



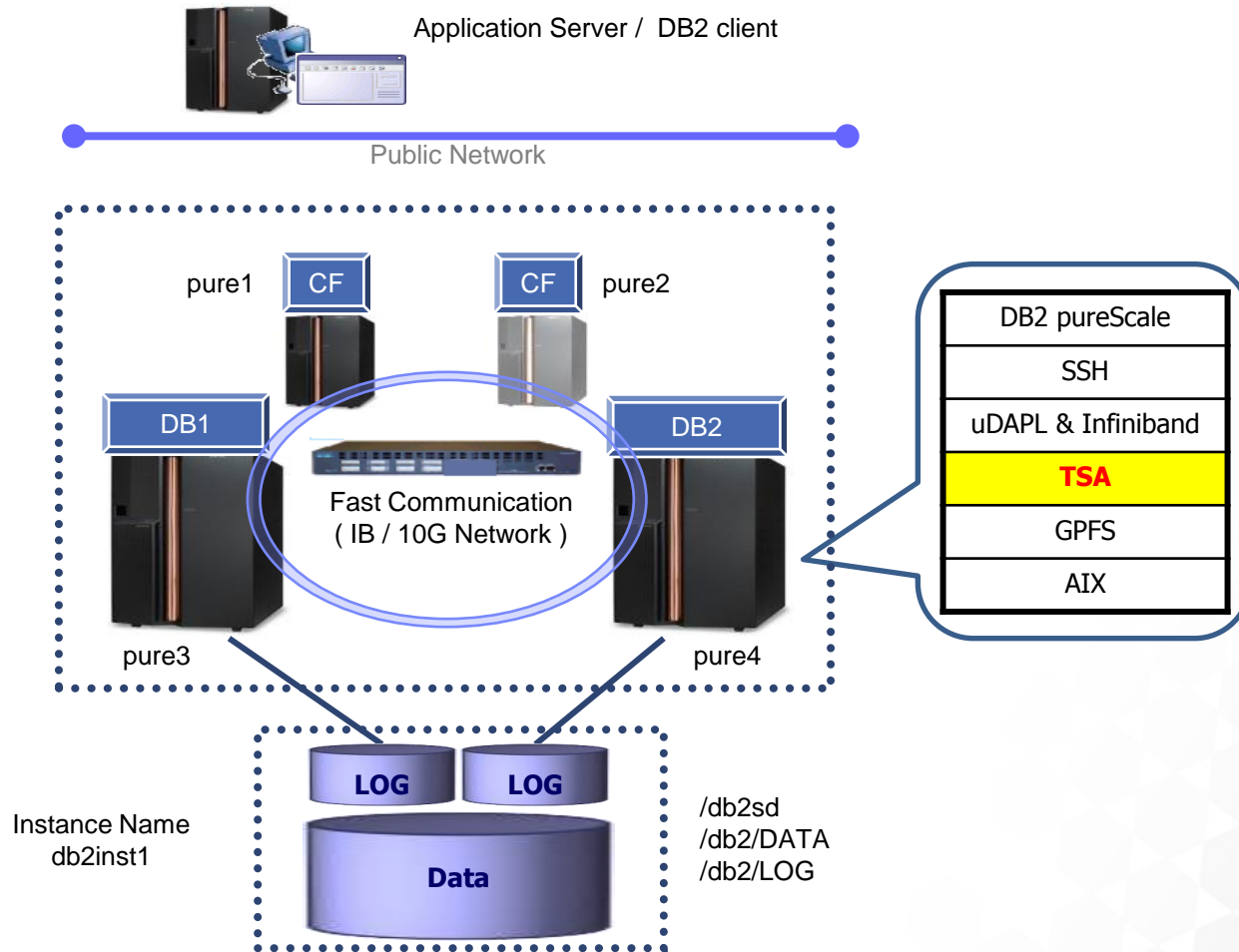
KDUG 기술 세미나

DB2 Tech Talk : pureScale & TSA

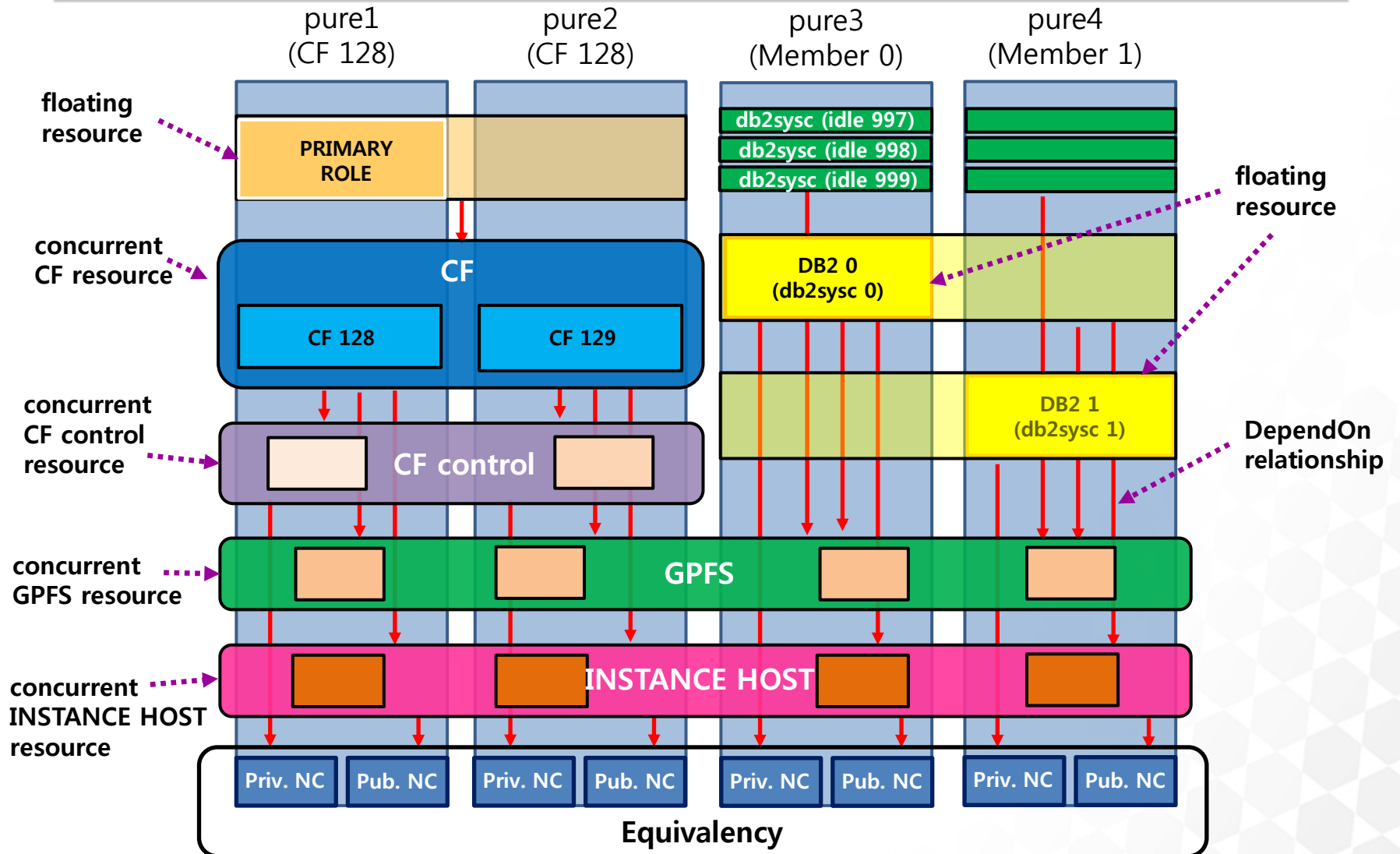
IDOT
송수광

- ❖ TSA Resource Model
- ❖ Issam command
- ❖ ResourceGroup
- ❖ ResourceClass
- ❖ Resource
- ❖ Equivalency
- ❖ RelationShip
- ❖ 예제 (Network down)

DB2 pureScale 구성



TSA Resource Model



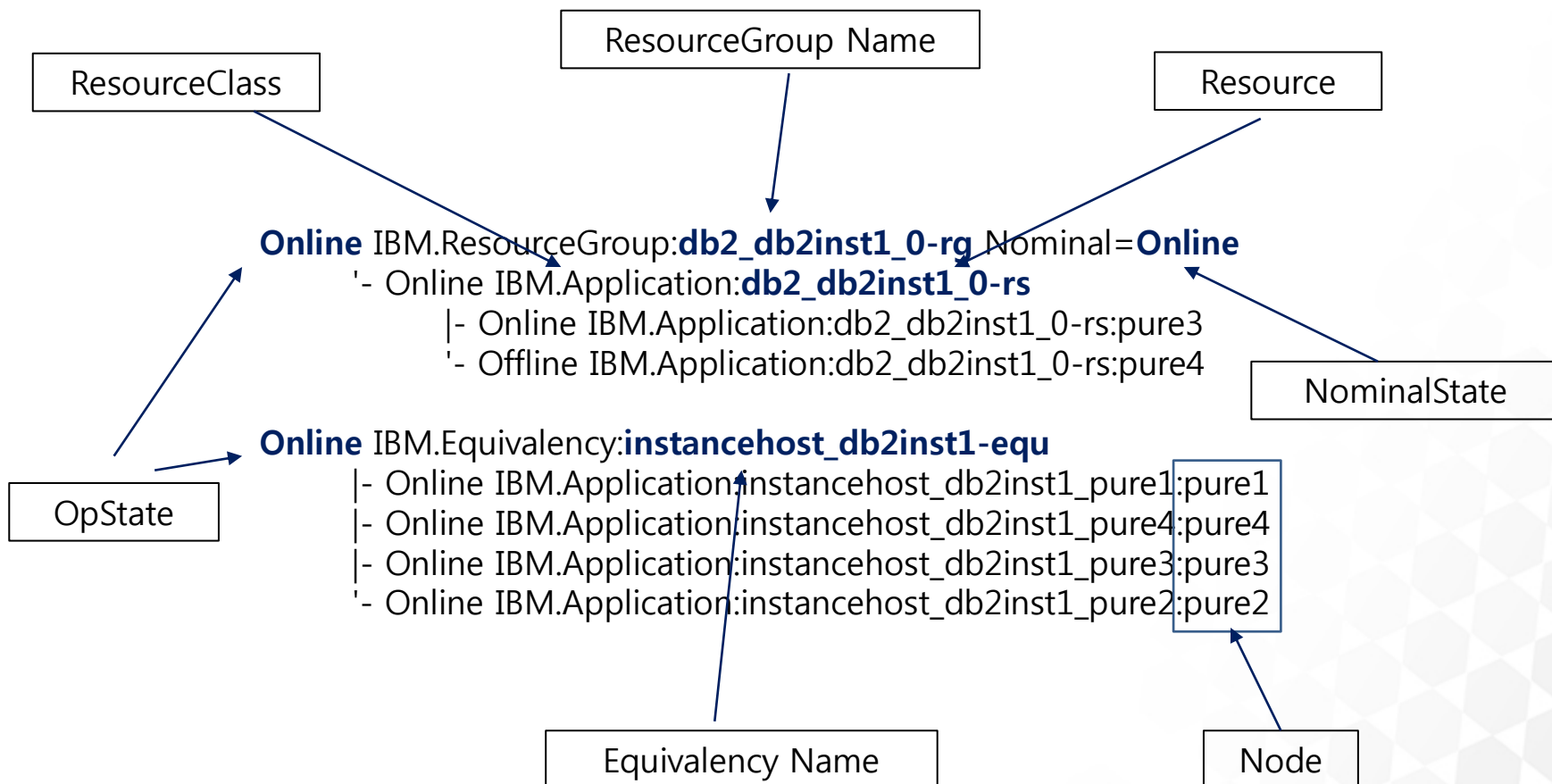
Issam Command



- Lists the defined resource groups and their members in tree format

```
Online IBM.ResourceGroup:ca_db2inst1_0-rg Nominal=Online
  '- Online IBM.Application:ca_db2inst1_0-rs
    |- Online IBM.Application:ca_db2inst1_0-rs:pure1
    '- Online IBM.Application:ca_db2inst1_0-rs:pure2
Online IBM.ResourceGroup:db2_db2inst1_0-rg Nominal=Online
  '- Online IBM.Application:db2_db2inst1_0-rs
    |- Online IBM.Application:db2_db2inst1_0-rs:pure3
    '- Offline IBM.Application:db2_db2inst1_0-rs:pure4
...
Online IBM.ResourceGroup:db2mnt-db2sd-rg Nominal=Online
  '- Online IBM.Application:db2mnt-db2sd-rs
    |- Online IBM.Application:db2mnt-db2sd-rs:pure1
    |- Online IBM.Application:db2mnt-db2sd-rs:pure2
    |- Online IBM.Application:db2mnt-db2sd-rs:pure3
    '- Online IBM.Application:db2mnt-db2sd-rs:pure4
Online IBM.ResourceGroup:idle_db2inst1_997_pure3-rg Nominal=Online
  '- Online IBM.Application:idle_db2inst1_997_pure3-rs
    '- Online IBM.Application:idle_db2inst1_997_pure3-rs:pure3
...
Online IBM.Equivalency:instancehost_db2inst1-equ
  |- Online IBM.Application:instancehost_db2inst1_pure1:pure1
  |- Online IBM.Application:instancehost_db2inst1_pure4:pure4
  |- Online IBM.Application:instancehost_db2inst1_pure3:pure3
  '- Online IBM.Application:instancehost_db2inst1_pure2:pure2
```

Issam Command (cont.)



OpState

- Offline
The resource is not started.
- Pending Online
The resource has been started, but is not yet ready for work
- Online
The resource is ready for work.
- Pending Offline
The resource is in the process of being stopped

Some of the operational states indicate problems:

- Failed Offline
The resource is broken and cannot be used. You have to reset the resource when you have fixed it.
- Stuck Online
The resource was being started, but did not become ready for work within the expected time interval and cannot be brought offline.
Another possibility is that the resource was online, but an offline request could not bring it offline.
- Unknown
System Automation for Multiplatforms is unable to obtain reliable state information from the RMC managing the resource.

ResourceGroup

- Logical containers for a collection of resources
- Container allows you to control multiple resources as a single logical entity

```
Online IBM.ResourceGroup:ca_db2inst1_0-rg Nominal=Online
  '- Online IBM.Application:ca_db2inst1_0-rs
    |- Online IBM.Application:ca_db2inst1_0-rs:pure1
    '- Online IBM.Application:ca_db2inst1_0-rs:pure2
```

```
Name          = ca_db2inst1_0-rg
MemberLocation = None
AllowedNode    = ca_db2inst1_0-rg_group-equ
NominalState   = Online
```


ResourceGroup (cont.)

```
Online IBM.ResourceGroup:db2_db2inst1_0-rg Nominal=Online
  '- Online IBM.Application:db2_db2inst1_0-rs
    |- Online IBM.Application:db2_db2inst1_0-rs:pure3
    '- Offline IBM.Application:db2_db2inst1_0-rs:pure4
```

Name	= db2_db2inst1_0-rg
MemberLocation	= Collocated
AllowedNode	= db2_db2inst1_0-rg_group-equ
NominalState	= Online

```
Online IBM.ResourceGroup:idle_db2inst1_997_pure3-rg Nominal=Online
  '- Online IBM.Application:idle_db2inst1_997_pure3-rs
    '- Online IBM.Application:idle_db2inst1_997_pure3-rs:pure3
```

Name	= idle_db2inst1_997_pure3-rg
MemberLocation	= Collocated
AllowedNode	= idle_db2inst1_997_pure3-rg_group-equ
NominalState	= Online

ResourceGroup (cont.)

- CF 관련 ResourceGroup
 - ca_db2inst1_0-rg
 - primary_db2inst1_900-rg
- Member 관련 ResourceGroup
 - db2_db2inst1_0-rg
 - db2_db2inst1_1-rg
- GPFS 관련 ResourceGroup
 - db2mnt-db2sd-rg
 - db2mnt-db2_DATA-rg
 - db2mnt-db2_LOG-rg
- Member restart light 관련 ResourceGroup
 - idle_db2inst1_997_pure3-rg
 - idle_db2inst1_998_pure3-rg
 - idle_db2inst1_999_pure3-rg
 - idle_db2inst1_997_pure4-rg
 - idle_db2inst1_998_pure4-rg
 - idle_db2inst1_999_pure4-rg

ResourceClass



- Collection of resources of the same type
- Resource classes allow you to define the common characteristics among the resources in its class.

```
Online IBM.ResourceGroup:db2_db2inst1_0-rg Nominal=Online
  '- Online IBM.Application:db2_db2inst1_0-rs
    |- Online IBM.Application:db2_db2inst1_0-rs:pure3
    '- Offline IBM.Application:db2_db2inst1_0-rs:pure4
```

- IBM.Application attribute

Name

ResourceType

StartCommand

StopCommand

MonitorCommand

MonitorCommandPeriod

MonitorCommandTimeout

StartCommandTimeout

StopCommandTimeout

CleanupCommand

CleanupCommandTimeout

NodeNameList

Fixed resource (0)

- Only a single instance within the cluster

Floating resource (1)

- Run on several nodes in the cluster
but **only on one node at a time**

Concurrent resource (2)

- Run on several nodes in the cluster
and **on multiple nodes at a time**

Represents the set of nodes on which the resource can run

ResourceClass (cont.)



Online IBM.Equivalency:db2_public_network_db2inst1_0

- | - Online **IBM.NetworkInterface**:en0:pure3
- ' - Online IBM.NetworkInterface:en0:pure4

Online IBM.Equivalency:db2mnt-db2sd-rg_group-equ

- | - Online **IBM.PeerNode**:pure1:pure1
- | - Online IBM.PeerNode:pure3:pure3
- | - Online IBM.PeerNode:pure4:pure4
- ' - Online IBM.PeerNode:pure2:pure2



Resource

- Any piece of hardware or software that can be defined to TSA

```
Online IBM.ResourceGroup:ca_db2inst1_0-rg Nominal=Online
```

```
'- Online IBM.Application:ca_db2inst1_0-rs  
  |- Online IBM.Application:ca_db2inst1_0-rs:pure1  
  '- Online IBM.Application:ca_db2inst1_0-rs:pure2
```

```
# pure1
```

```
Name = "ca_db2inst1_0-rs"  
ResourceType = 0  
StartCommand = "/home/db2inst1/sqllib/adm/db2rocme 1 CF db2inst1 128 START"  
StopCommand = "/home/db2inst1/sqllib/adm/db2rocme 1 CF db2inst1 128 STOP"  
MonitorCommand = "/home/db2inst1/sqllib/adm/db2rocme 1 CF db2inst1 128 MONITOR"  
CleanupCommand = "/home/db2inst1/sqllib/adm/db2rocme 1 CF db2inst1 128 CLEANUP"  
NodeNameList = {"pure1"}
```

```
Name = "ca_db2inst1_0-rs"  
ResourceType = 2  
StartCommand = "/home/db2inst1/sqllib/adm/db2r  
StopCommand = "/home/db2inst1/sqllib/adm/db2  
MonitorCommand = "/home/db2inst1/sqllib/adm/db  
CleanupCommand = "/home/db2inst1/sqllib/adm/db  
NodeNameList = {"pure1","Unknown_Node_Name"}
```

```
# pure2  
Name = "ca_db2inst1_0-rs"  
ResourceType = 0  
NodeNameList = {"pure2"}  
  
Name = "ca_db2inst1_0-rs"  
ResourceType = 2  
NodeNameList = {"Unknown_Node_Name","pure2"}
```

Resource (cont.)

```
Online IBM.ResourceGroup:db2_db2inst1_0-rg Nominal=Online
  '- Online IBM.Application:db2_db2inst1_0-rs
    | Online IBM.Application:db2_db2inst1_0-rs:pure3
    '- Offline IBM.Application:db2_db2inst1_0-rs:pure4
```

pure3

```
Name          = "db2_db2inst1_0-rs"
ResourceType  = 0
NodeNameList  = {"pure3"}
```

```
Name          = "db2_db2inst1_0-rs"
ResourceType  = 1
NodeNameList  = {"pure3","Unknown_Node_Name"}
```

pure4

```
Name          = "db2_db2inst1_0-rs"
ResourceType  = 0
NodeNameList  = {"pure4"}
```

```
Name          = "db2_db2inst1_0-rs"
ResourceType  = 1
NodeNameList  = {"Unknown_Node_Name","pure4"}
```

Resource (cont.)

```
Online IBM.ResourceGroup:idle_db2inst1_997_pure3-rg Nominal=Online
  '- Online IBM.Application:idle_db2inst1_997_pure3-rs
    '- Online IBM.Application:idle_db2inst1_997_pure3-rs:pure3
```

```
# pure3
Name           = "idle_db2inst1_997_pure3-rs"
ResourceType   = 0
NodeNameList   = {"pure3"}

Name           = "idle_db2inst1_997_pure3-rs"
ResourceType   = 1
NodeNameList   = {"pure3"}
```

Resource (cont.)

- CF 관련 Resource
 - ca_db2inst1_0-rs
 - primary_db2inst1_900-rs
- Member 관련 Resource
 - db2_db2inst1_0-rs
 - db2_db2inst1_1-rs
- GPFS 관련 Resource
 - db2mnt-db2sd-rs
 - db2mnt-db2_DATA-rs
 - db2mnt-db2_LOG-rs
- Member restart light 관련 Resource
 - idle_db2inst1_997_pure3-rs
 - idle_db2inst1_998_pure3-rs
 - idle_db2inst1_999_pure3-rs
 - idle_db2inst1_997_pure4-rs
 - idle_db2inst1_998_pure4-rs
 - idle_db2inst1_999_pure4-rs

Equivalency

- Collection of resources that provides the same functionality

Online IBM.Equivalency:ca_db2inst1_0-rg_group-equ

- |- Online IBM.PeerNode:pure1:pure1
- '- Online IBM.PeerNode:pure2:pure2

Online IBM.Equivalency:db2_db2inst1_0-rg_group-equ

- |- Online IBM.PeerNode:pure3:pure3
- '- Online IBM.PeerNode:pure4:pure4

Online IBM.Equivalency:idle_db2inst1_997_pure3-rg_group-equ

- '- Online IBM.PeerNode:pure3:pure3

Online IBM.Equivalency:instancehost_db2inst1-equ

- |- Online IBM.Application:instancehost_db2inst1_pure1:pure1
- |- Online IBM.Application:instancehost_db2inst1_pure4:pure4
- |- Online IBM.Application:instancehost_db2inst1_pure3:pure3
- '- Online IBM.Application:instancehost_db2inst1_pure2:pure2

Equivalency (cont.)

- CF 관련 Equivalency
 - cacontrol_db2inst1_equ
 - ca_db2inst1_0-rg_group-equ
 - primary_db2inst1_900-rg_group-equ
- Member 관련 Equivalency
 - db2_db2inst1_0-rg_group-equ
 - db2_db2inst1_1-rg_group-equ
- GPFS 관련 Equivalency
 - db2mnt-db2sd-rg_group-equ
 - db2mnt-db2_DATA-rg_group-equ
 - db2mnt-db2_LOG-rg_group-equ
- Member restart light 관련 Equivalency
 - idle_db2inst1_997_pure3-rg_group-equ
 - idle_db2inst1_998_pure3-rg_group-equ
 - idle_db2inst1_999_pure3-rg_group-equ
 - idle_db2inst1_997_pure4-rg_group-equ
 - idle_db2inst1_998_pure4-rg_group-equ
 - idle_db2inst1_999_pure4-rg_group-equ
- Host 및 network 관련
 - db2_public_network_db2inst1_0
 - instancehost_db2inst1-equ

Relationship



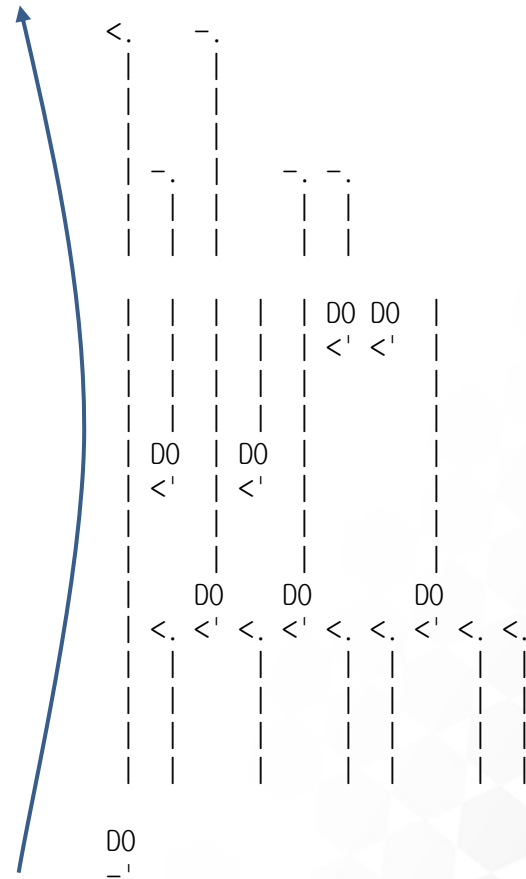
- Start or stop relationships
 - Used to define start and stop dependencies between resources.
StartAfter, StopAfter, **DependsOn**, DependsOnAny, and ForcedDownBy
- Location relationships
 - Applied when resources must, or should if possible, be started on the same or a different node in the cluster
Collocation, AntiCollocation, Affinity, AntiAffinity, and IsStartable

Relationship (cont.)

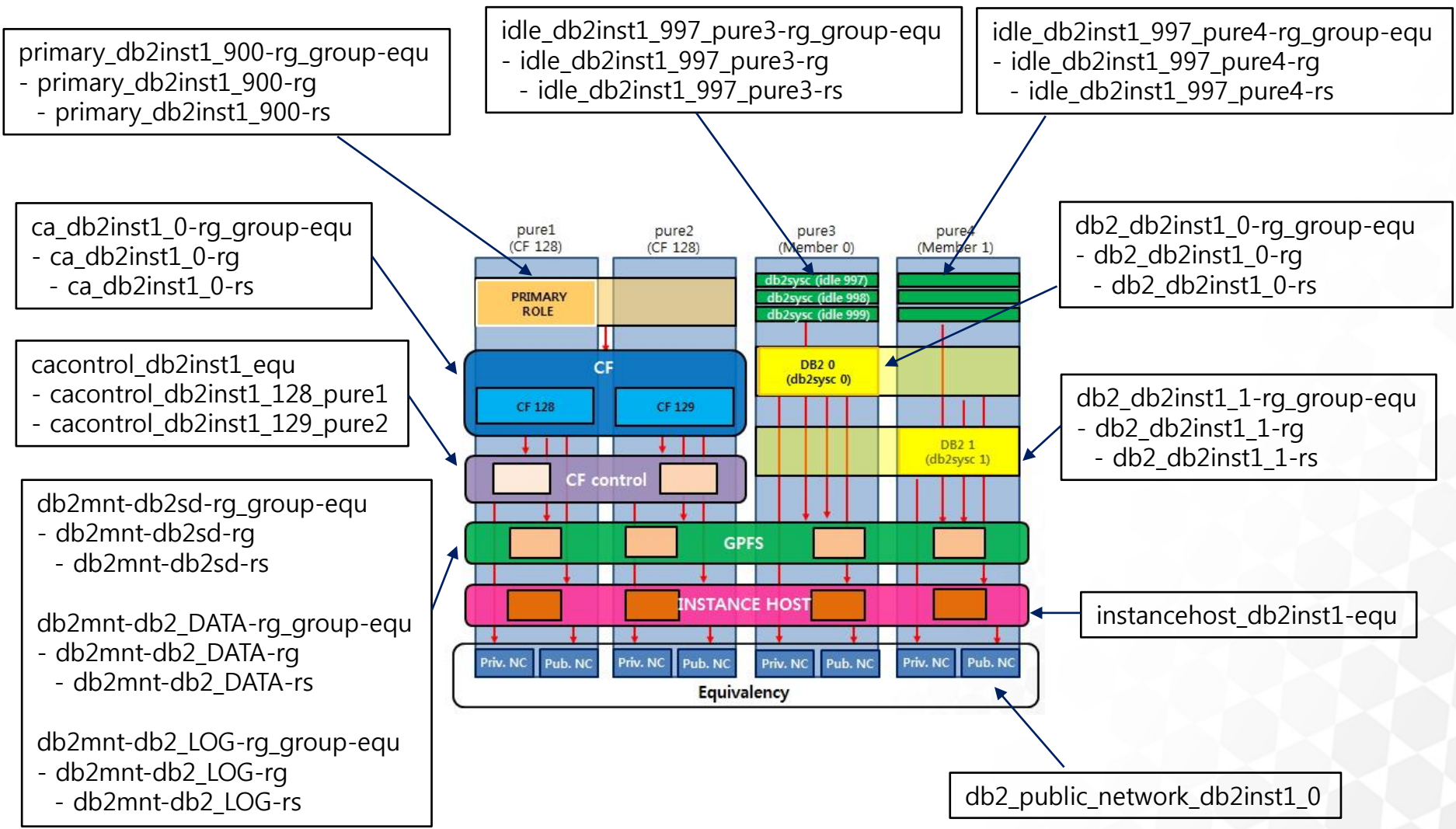
```
# lssam -noequ -V
```

```
Online IBM.ResourceGroup:ca_db2inst1_0-rg Nominal=Online
  '- Online IBM.Application:ca_db2inst1_0-rs
     |- Online IBM.Application:ca_db2inst1_0-rs:pure1
     '- Online IBM.Application:ca_db2inst1_0-rs:pure2
Online IBM.ResourceGroup:db2_db2inst1_0-rg Nominal=Online
  '- Online IBM.Application:db2_db2inst1_0-rs
     |- Online IBM.Application:db2_db2inst1_0-rs:pure3
     '- Offline IBM.Application:db2_db2inst1_0-rs:pure4
...
Online IBM.ResourceGroup:db2mnt-db2_DATA-rg Nominal=Online
  '- Online IBM.Application:db2mnt-db2_DATA-rs
     |- Online IBM.Application:db2mnt-db2_DATA-rs:pure3
     '- Online IBM.Application:db2mnt-db2_DATA-rs:pure4
Online IBM.ResourceGroup:db2mnt-db2_LOG-rg Nominal=Online
  '- Online IBM.Application:db2mnt-db2_LOG-rs
     |- Online IBM.Application:db2mnt-db2_LOG-rs:pure3
     '- Online IBM.Application:db2mnt-db2_LOG-rs:pure4
Online IBM.ResourceGroup:db2mnt-db2sd-rg Nominal=Online
  '- Online IBM.Application:db2mnt-db2sd-rs
     |- Online IBM.Application:db2mnt-db2sd-rs:pure1
     |- Online IBM.Application:db2mnt-db2sd-rs:pure2
     |- Online IBM.Application:db2mnt-db2sd-rs:pure3
     '- Online IBM.Application:db2mnt-db2sd-rs:pure4
...
Online IBM.ResourceGroup:primary_db2inst1_900-rg Nominal=Online
  '- Online IBM.Application:primary_db2inst1_900-rs
     |- Online IBM.Application:primary_db2inst1_900-rs:pure1
     '- Offline IBM.Application:primary_db2inst1_900-rs:pure2
```

DO
(DependsOn)



TSA Resource Model (cont.)



예제 (Network down)

- db2instance -list (정상 상태인 경우)

MEMBER & CF state

ID	TYPE	STATE	HOME_HOST	CURRENT_HOST	ALERT	PARTITION_NUMBER	LOGICAL_PORT	NETNAME
0	MEMBER	STARTED	pure3	pure3	NO	0	0	pure3-ib
1	MEMBER	STARTED	pure4	pure4	NO	0	0	pure4-ib
128	CF	PRIMARY	pure1	pure1	NO	-	0	pure1-ib
129	CF	PEER	pure2	pure2	NO	-	0	pure2-ib

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
pure2	ACTIVE	NO	NO
pure1	ACTIVE	NO	NO
pure4	ACTIVE	NO	NO
pure3	ACTIVE	NO	NO

HOST state

예제 (cont.)

- db2instance -list (장애가 발생한 경우)

MEMBER & CF state

ID	TYPE	STATE	HOME_HOST	CURRENT_HOST	ALERT	PARTITION_NUMBER	LOGICAL_PORT	NETNAME
0	MEMBER	WAITING_FOR_FAILBACK	pure3	pure4	YES	0	1	pure4-ib
1	MEMBER	STARTED	pure4	pure4	YES	0	0	pure4-ib
128	CF	PRIMARY	pure1	pure1	NO	-	0	pure1-ib
129	CF	PEER	pure2	pure2	NO	-	0	pure2-ib

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
pure2	ACTIVE	NO	NO
pure1	ACTIVE	NO	NO
pure4	ACTIVE	NO	NO
pure3	ACTIVE	YES	YES

HOST state

예제 (cont.)

Online IBM.ResourceGroup:db2_db2inst1_0-rg Control=MemberInProblemState Nominal=Online
'- Online IBM.Application:db2_db2inst1_0-rs Control=MemberInProblemState

| - Failed offline IBM.Application:db2_db2inst1_0-rs:pure3
'- Online IBM.Application:db2_db2inst1_0-rs:pure4

Online IBM.ResourceGroup:db2_db2inst1_1-rg Control=MemberInProblemState Nominal=Online
'- Online IBM.Application:db2_db2inst1_1-rs Control=MemberInProblemState

| - Failed offline IBM.Application:db2_db2inst1_1-rs:pure3
'- Online IBM.Application:db2_db2inst1_1-rs:pure4

Online IBM.ResourceGroup:db2mnt-db2_DATA-rg Control=MemberInProblemState Nominal=Online
'- Online IBM.Application:db2mnt-db2_DATA-rs Control=MemberInProblemState

| - Failed offline IBM.Application:db2mnt-db2_DATA-rs:pure3
'- Online IBM.Application:db2mnt-db2_DATA-rs:pure4

Online IBM.ResourceGroup:db2mnt-db2_LOG-rg Control=MemberInProblemState Nominal=Online
'- Online IBM.Application:db2mnt-db2_LOG-rs Control=MemberInProblemState

| - Failed offline IBM.Application:db2mnt-db2_LOG-rs:pure3
'- Online IBM.Application:db2mnt-db2_LOG-rs:pure4

Online IBM.ResourceGroup:db2mnt-db2sd-rg Control=MemberInProblemState Nominal=Online
'- Online IBM.Application:db2mnt-db2sd-rs Control=MemberInProblemState

| - Online IBM.Application:db2mnt-db2sd-rs:pure1
| - Online IBM.Application:db2mnt-db2sd-rs:pure2
| - Failed offline IBM.Application:db2mnt-db2sd-rs:pure3
'- Online IBM.Application:db2mnt-db2sd-rs:pure4

예제 (cont.)



```
Failed offline IBM.ResourceGroup:idle_db2inst1_997_pure3-rg Control=MemberInProblemState Nominal=Online
'- Failed offline IBM.Application:idle_db2inst1_997_pure3-rs
  '- Failed offline IBM.Application:idle_db2inst1_997_pure3-rs:pure3
Failed offline IBM.ResourceGroup:idle_db2inst1_998_pure3-rg Binding=Sacrificed Nominal=Online
'- Offline IBM.Application:idle_db2inst1_998_pure3-rs
  '- Offline IBM.Application:idle_db2inst1_998_pure3-rs:pure3
Failed offline IBM.ResourceGroup:idle_db2inst1_999_pure3-rg Binding=Sacrificed Nominal=Online
'- Offline IBM.Application:idle_db2inst1_999_pure3-rs
  '- Offline IBM.Application:idle_db2inst1_999_pure3-rs:pure3
```

```
Online IBM.Equivalency:db2_public_network_db2inst1_0
|- Offline IBM.NetworkInterface:en0:pure3
'- Online IBM.NetworkInterface:en0:pure4
```

```
Online IBM.Equivalency:instancehost_db2inst1-equ
|- Online IBM.Application:instancehost_db2inst1_pure1:pure1
|- Online IBM.Application:instancehost_db2inst1_pure4:pure4
|- Offline IBM.Application:instancehost_db2inst1_pure3:pure3
'- Online IBM.Application:instancehost_db2inst1_pure2:pure2
```

예제 (cont.)

```
# pure3
db2inst1 7733562 3866798 0 02:51:40 - 0:07 db2sysc 0
db2inst1 8847742 7471438 0 02:51:38 - 0:01 db2sysc (idle 997)
db2inst1 6422578 4587934 0 May 07 - 0:40 db2sysc (idle 998)
db2inst1 9371862 9044398 0 May 07 - 0:40 db2sysc (idle 999)

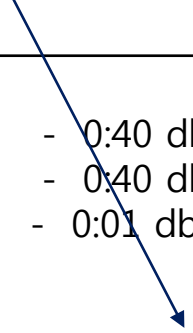
# pure4
db2inst1 7798792 7143434 0 May 07 - 12:52 db2sysc 1
db2inst1 5046560 14155936 0 Apr 29 - 1:21 db2sysc (idle 998)
db2inst1 13959526 14811630 0 Apr 29 - 1:21 db2sysc (idle 997)
db2inst1 17891752 5767238 0 02:51:40 - 0:01 db2sysc (idle 999)
```

정상 상태

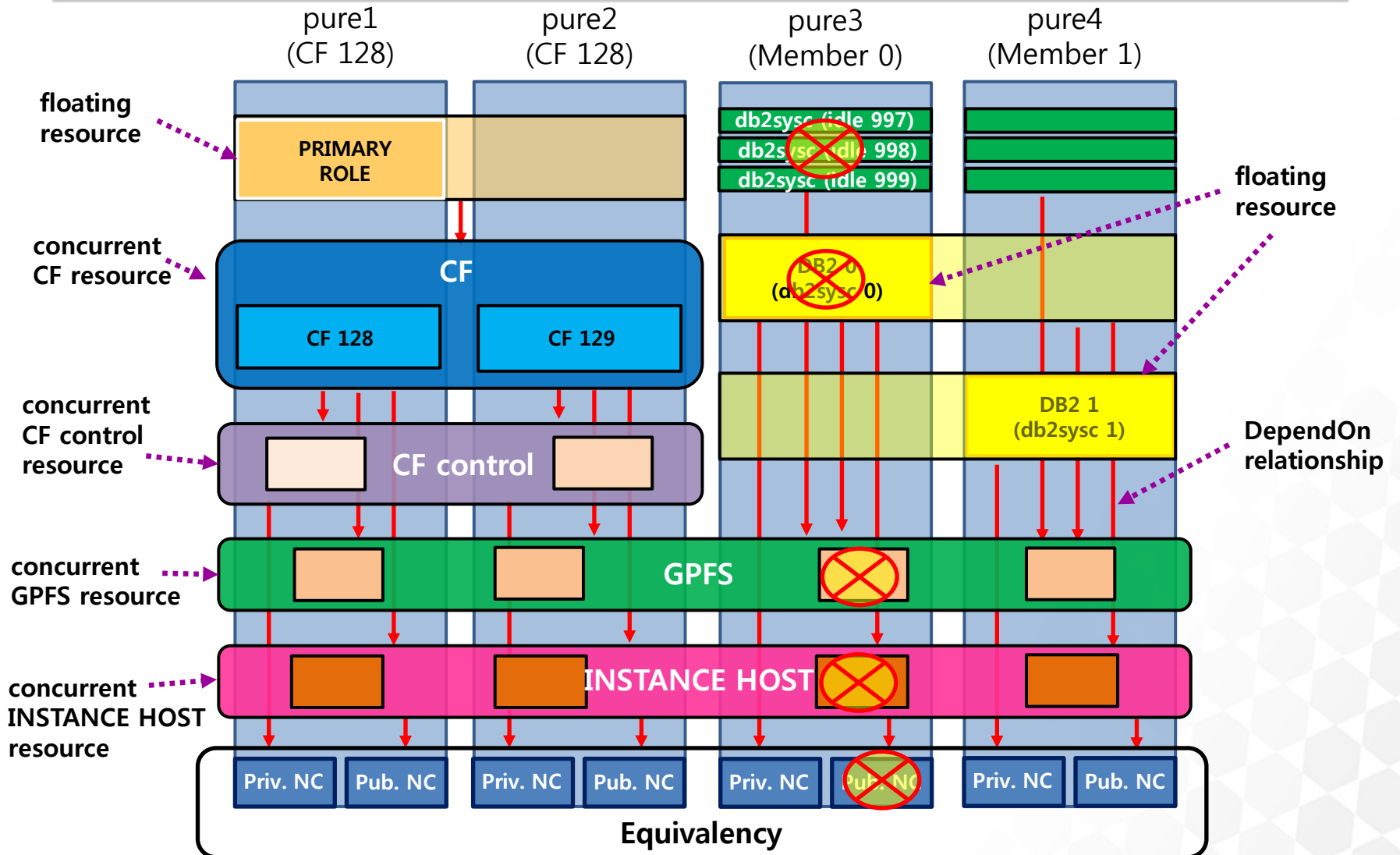
장애 발생 시

```
# pure3
db2inst1 6422578 4587934 0 May 07 - 0:40 db2sysc (idle 998)
db2inst1 9371862 9044398 0 May 07 - 0:40 db2sysc (idle 999)
db2inst1 8847742 7471438 0 02:51:38 - 0:01 db2sysc (idle 997)

# pure4
db2inst1 17891752 5767238 0 02:51:40 - 0:01 db2sysc 0
db2inst1 7798792 7143434 0 May 07 - 12:52 db2sysc 1
db2inst1 13959526 14811630 0 Apr 29 - 1:21 db2sysc (idle 997)
db2inst1 5046560 14155936 0 Apr 29 - 1:21 db2sysc (idle 998)
```



예제 (cont.)



Q & A





Thank you