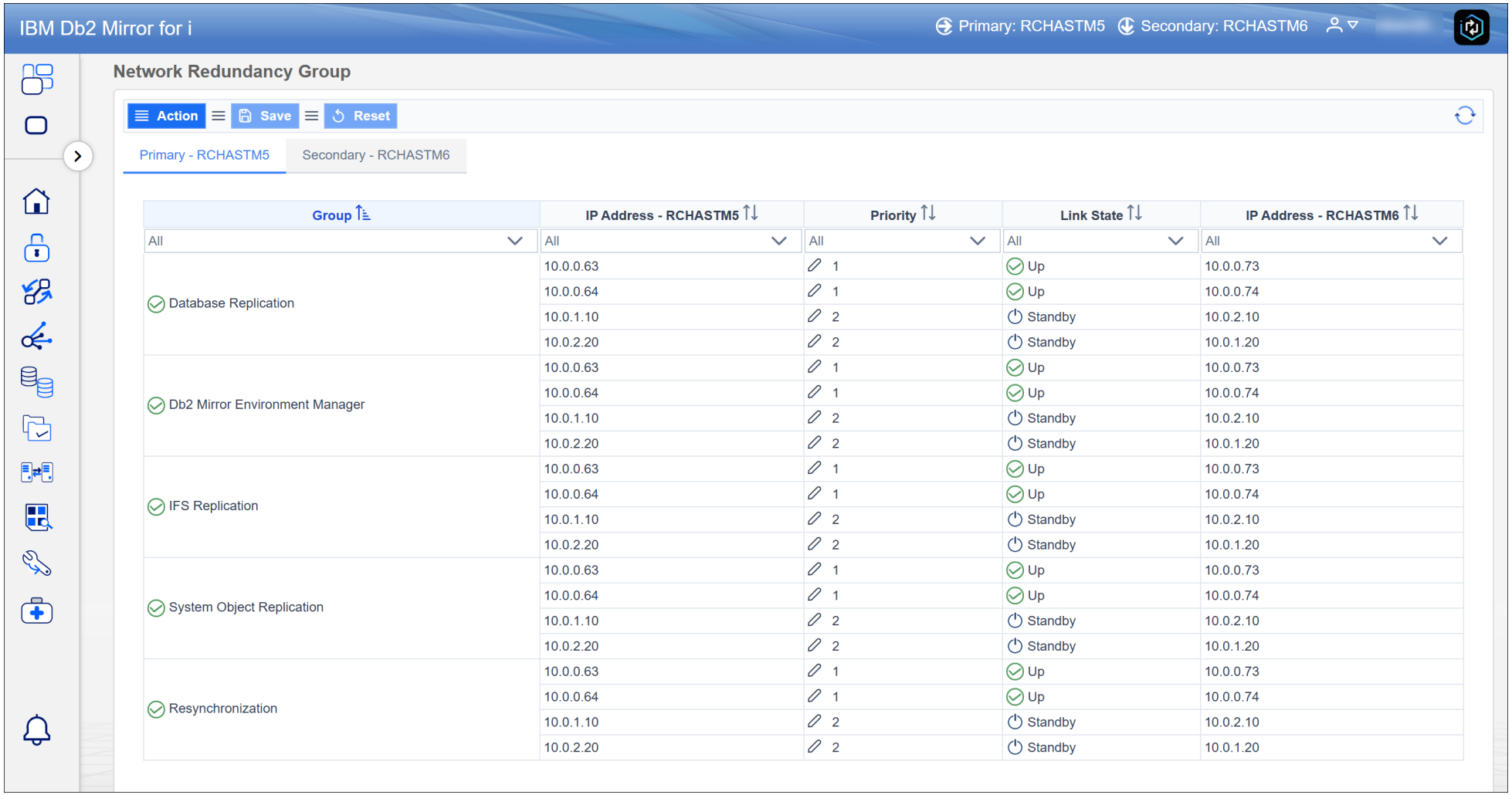


Maximum distance of 10 km for encrypted RDMA

Synchronous Replication Network Architecture

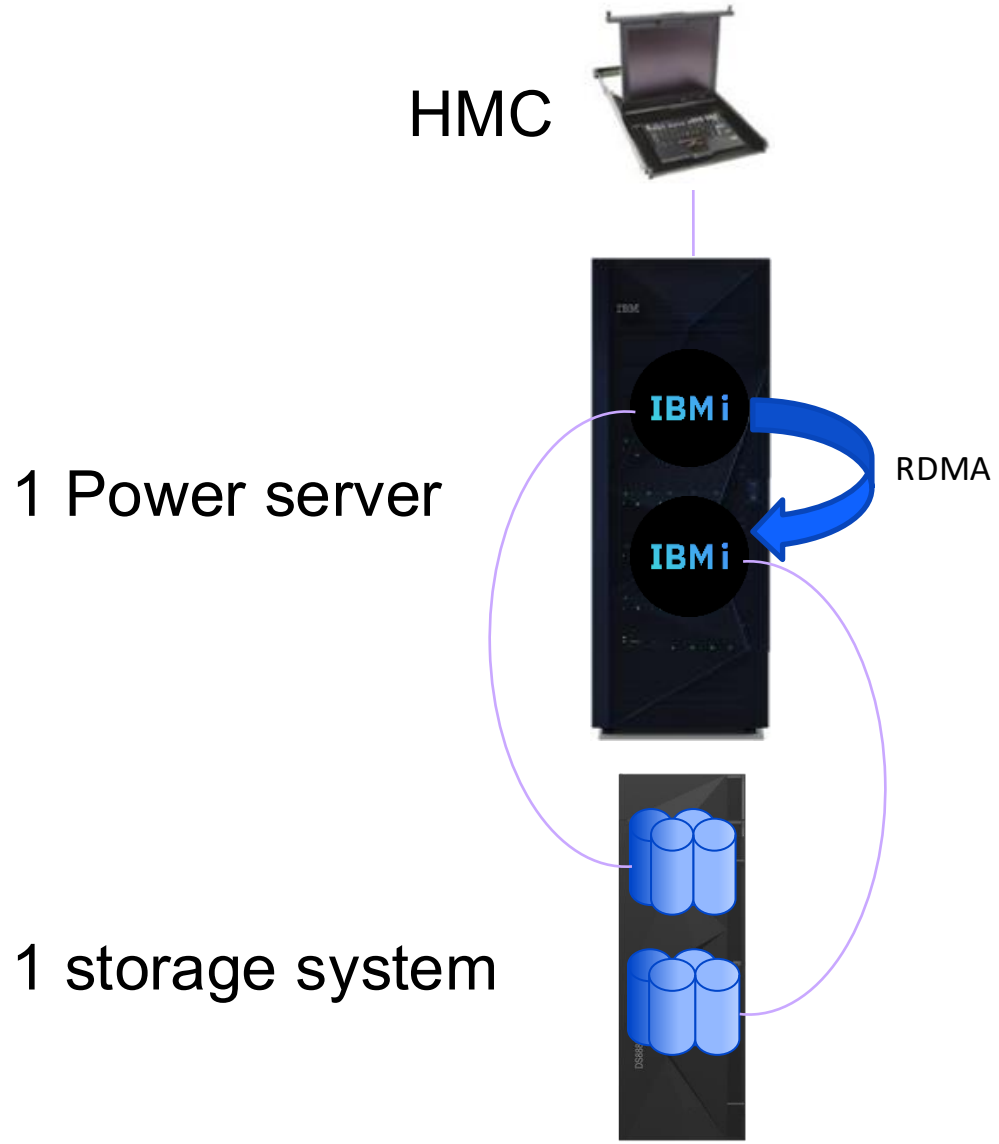
Network Redundancy Groups (NRG)

- Built in protection for network failures
- Prioritization controls can be used to separate different types of traffic across specific links



Group	IP Address - RCHASTM5	Priority	Link State	IP Address - RCHASTM6
All	All	All	All	All
Database Replication	10.0.0.63	1	Up	10.0.0.73
	10.0.0.64	1	Up	10.0.0.74
	10.0.1.10	2	Standby	10.0.2.10
	10.0.2.20	2	Standby	10.0.1.20
Db2 Mirror Environment Manager	10.0.0.63	1	Up	10.0.0.73
	10.0.0.64	1	Up	10.0.0.74
	10.0.1.10	2	Standby	10.0.2.10
	10.0.2.20	2	Standby	10.0.1.20
IFS Replication	10.0.0.63	1	Up	10.0.0.73
	10.0.0.64	1	Up	10.0.0.74
	10.0.1.10	2	Standby	10.0.2.10
	10.0.2.20	2	Standby	10.0.1.20
System Object Replication	10.0.0.63	1	Up	10.0.0.73
	10.0.0.64	1	Up	10.0.0.74
	10.0.1.10	2	Standby	10.0.2.10
	10.0.2.20	2	Standby	10.0.1.20
Resynchronization	10.0.0.63	1	Up	10.0.0.73
	10.0.0.64	1	Up	10.0.0.74
	10.0.1.10	2	Standby	10.0.2.10
	10.0.2.20	2	Standby	10.0.1.20

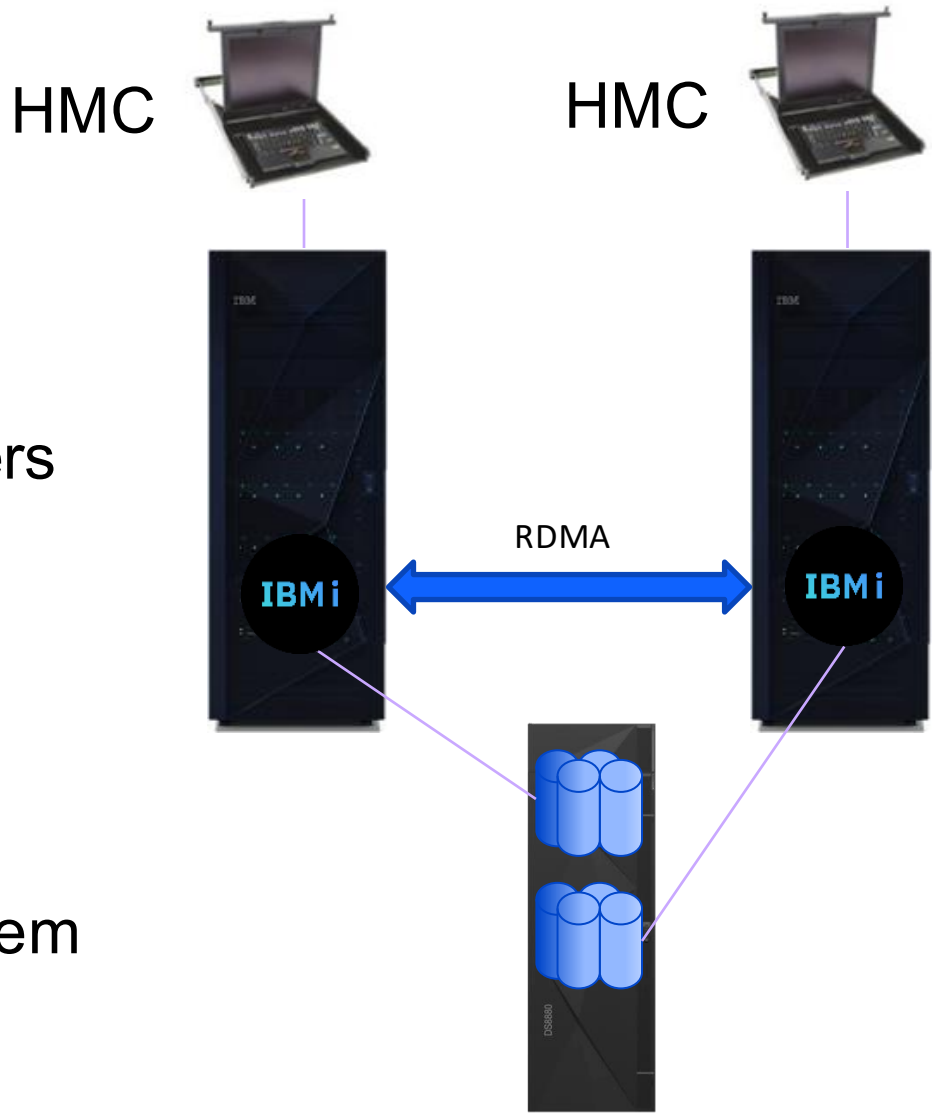
Small environment for functional test



Server redundancy

2 Power servers

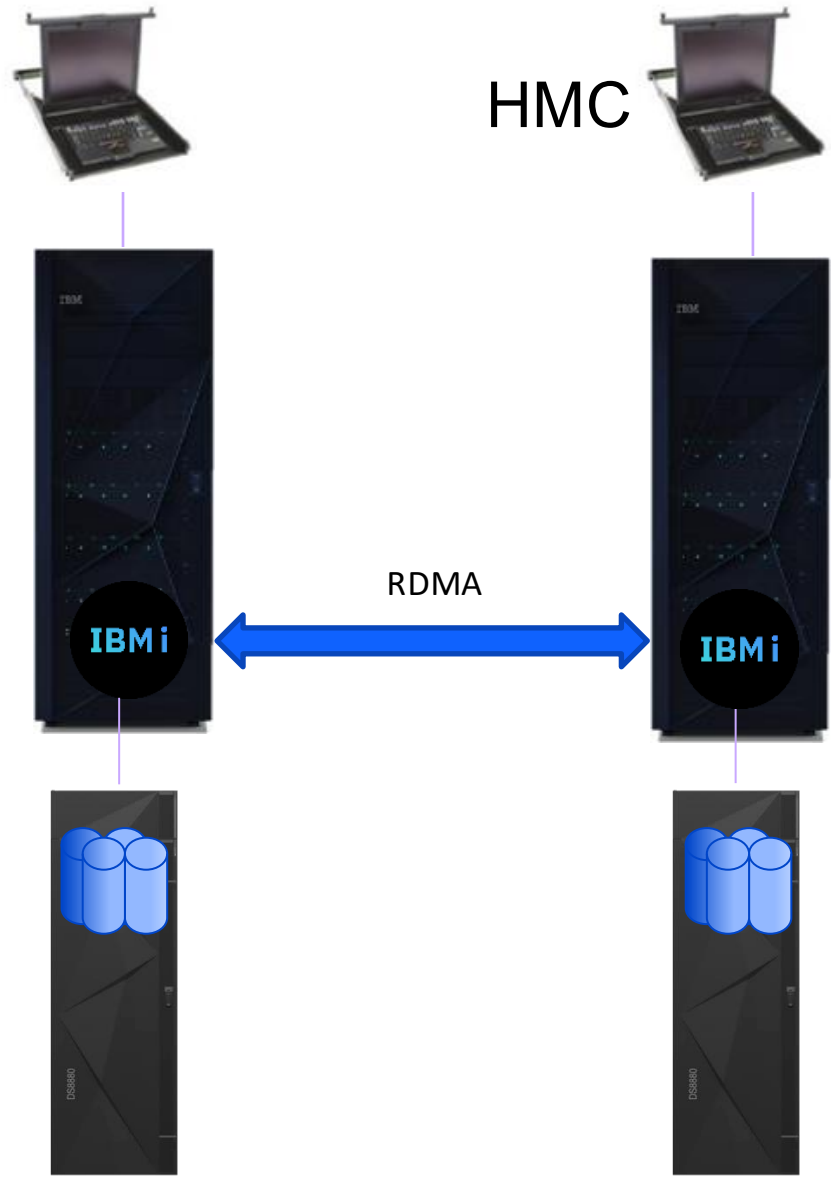
1 storage system



Server and storage redundancy

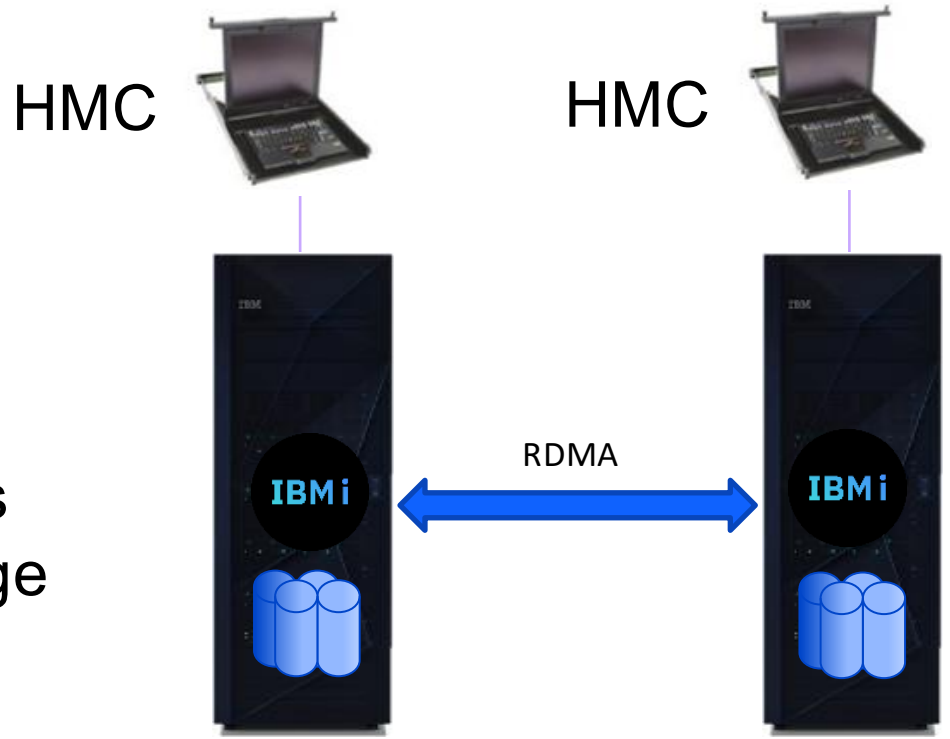
2 Power servers

2 storage systems



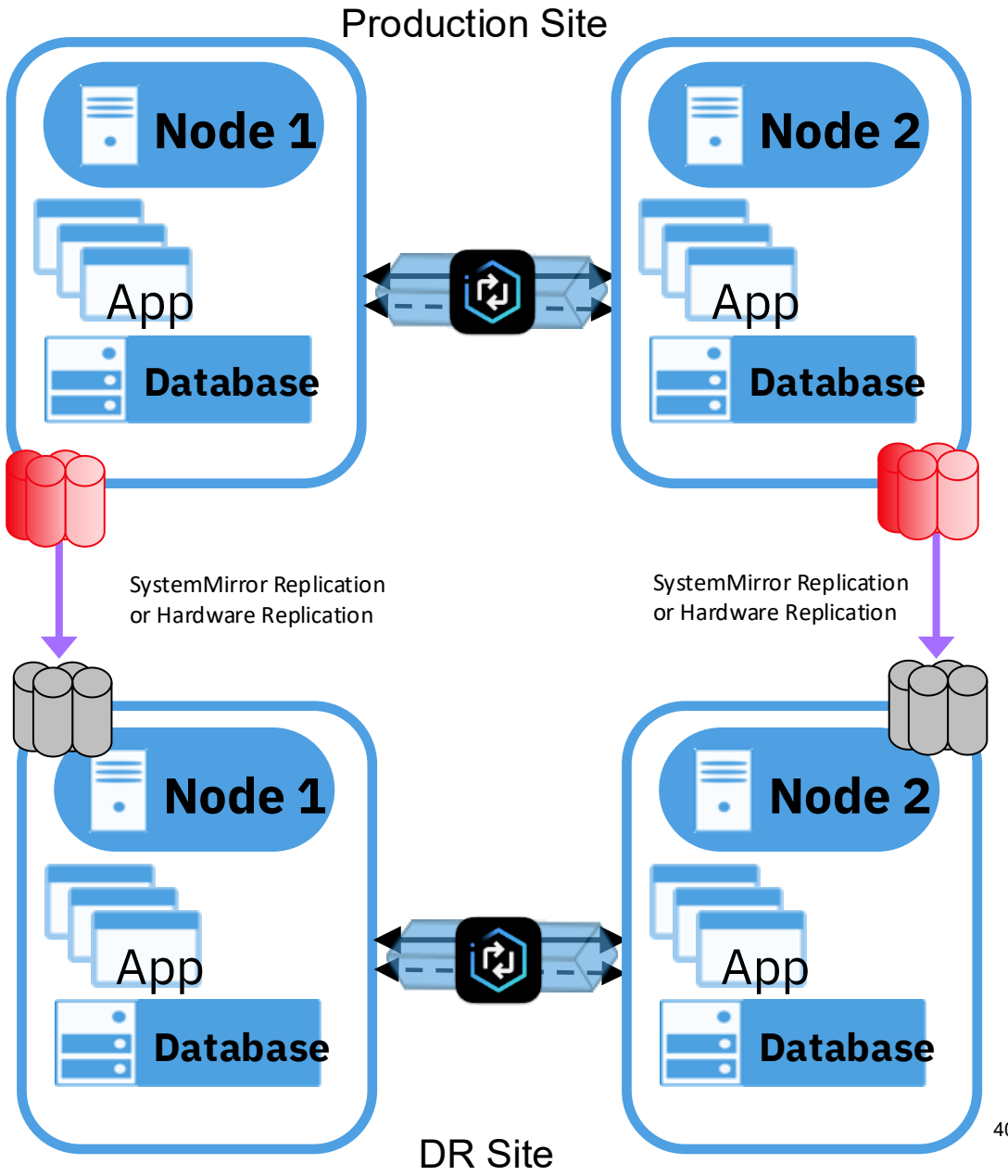
Server redundancy and internal storage

2 Power servers
& internal storage



Planning for Disaster Recovery

- Production remains at production site as long as one Db2 Mirror node is up.
- If both production site nodes are unavailable, then a switch to the DR site can be initiated.
- Define a policy for manual or automatic switch to DR.
- Only one node at the DR site has the most recent copy of data when the switch occurs, so a Db2 Mirror resynchronization is needed to get both nodes at the DR site back in sync.



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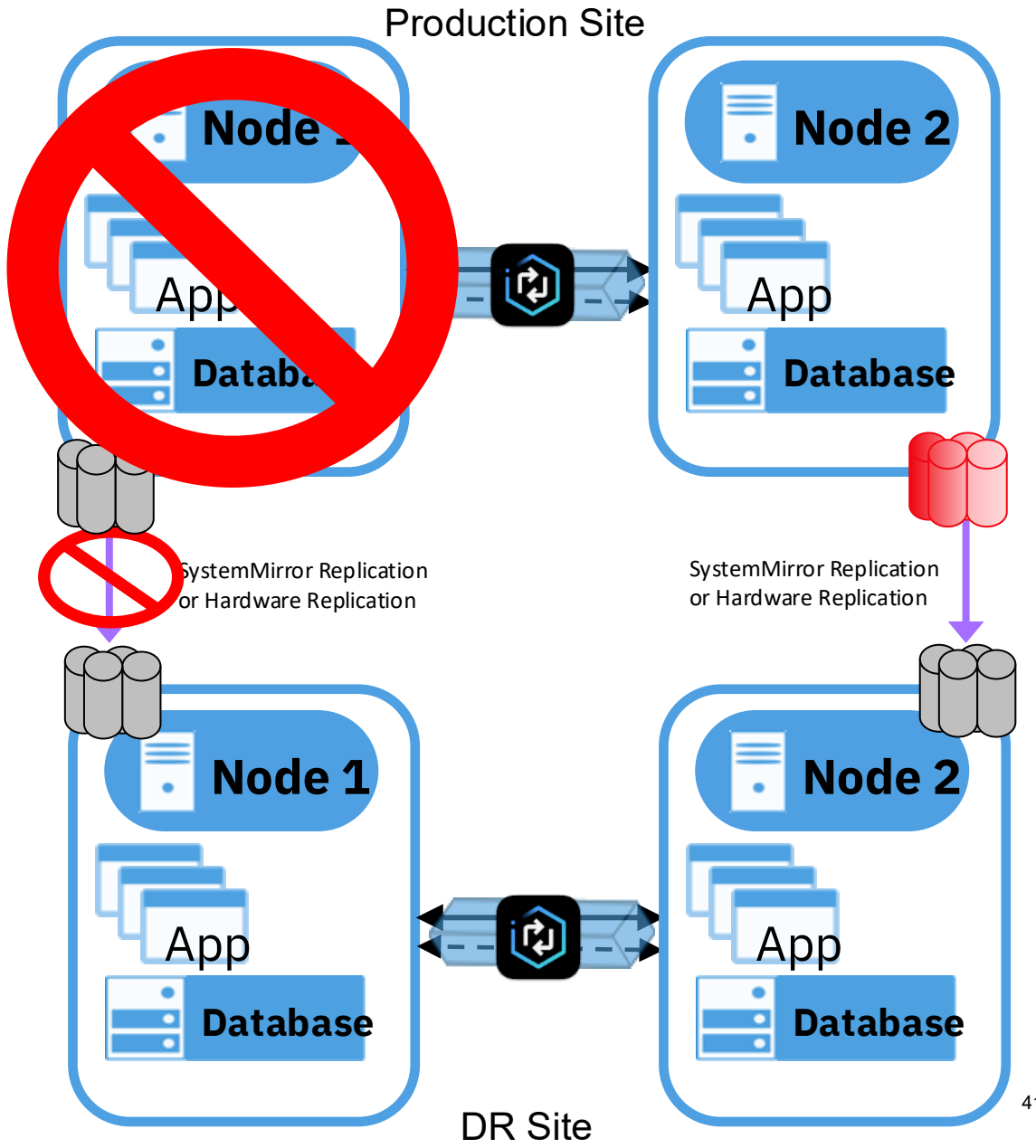

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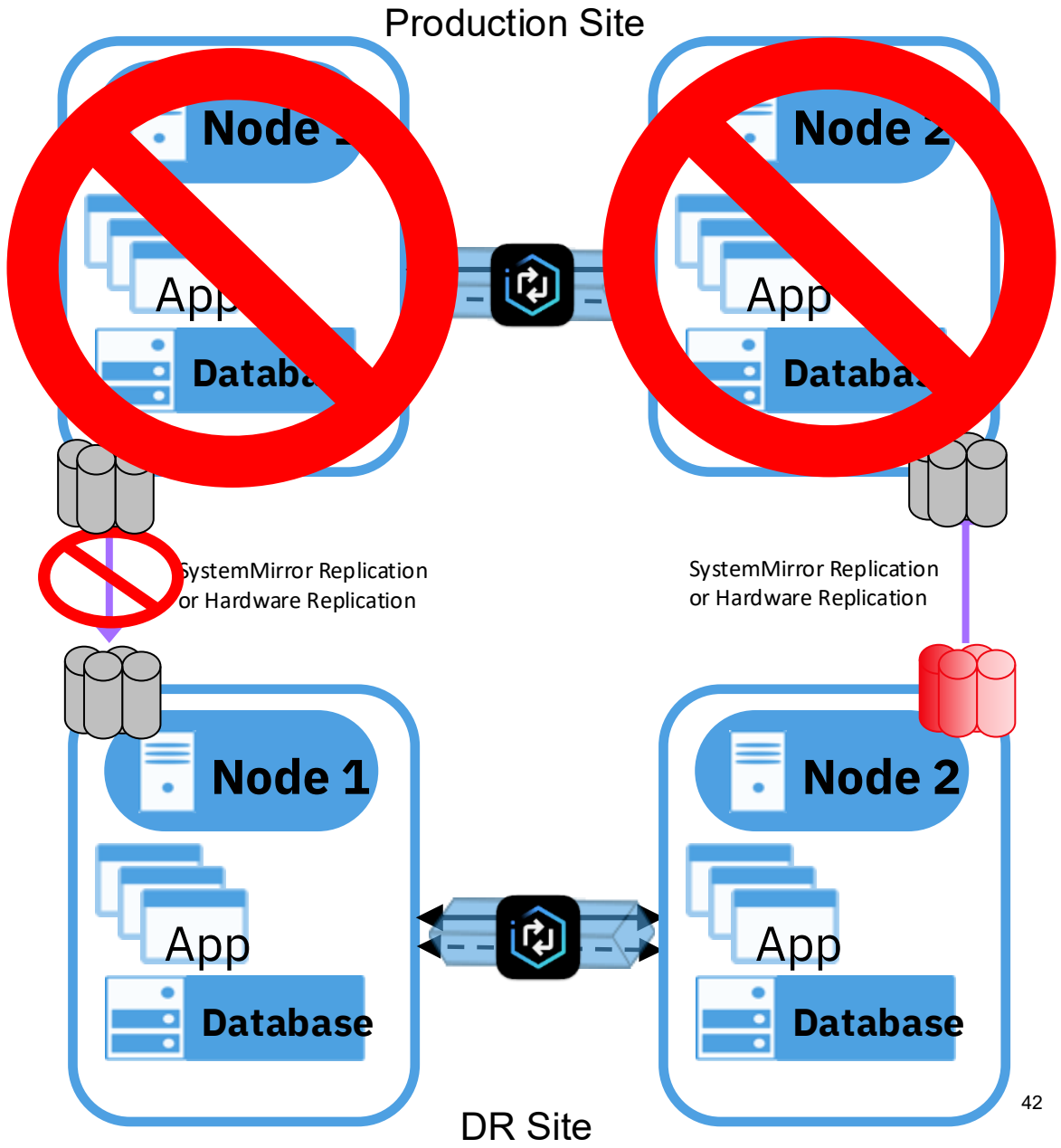

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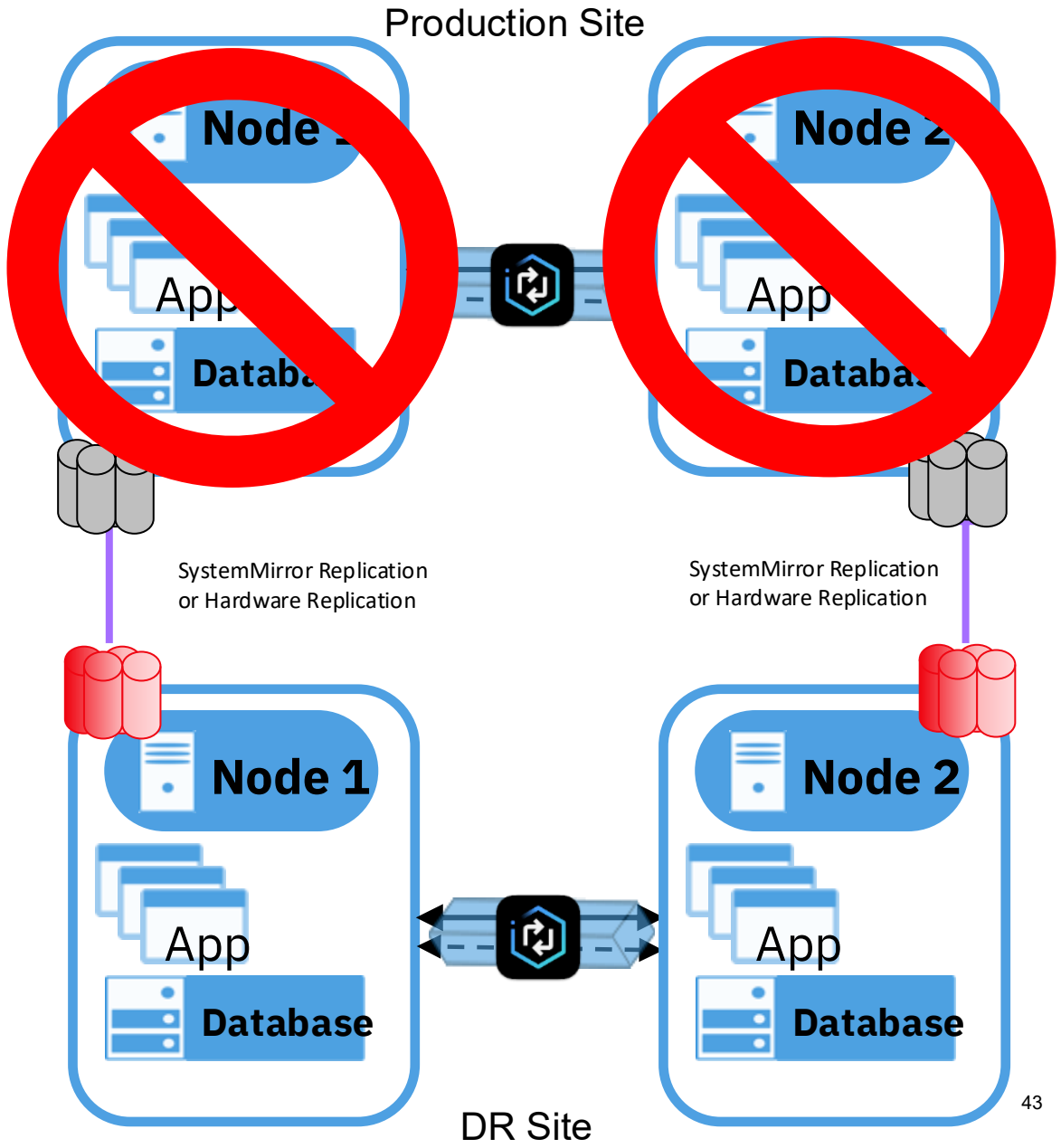
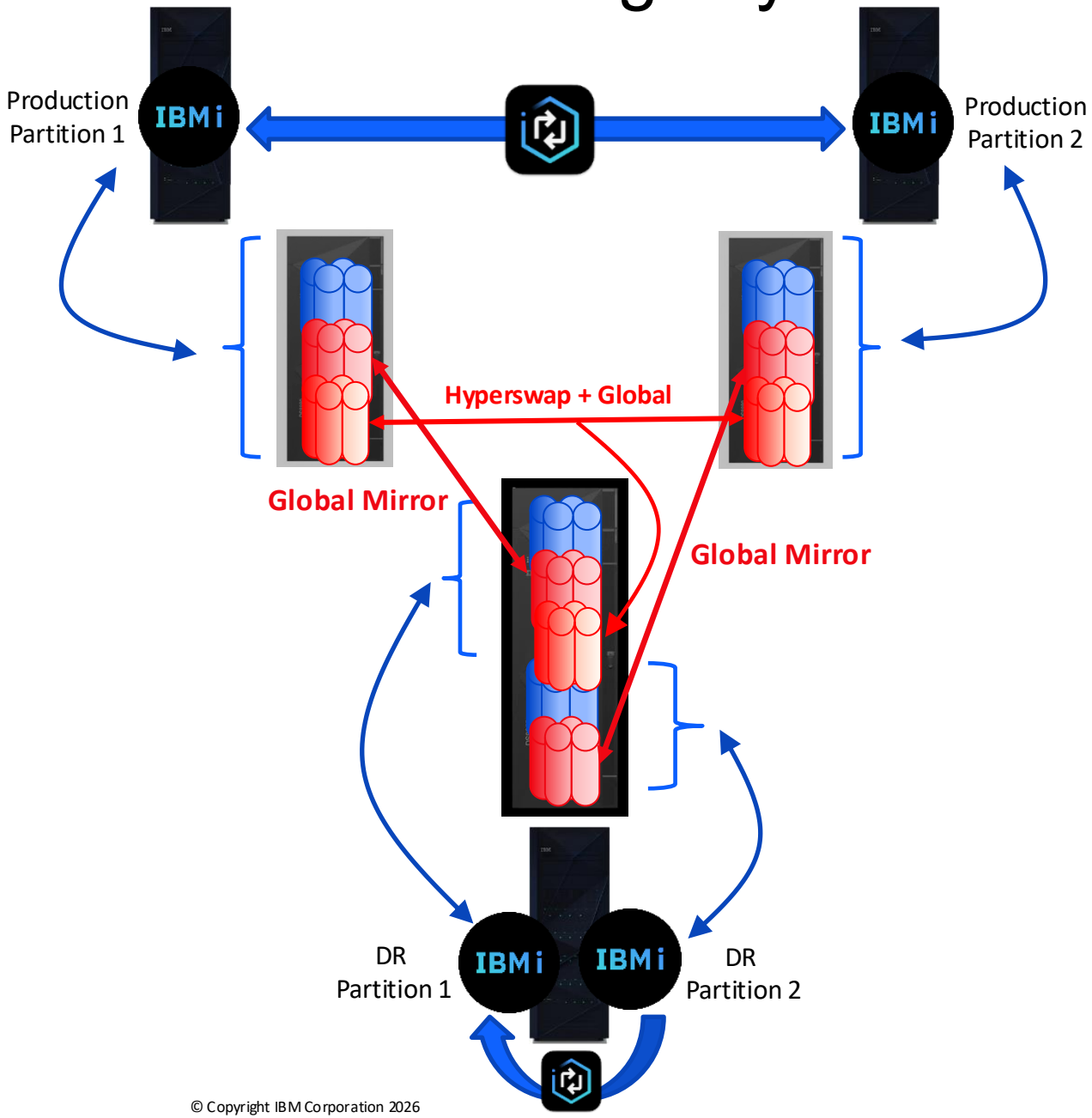


DR: 3 Power servers and 3 storage systems

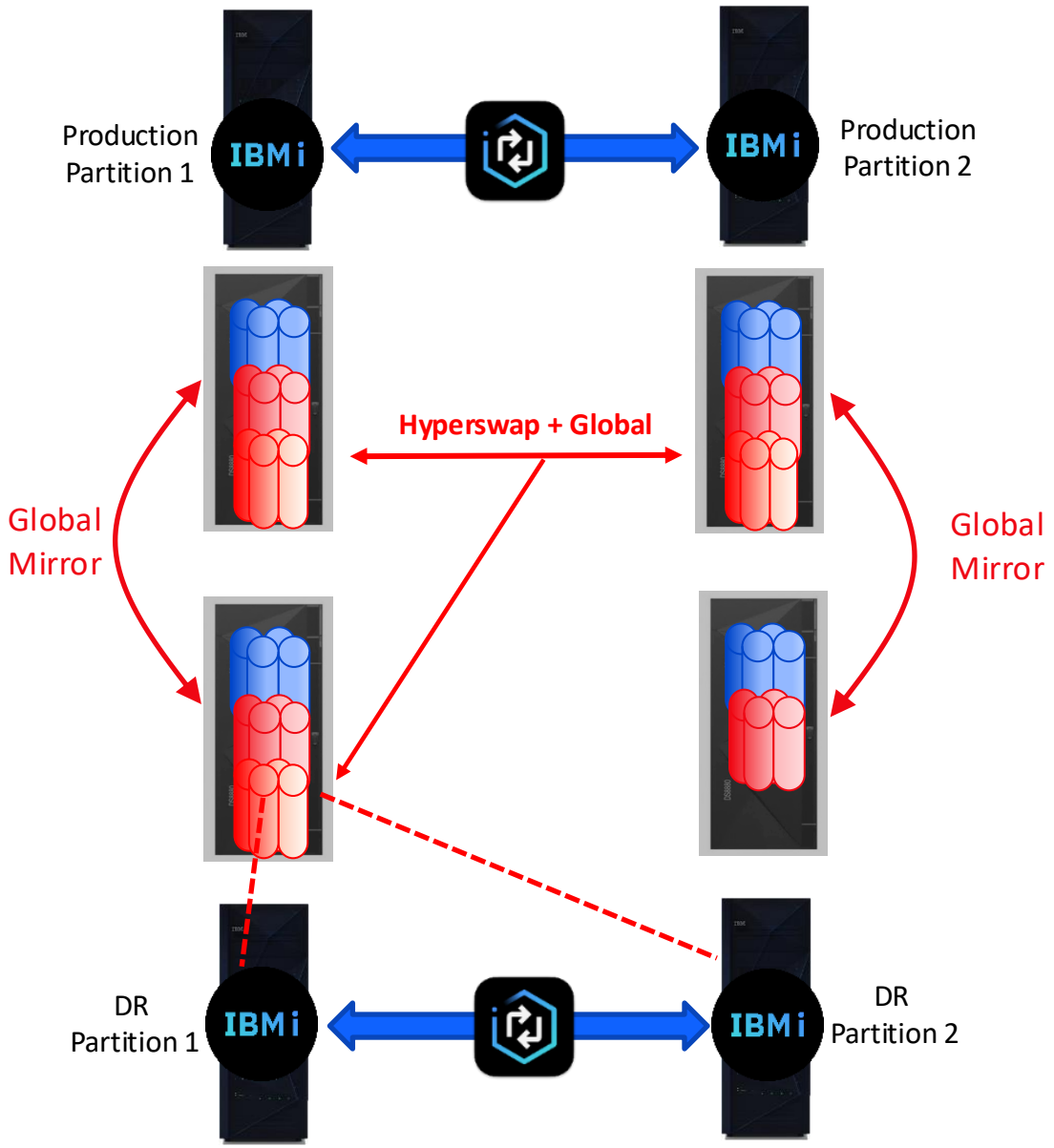


= SYSBAS

= DB IASP

= IFS IASP

DR: 4 Power servers and 4 storage systems



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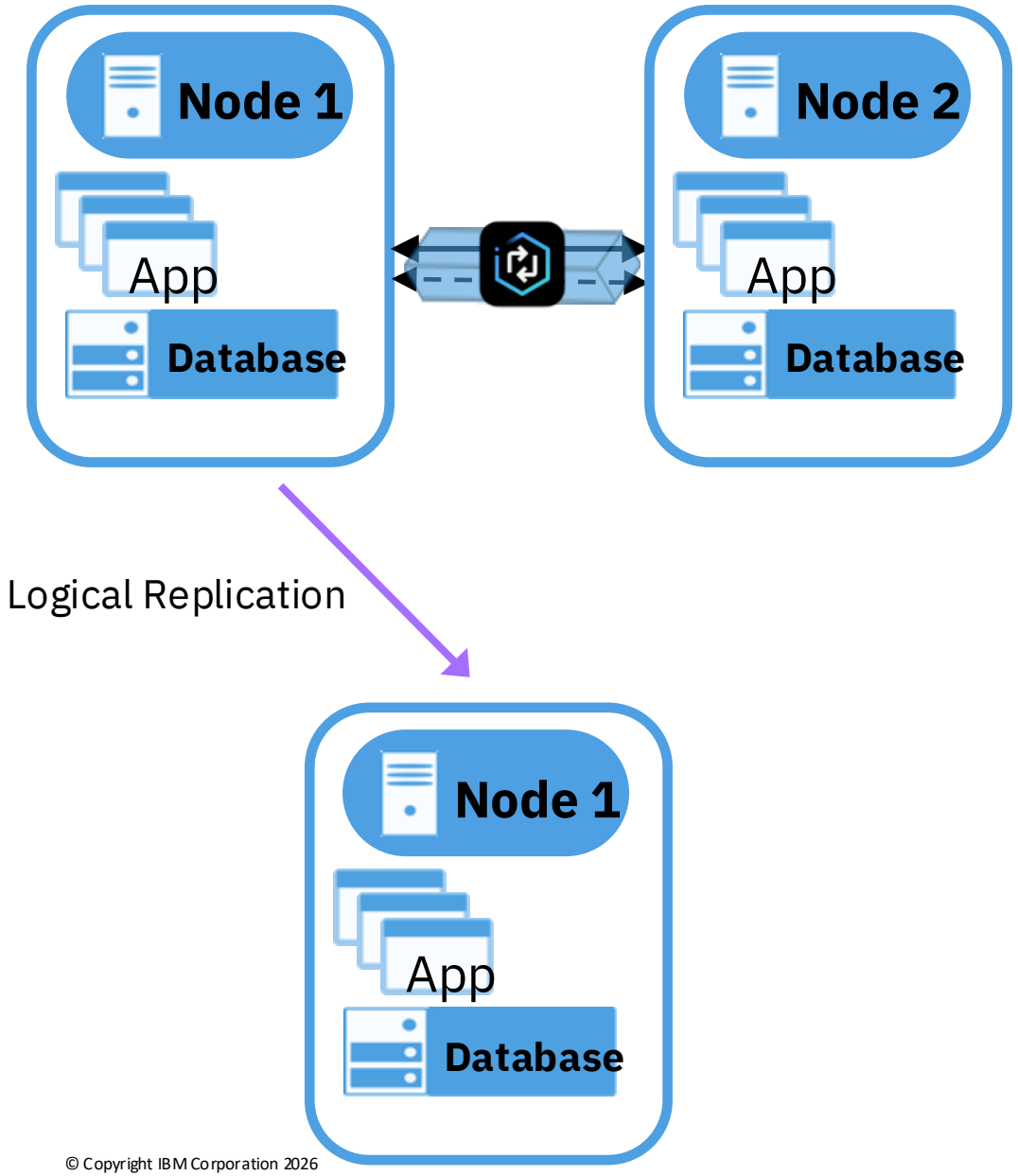
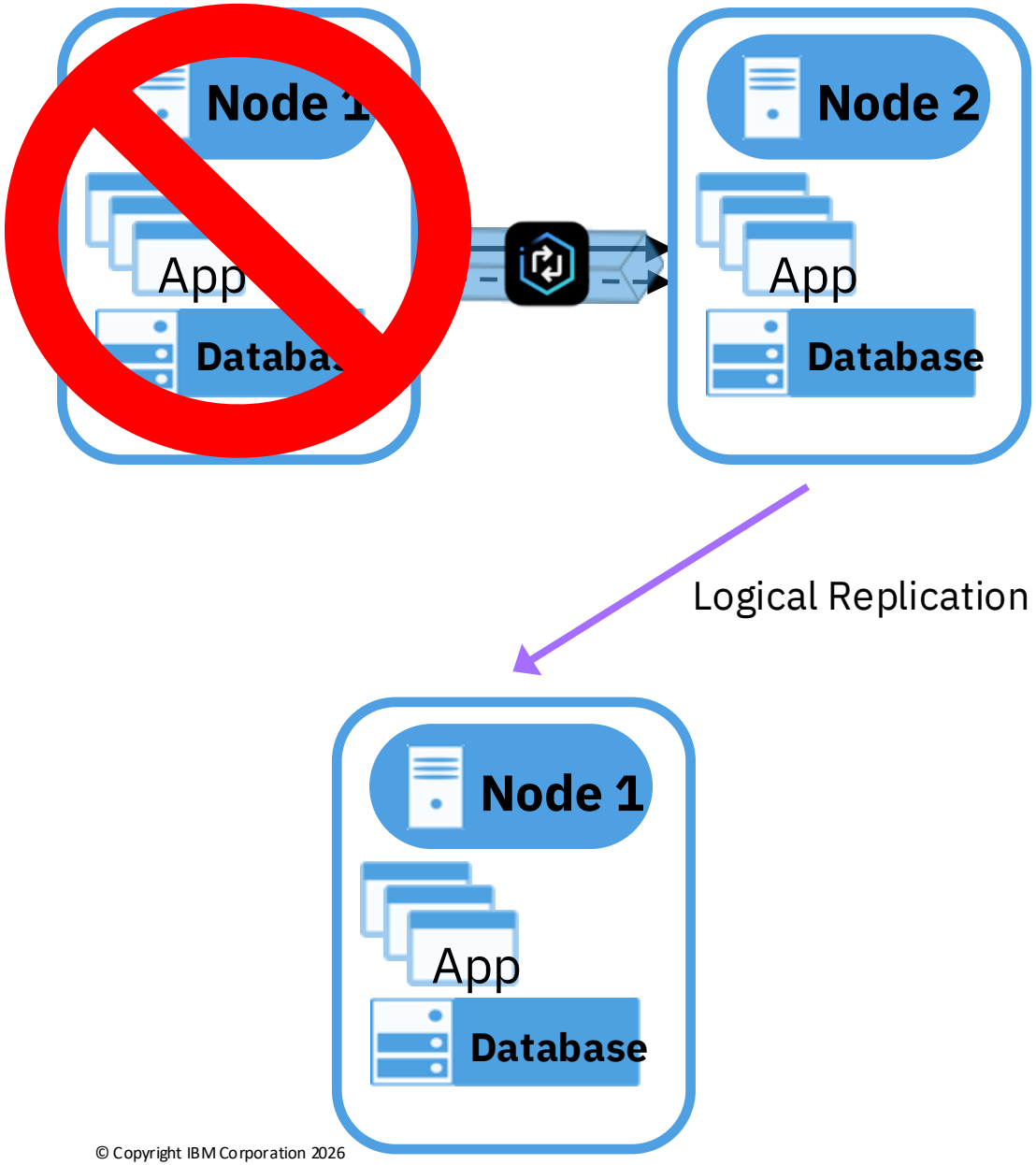
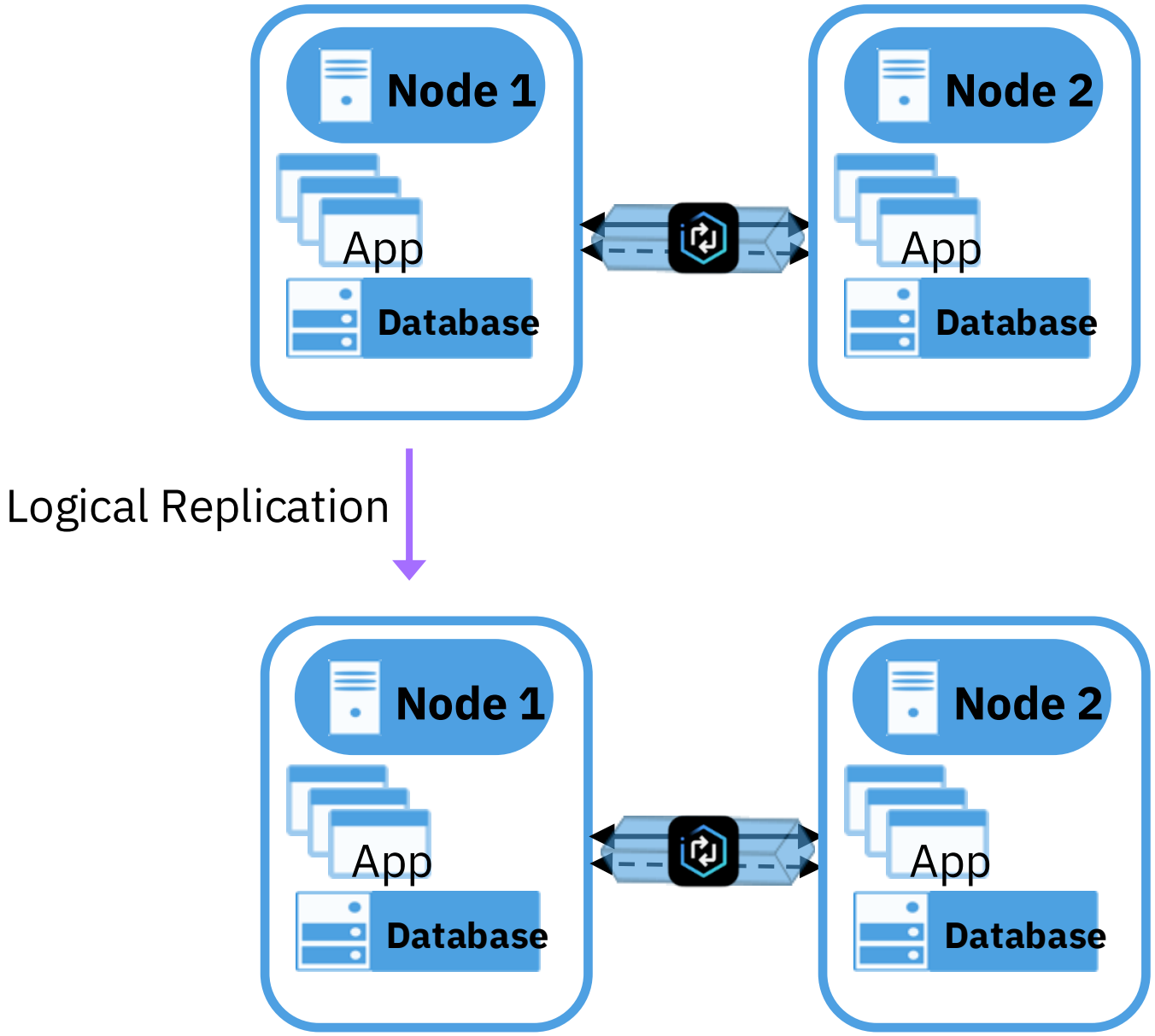
Logical Replication to Single DR Node



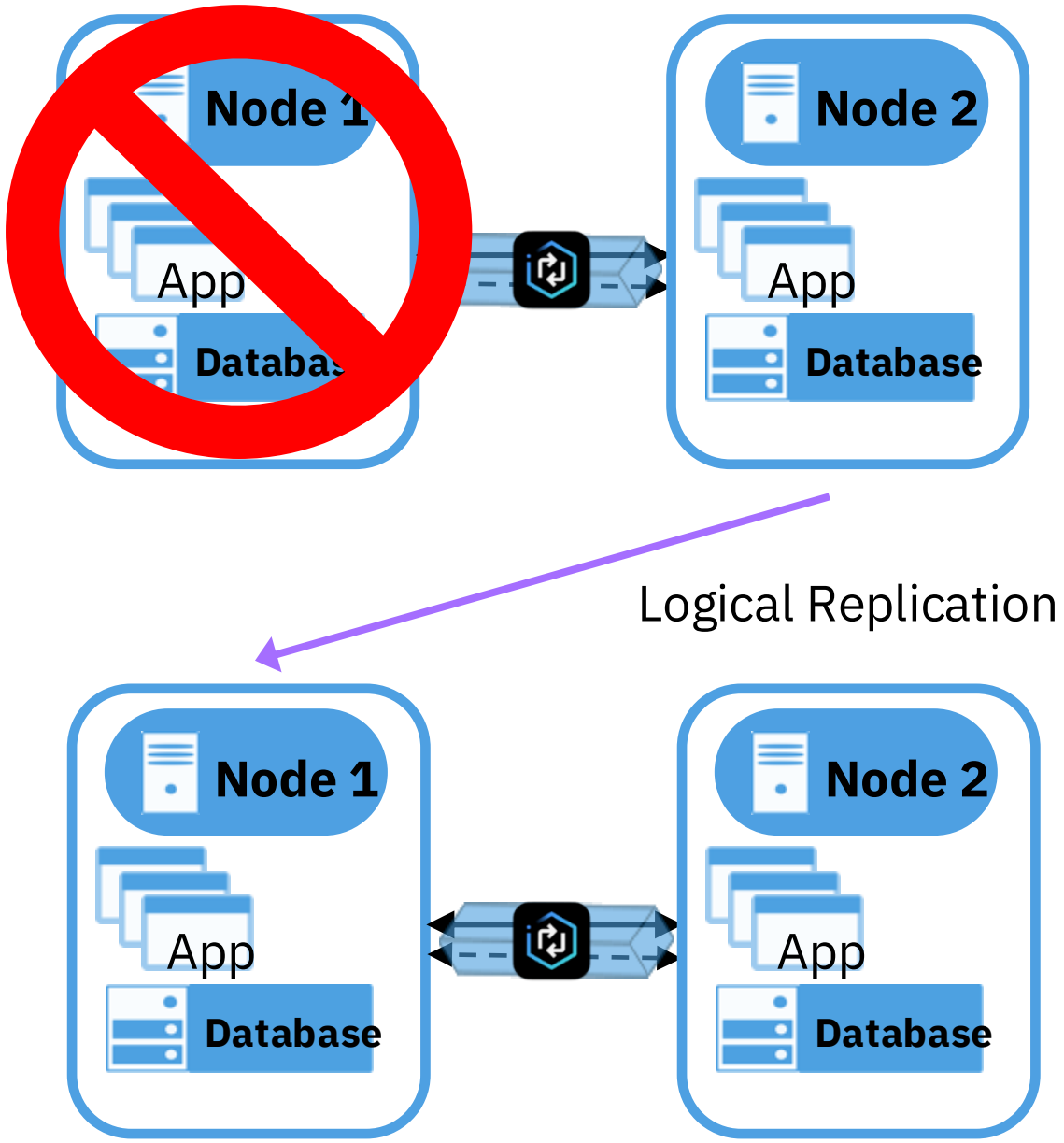
Logical Replication to Single DR Node



Logical Replication to Db2 Mirror DR



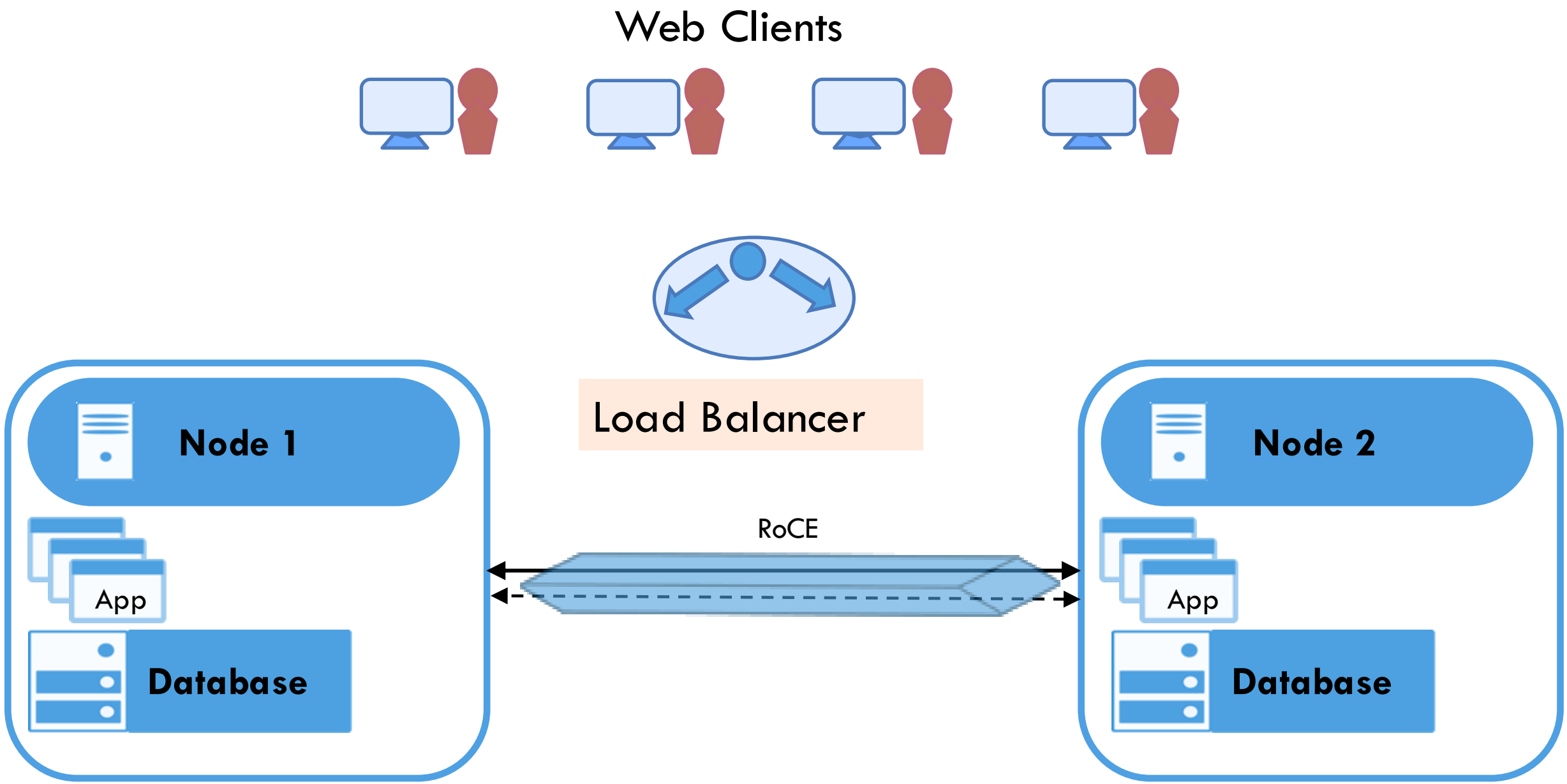
Logical Replication to Db2 Mirror DR



#4 Plan for application switching

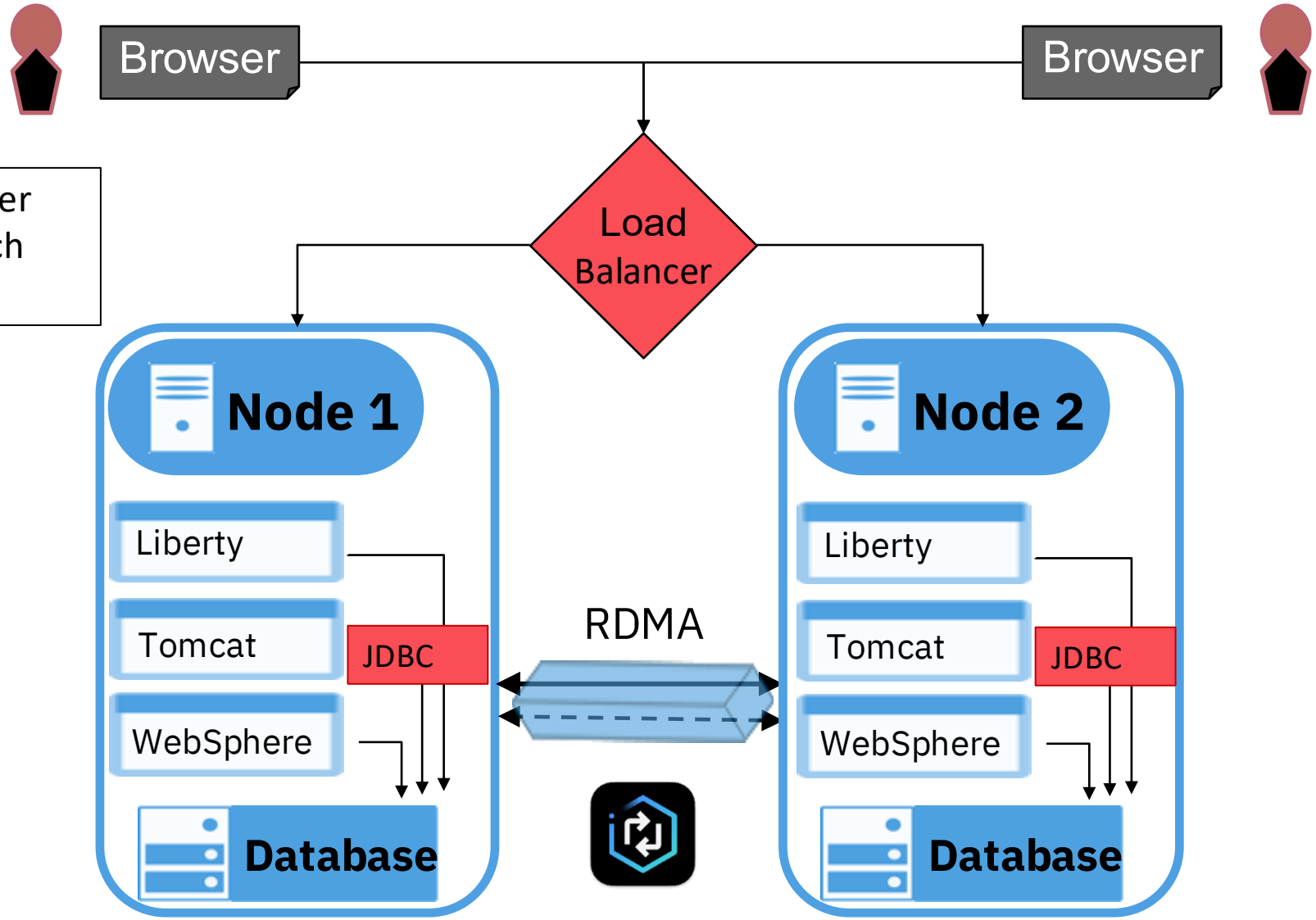
- Load Balancer
- Takeover IP address groups
- JDBC Alternate Server
- Exit Programs
- Other approaches

Db2 Mirror – Active Active, Web Clients with Load Balancer



Example Active/Active Web Application Implementation

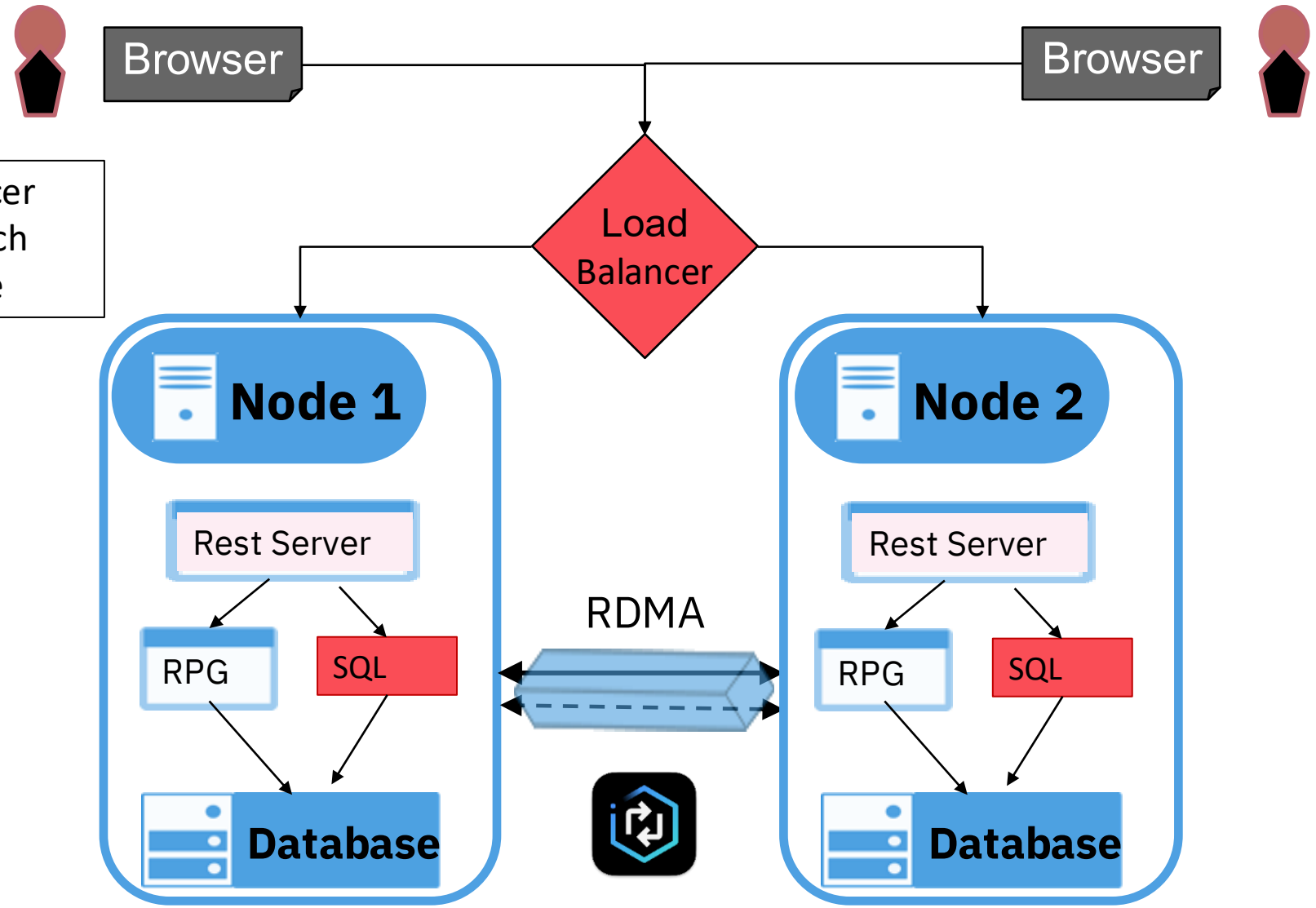
The Load Balancer determines which nodes are active



Active/Active Web Application
Active/Active Database

Example Active/Active REST Services Implementation

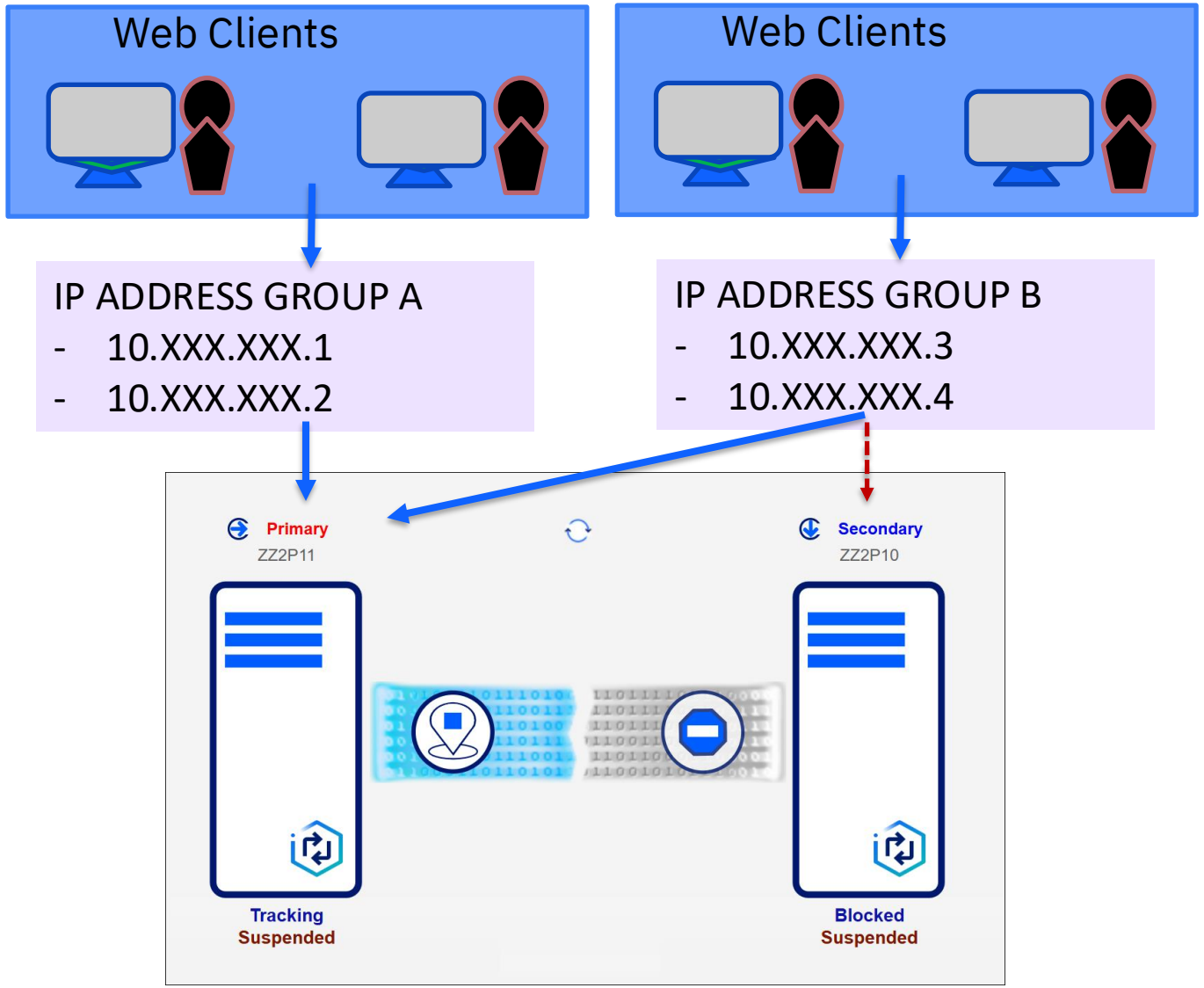
The Load Balancer determines which nodes are active



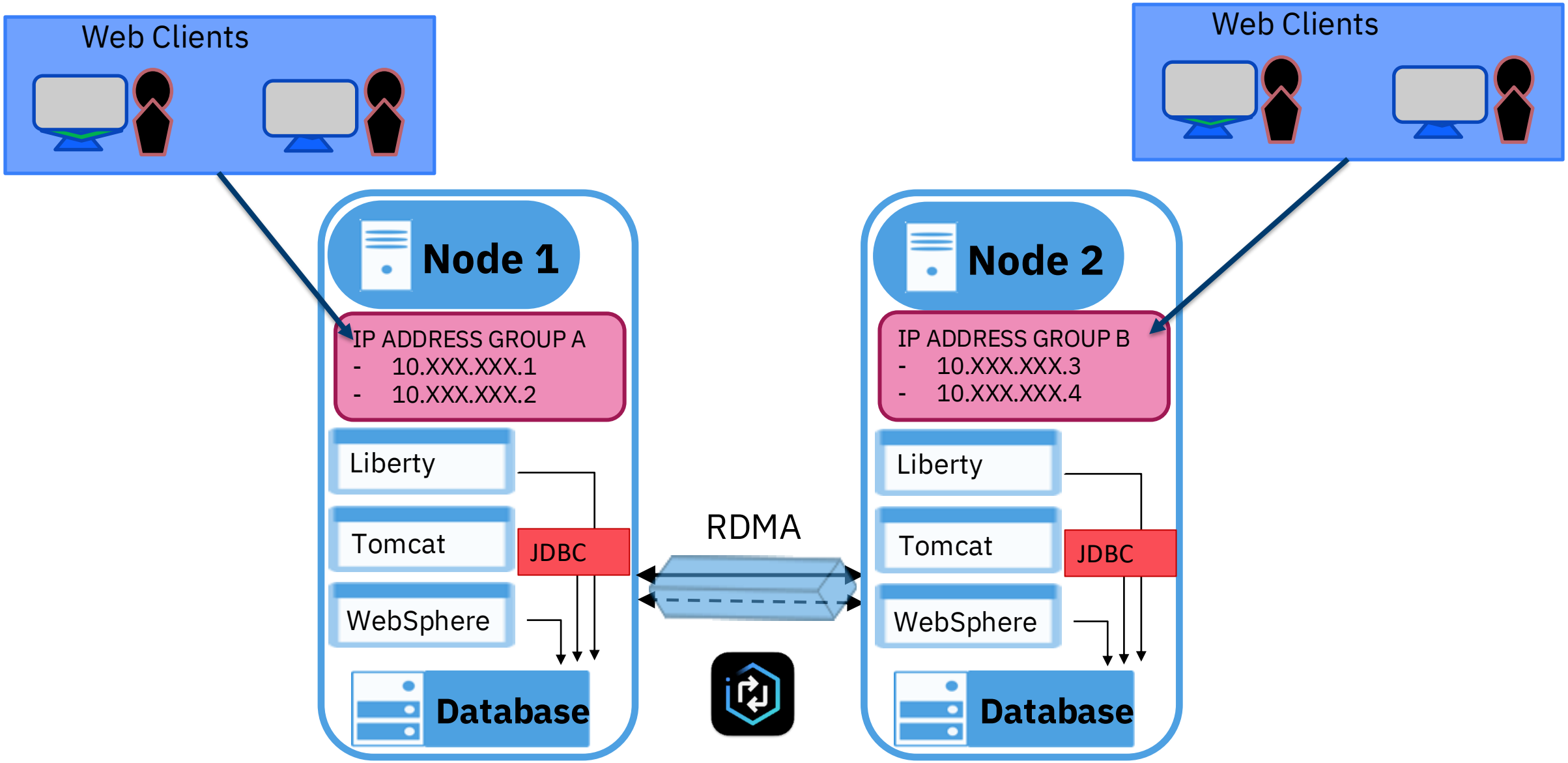
Active/Active REST Connection
Active/Active Database

Db2 Mirror Takeover IP Address Switching

- IP address groups switched between nodes by Db2 Mirror
- Automatic switch
  - When replication state is BLOCKED
  - When node becomes unavailable
- IP address group can be manually switched if necessary

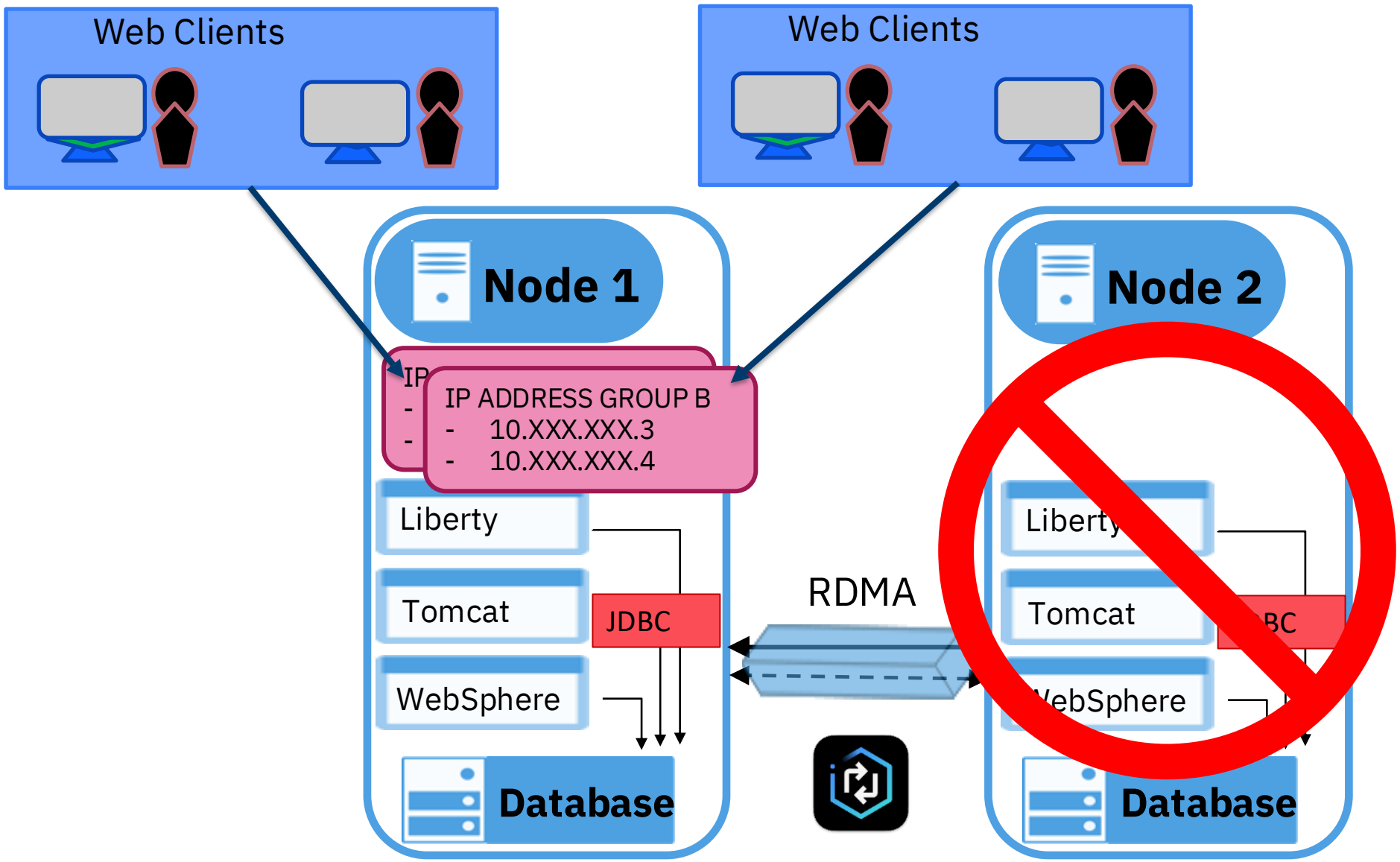


Takeover IP Address Switching Example



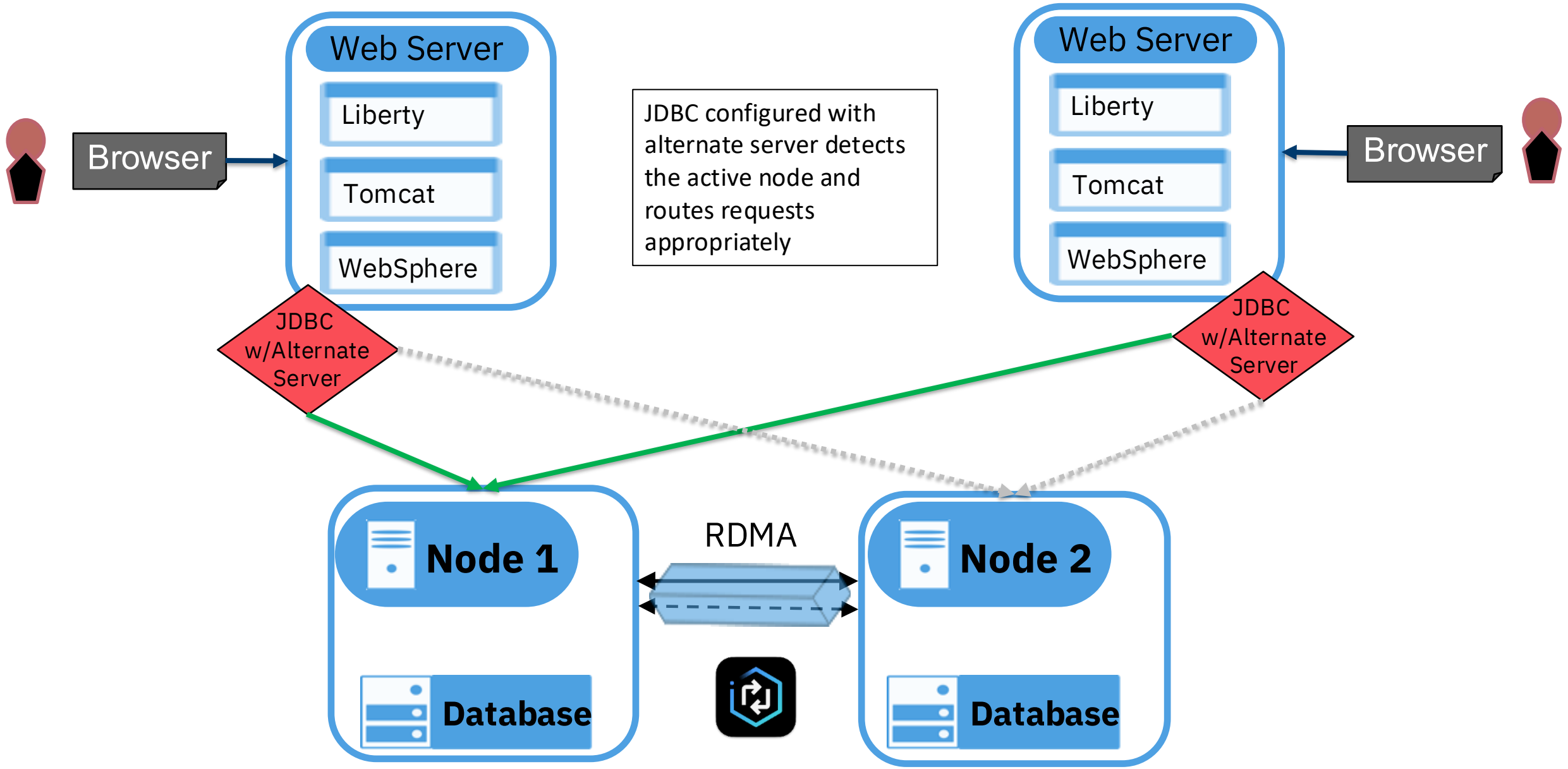
Active/Active Database

Takeover IP Address Switching Example

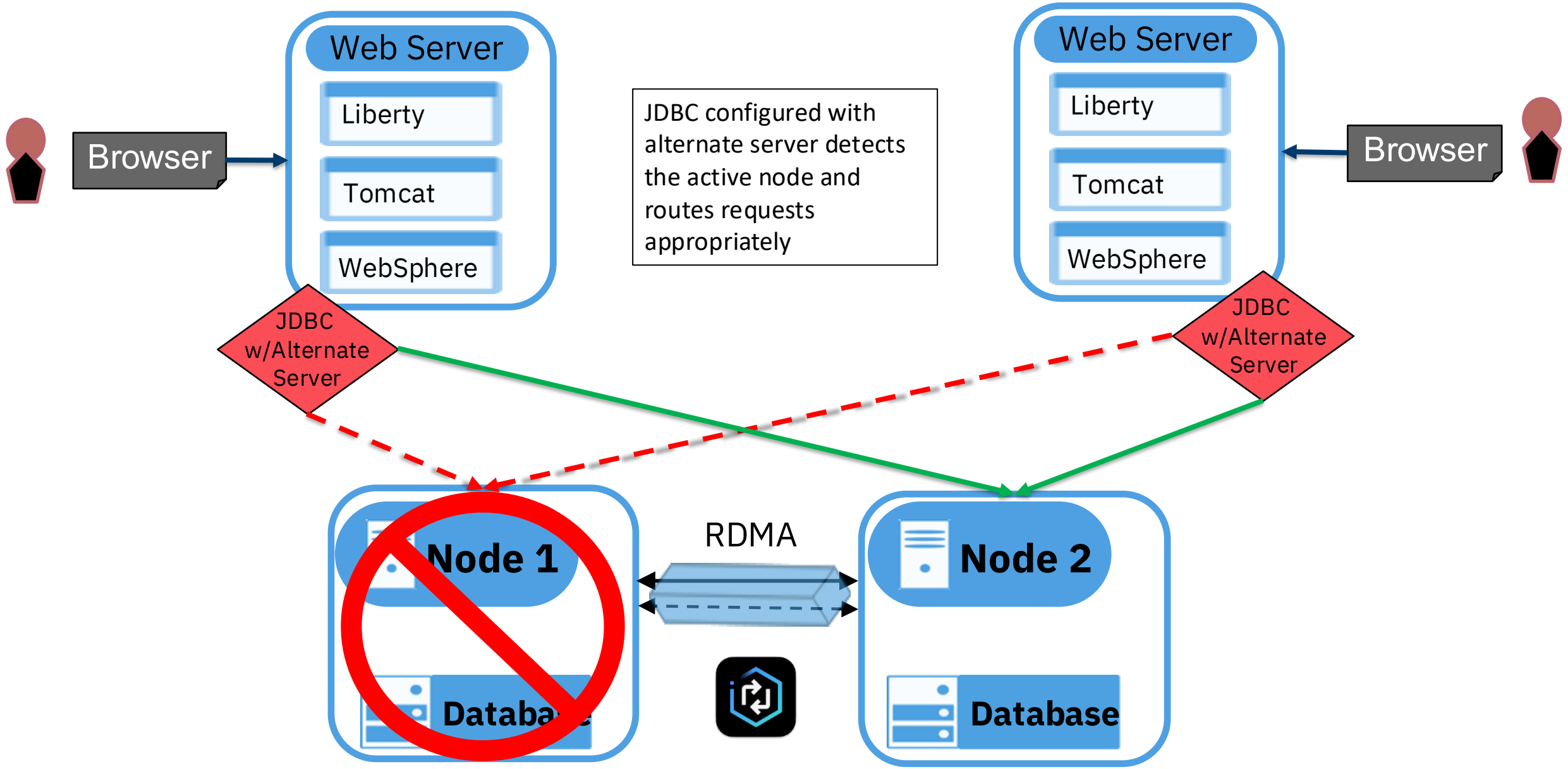


Active/Active Database

Another Web Application Implementation Example



Another Web Application Implementation Example



JTOpen JDBC alternate server properties

- **Before:**
  - JTOpen applications incur a failure when the connection drops

- **JTOpen 9.6:**
  - JTOpen applications can automatically reconnect
  - Controls:
    - List of alternate servers to use
    - Maximum # of retry attempts
    - Wait time between retry attempts
    - Whether to attempt to automatically switch back to preferred server

https://www.ibm.com/docs/en/ssw_ibm_i_76/db2mi/db2mappdevjtopen.htm

https://jt400.sourceforge.net/doc/com/ibm/as400/access/doc-files/JDBCProperties.html#alternate

QIBM_QMRDB_STATE_CHG exit point

Programmatically handle:

- ACTIVE ➔ BLOCKED
  - Non-replicated data can be read or changed
  - Replicated data can be read
  - Replicated data can not be changed
- BLOCKED ➔ ACTIVE (synchronizing)
  - Non-replicated data can be read or changed
  - Replicated data can be read
  - Replicated data can be changed when resync for that object has completed
- BLOCKED ➔ ACTIVE (replicating)
  - Resynchronization has completed

QIBM_QMRDB_STATE_CHG Format SCHG0200

Exit program called each time the replication state or replication detail changes for SYSBAS or any database independent auxiliary storage pool (IASP)

Parameter	Description	Valid Values
1	**ASP group name** DB IASP name or *SYSBAS	iasp-name *SYSBAS
2	**Current replication state** Identifies the current replication state for the IASP group or SYSBAS.	ACTIVE BLOCKED TRACKING NOT MIRRORED
3	**Current replication detail** Identifies the current replication detail for the IASP group or SYSBAS.	NONE REPLICATING SUSPENDED SYNCHRONIZING

https://www.ibm.com/docs/en/ssw_ibm_i_76/db2mi/db2mmonitorexits.htm

QIBM_QMRDB_ROLE_CHG Format RCHG0200

Parameter	Description	Valid Values
1	**Current replication role** Identifies the new (current) role for SYSBAS on this node.	PRIMARY SECONDARY
2	**Previous replication role** Identifies the previous role for SYSBAS on this node.	PRIMARY SECONDARY
3	**Replication role change source** Identifies the source of the replication role change for SYSBAS on this node	SYSTEM USER

- SYSTEM
  - automatic takeover for unplanned outages
  - automatic role swap for planned outages is enabled
- USER
  - role change initiated by Db2 Mirror GUI user
  - role change initiated by the QSYS2.SWAP_MIRROR_ROLES procedure

#5 Make application changes

- Changes you may need to make:
  - Use replication eligible object types
  - Use IASPs
  - Enable application switching

#6 Deploy a test environment

- Practice outages and role swaps
- Analyze performance

- Stay current with Db2 for i & Db2 Mirror for i PTF Groups

PTF Groups being released on July 24th, 2026

Db2 for i – SF99704 Level 33 (IBM i 7.4)

Db2 for i – SF99950 Level 12 (IBM i 7.5)

Db2 for i – SF99960 Level 3 (IBM i 7.6)

https://www.ibm.com/support/pages/node/7251904

Db2 Mirror – SF99668 Level 29 (IBM i 7.4)

Db2 Mirror – SF99951 Level 11 (IBM i 7.5)

Db2 Mirror – SF99961 Level 3 (IBM i 7.6)

https://www.ibm.com/support/pages/node/7252107

Performance Expectations

- IBM Db2 Mirror for i: Performance Considerations
  https://www.ibm.com/downloads/cas/QYGKQJMK

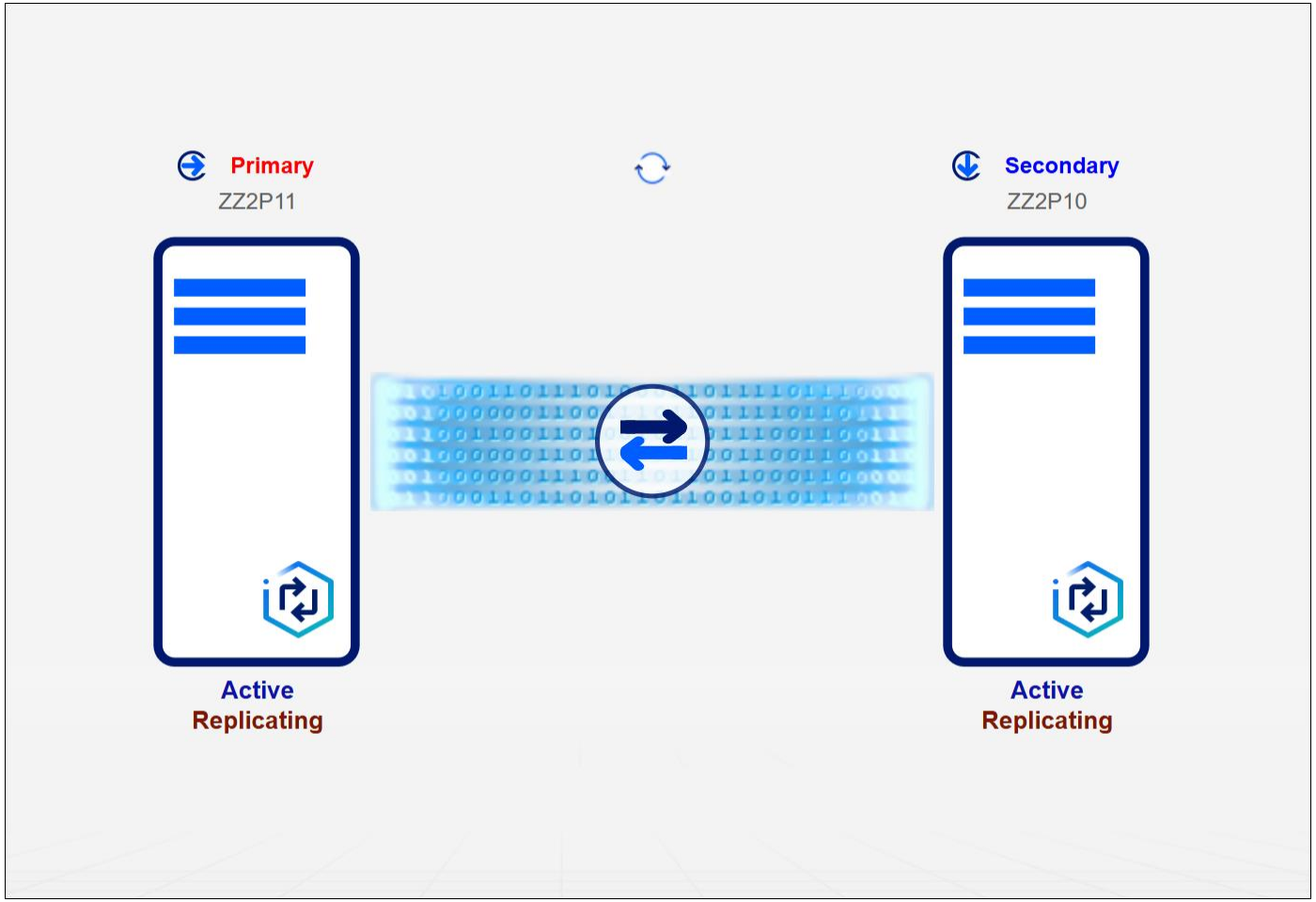
- Synchronous replication increases the complete path length of an operation since an action may drive I/O on both nodes in order to finish.
  - Could increase by up to ~(2-3)X for Db2 changes

- The ability to run transactions on both nodes should mitigate per transaction overhead and with a target of achieving equal to or greater transactional throughput

- Read workloads are not impacted since they are not replicated

- Single threaded or serial I/O workloads will be the most impacted

#7 Deploy in production



IBM Power
Quick Reference Guide

Db2 Mirror for i Readiness Assessment

Overview

This readiness assessment will help you develop the skills required to implement a Db2 Mirror solution and provide a test environment for evaluating key applications and databases. The assessment is customized to your requirements, but generally takes between two and three weeks.

Target Audience

- ISVs and clients that are planning to enable their applications and infrastructure for Db2 Mirror for IBM i

Why Use This Service?

- Are you looking for an alternative to your current IBM i software replication solutions for high availability?
- Do you need a zero-time failover environment to an active high availability system?
- Are your business users asking for an active/active solution for their critical applications?

Benefits

- This service will help you prepare for a continuous availability solution for your applications
- It will help you address the active/active application requirements of your business users

Service Provided

- Develop a customized plan for infrastructure and database to support Db2 Mirror including the following options:
  - Planning
  - Implementation
  - Application compatibility
  - Performance optimization
  - Fail over testing
- Create an IBM i test infrastructure environment based on Power servers with DS8000 and SVC/Flash storage options
- Create a test database environment with sample application and data, cloned to create a Db2 Mirror solution (Note that no HIPAA or PHI client data can be loaded on IBM systems)
- Analyze and optimize application performance
- Perform fail over testing

Deliverables

- Analysis of infrastructure, database and application considerations for a successful implementation of Db2 Mirror
- Design for infrastructure (compute and storage), including PowerHA, Metro and Global Mirror integration where applicable
- Design for database and applications to best exploit Db2 Mirror
- Recommendations for application and database modernization for optimal performance in a mirrored database environment
- Skills enablement and guidance on best practices for Db2 Mirror

Contacts

- Contact us at ibmsls@ibm.com or your local Technology Expert Labs team
- Principal Technology Experts Lab consultant:
  Selwyn Dickey
  sdickey@us.ibm.com

For more information

IBM Sites:

IBM i Home Page	https://www.ibm.com/it-infrastructure/power/os/ibm-i
IBM Strategy Whitepaper	https://www.ibm.com/it-infrastructure/us-en/resources/power/i-strategy-roadmap/
IBM Client Success	https://www.ibm.com/it-infrastructure/us-en/resources/power/ibm-i-customer-stories/
Support Life Cycle	https://www.ibm.com/support/lifecycle/
License Topics	https://www-01.ibm.com/support/docview.wss?uid=nas8N1022087
IBM i Release Life Cycle	https://www.ibm.com/support/pages/release-life-cycle
IBM i TR Wikis	IBM i Technology Updates

For more information:

Blogs to follow

- TechChannel You and i (Steve Will)
- TechChannel: i Can (Dawn May)
- TechChannel: OpenYour i with Jesse Gorzinski
- IBM Db2 for i (Kent Milligan)
- IBM i Analytics Blog (Jon Westcott Jr)
- iSee with Scott and Tim

More to follow

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@OpenPOWERorg
@ITJungleNews
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Hashtags to Use

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#IBMi
#IBMAIX
#Power10
#LinuxonPower
#HANAonPower
#ITinfrastructure
#OpenSource
#HybridCloud

IBM i

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