# Agenda

- An introduction to Db2 pureScale
- Fix Pack and Mod Pack Updates
- Db2 Version Upgrade
- Validation Steps

Introduction to pureScale

Db2 pureScale

- Extreme capacity
  - Add compute resources or members as your need arises
- Continuous Availability
  - No single point of failure
  - 24x7 availability
- Application Transparency
  - No changes to application code or configuration
  - Load balancing logic is within Db2
  - Connection Rebalance
    - Use db2dsdriver.cfg
    - Use F5/Big Fix Load balancer
    - Use Multi-Home DNS concept
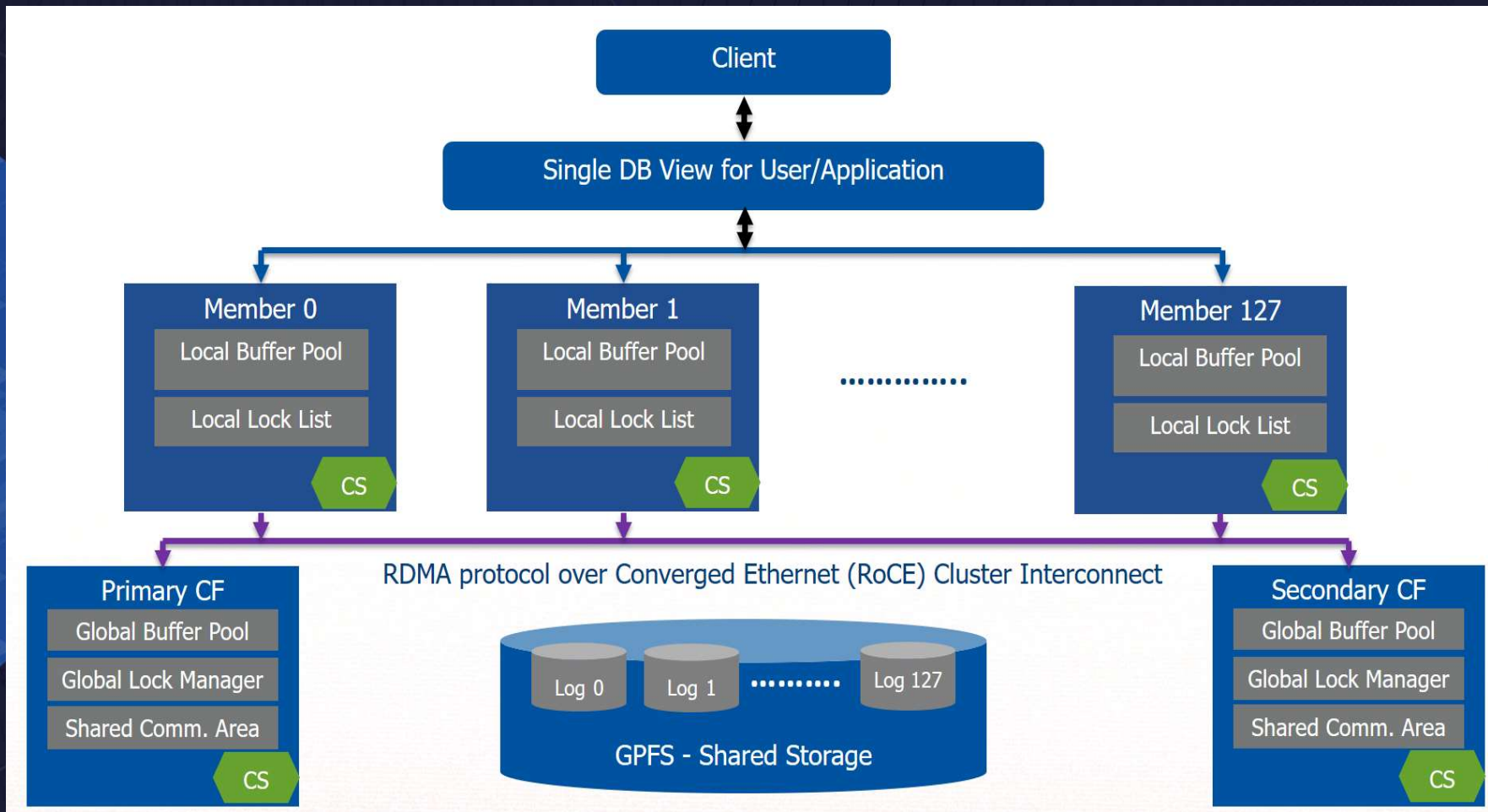
What is a Db2 pureScale Member? (1|2)

A Db2 member is the core processing engine within the pureScale cluster. Like single partition Db2, it contains: a Db2 system controller process (db2sysc) and a watch dog process (db2wdog), Local buffer pools, lock list, database heap, log buffer, sort heap and application heap etc.

New Engine Dis-patchable Units (EDU's) within pureScale are:

db2castructevent	db2LLMn1	db2LLMn2
db2LLMng	db2LLMrl	db2LLMrc
db2XInot	db2LLMrf	db2LLMehl
db2ehl	db2ExtMovHelper	db2sysc (3 additional processes on each member)

What is a Db2 pureScale Member? (1|2)

No concept of catalog node (admin node), data nodes
Db2 engine address space

    - A db2sysc process and its threads
    - 3 additional db2sysc processes (idle in nature) will be allocated on each member along with one active db2sysc. The idle db2sysc processes pre-allocated for Member Crash Recovery and Restart Light of a guest member on a host quickly and without competing with the resident member for resources.

 EDU's:

    db2pclnr – Buffer pool page cleaners
    db2loggr/db2loggw – Transaction log processing and recovery
    db2dlock – Deadlock detection
    db2glock – Co-ordinate deadlock information between multiple members

What is a Db2 pureScale CF? (1|2)

A pureScale cluster facilitates data sharing and concurrency control between its multiple database members, using the concept of a cluster caching facility (CF). The CF is a software application managed by Db2 cluster services to facilitate centralized coordination of locking through a Global Lock Manager (GLM) and centralized page caching through a Group Buffer Pool (GBP).

The services includes:

- Group Buffer pool Management (GBP)
- Global Lock Management (GLM)
- Shared Communication Area (SCA)

What is a Db2 pureScale CF? (2|2)

The Local Lock Manager (LLM), the lock manager within each DB2 member, requests the physical lock from the GLM before granting a logical lock to a transaction. The purpose of the Global Lock List is to track the lock requests made by the LLMs of active database members.

The Shared Communication Area (SCA) contains database wide control block information for table tables, indexes, table spaces and catalogs.

Fix Pack and Mod Pack Updates

Prerequisites

Task No	Task
1	Review the Flashes and open Authorized Problem Analysis Reports (APARs) https://www.ibm.com/support/pages/node/318421
2	Check the recent cumulative build and the fixes to identify the right build for your environment https://www.ibm.com/support/pages/db2-v1159-published-cumulative-special-build-downloads
3	Validate you have sufficient space available. (a) Image copy location (b) /tmp and /var (c) Db2 installation file system https://www.ibm.com/docs/en/db2/11.5?topic=servers-disk-memory-requirements
4	Ensure that your system meets all the installation requirements. Run the **db2prereqcheck** command to determine if your system satisfies the Db2 installation prerequisites. https://www.ibm.com/docs/en/db2/11.5?topic=servers-checking-installation-prerequisites-by-using-db2prereqcheck-command
5	Backup the following: (a) Databases (b) DB CFG, DBM CFG, db2look, Db2 Registry Variables
6	Download Db2 Activation Kit (license keys) via IBM Passport Advantage
7	Validate the /etc/hosts file (avoid any duplicate entries)

Release Levels in Db2 pureScale

Code Level: Refers to the specific version and fix pack level of the Db2 software installed on the system. This includes the base version, applied fix packs, and any interim fixes.

Architecture Level: During the update process, architecture level will be same as code level.

Current Effective Code Level (CECL):
This is the actual running version of the Db2 code on each member of the pureScale cluster. This can sometimes differ from the installed code level if certain patches or fixes have not yet been activated.

Current Effective Architecture Level (CEAL):
This indicates the version of the cluster's architecture that is actively in use. This can include the configuration and versioning of cluster-wide components and features.

Section Level:
Refers to the level of the database sections (plans or compiled SQL statements) that are being executed within the database. It's often tied to the execution plan and optimization settings of the database queries.

How to extract the release level information?

```
SELECT RECORD_TYPE, ID, SUBSTR(ARCHITECTURE_LEVEL_DISK,1,28) AS ARCHITECTURE_LEVEL,
SUBSTR(SECTION_LEVEL_DISK,1,26) AS SECTION_LEVEL, SUBSTR(CODE_LEVEL_DISK,1, 28) AS CODE_LEVEL, LAST_UPDATED
FROM TABLE (SYSPROC.ENV_GET_INSTANCE_CODE_LEVELS())


RECORD_TYPE ID      ARCHITECTURE_LEVEL            SECTION_LEVEL              CODE_LEVEL
----------- ------  ---------------------------- -------------------------- ----------------------------
INSTANCE         -  V:11 R:5 M:9 F:0 I:0 SB:0    -                          V:11 R:5 M:9 F:0 I:0 SB:4256
MEMBER           0  V:11 R:5 M:9 F:0 I:0 SB:0    V:11 R:5 M:9 F:0 I:0 SB:0  V:11 R:5 M:9 F:0 I:0 SB:4256
MEMBER           1  V:11 R:5 M:9 F:0 I:0 SB:0    V:11 R:5 M:9 F:0 I:0 SB:0  V:11 R:5 M:9 F:0 I:0 SB:4256
MEMBER           2  V:11 R:5 M:9 F:0 I:0 SB:0    V:11 R:5 M:9 F:0 I:0 SB:0  V:11 R:5 M:9 F:0 I:0 SB:4256
CF             128  V:11 R:5 M:9 F:0 I:0 SB:0    -                          V:11 R:5 M:9 F:0 I:0 SB:4256
CF             129  V:11 R:5 M:9 F:0 I:0 SB:0    -                          V:11 R:5 M:9 F:0 I:0 SB:4256
```

Verify no alerts within the cluster

```
db2instance -list

ID       TYPE    STATE  HOME_HOST          CURRENT_HOST ALERT   PARTITION_NUMBER LOGICAL_PORT NETNAME
--       ----    -----  ---------          ------------ -----   ---------------- ------------ -------
0        MEMBER  STARTED ibmdb2st301       ibmdb2st301  NO                     0            0 ibmdb2st301-roce0,ibmdb2st301-roce1
1        MEMBER  STARTED ibmdb2st302       ibmdb2st302  NO                     0            0 ibmdb2st302-roce0,ibmdb2st302-roce1
2        MEMBER  STARTED ibmdb2st303       ibmdb2st303  NO                     0            0 ibmdb2st303-roce0,ibmdb2st303-roce1
128      CF      PRIMARY ibmdb2cf301       ibmdb2cf301  NO                     -            0 ibmdb2cf301-roce0,ibmdb2cf301-roce1
129      CF         PEER ibmdb2cf302       ibmdb2cf302  NO                     -            0 ibmdb2cf302-roce0,ibmdb2cf302-roce1

HOSTNAME         STATE INSTANCE_STOPPED ALERT
--------         ----- ---------------- -----
ibmdb2cf302      ACTIVE               NO    NO
ibmdb2cf301      ACTIVE               NO    NO
ibmdb2st303      ACTIVE               NO    NO
ibmdb2st302      ACTIVE               NO    NO
ibmdb2st301      ACTIVE               NO    NO


db2cluster -cm -list -alert
There are no alerts
```

RSCT and TSA Version Check

1. Perform the prerequisites check for TSAMP

${DB2_INSTALLATION_IMAGE_DIRECTOY}/server_dec/db2/linuxamd64/tsamp/prereqSAM
${DB2_INSTALLATION_IMAGE_DIRECTOY}/server_dec/db2/linuxamd64/install/db2cktsa -v install
${DB2_INSTALLATION_IMAGE_DIRECTOY}/server_dec/db2/linuxamd64/install/db2cktsa -v media

2. Make sure to set umask 022

3. Validate the TSA version based on Db2 version

https://www.ibm.com/docs/en/db2/11.5?topic=faq-what-versions-tivoli-sa-mp-rsct-spectrum-scale-are-bundled-in-each-db2-fix-pack-mod-pack

Perform the Rolling Update (1|3)

1. Perform rolling Db2 update one member at a time

```
${DB2_IMAGE_DIRECTORY}/v11.5.8/universal/db2/linuxamd64/install/installFixPack -p /opt/IBM/db2/V11.5/M8FP0 -
I db2inst1 -online -l /tmp/M8FP0_online.member0.log -t /tmp/M8FP0_online.member0.trc

DB2 pureScale online update evaluation:
======================================
Hostname: ibmdb2st301
Instance name:db2inst1
Target Installation path:/opt/IBM/db2/V11.5/M8FP0
Target Code level        =  Version:11 Release:5 Modification:8 Fixpack:0 Interim:0 Special Build:23839
Target Architecture level =  Version:11 Release:5 Modification:8 Fixpack:0

TSA version installed on this host : 4.1.0.7
TSA version present on the media : 4.1.0.7
TSA version after update : 4.1.0.7

GPFS version installed on the host: 5.0.5.8
GPFS version present on the media : 5.1.2.5.4
GPFS version after update : 5.1.2.5.4

Total number of tasks to be performed: 9
Total estimated time for all tasks to be performed: 2616 second(s)
```

Perform the Rolling Update (2|3)

```
Task #1 start
Description: Installing DB2 database product binaries
Estimated time 1485 second(s)
Task #1 end

Task #2 start
Description: Stopping the DB2 member on the local host
Estimated time 10 second(s)
Task #2 end

Task #3 start
Description: Stopping the instance on the local host
Estimated time 10 second(s)
Task #3 end

Task #4 start
Description: Entering cluster file system into maintenance mode
Estimated time 6 second(s)
Task #4 end

Task #5 start
Description: Updating cluster software TSA and GPFS
Estimated time 650 second(s)
Task #5 end
```

Perform the Rolling Update (3|3)

```
Task #6 start
Description: Exiting cluster management software out of maintenance mode
Estimated time 6 second(s)
Task #6 end

Task #7 start
Description: Exiting cluster file system out of  maintenance mode
Estimated time 6 second(s)
Task #7 end

Task #8 start
Description: Updating the DB2 database manager instance configuration
Estimated time 429 second(s)
Task #8 end

Task #9 start
Description: Starting the instance on the local host
Estimated time 10 second(s)
Task #9 end

Task #10 start
Description: Starting the DB2 member on the local host
Estimated time 10 second(s)
Task #10 end

The execution completed successfully.
```