



Getting started with DB2

IBM Information Management Cloud Computing Center of Competence
IBM Canada Labs

Agenda

- **DB2 server editions, clients and drivers**
- **DB2 Express-C overview**
- **The DB2 Command Line Processor (demo)**
- **The DB2 Environment**
- **Configuring DB2**
- **Working with scripts**
- **Connecting to a DB2 server**
- **Data movement utilities**

Supporting reading material & videos

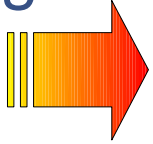
- **Reading materials**

- Getting started with DB2 Express-C eBook
 - Chapter 1: What is DB2 Express-C?
 - Chapter 3: DB2 installation
 - Chapter 4: DB2 Environment
 - Chapter 5, section 5.10: Scripting
 - Chapter 6, section 6.3: DB2 Storage Model
 - Chapter 7: DB2 Client connectivity
 - Chapter 9: Data movement utilities

- **Videos**

- db2university.com course AA001EN
 - Lesson 2: Getting started with DB2
 - Lesson 4: Working with scripts
 - Lesson 5: Connecting to a DB2 server

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DB2 server editions

DB2 Express-C

DB2 server editions

DB2 Express-C

+ Extra
functionality

DB2 server editions

DB2 Express Edition

DB2 Express-C

DB2 server editions

DB2 Express Edition

DB2 Express-C

+ Extra
functionality

DB2 server editions

DB2 Workgroup Edition

DB2 Express Edition

DB2 Express-C

DB2 server editions

DB2 Workgroup Edition

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+ Extra
functionality

DB2 server editions

DB2 Enterprise Edition

DB2 Workgroup Edition

DB2 Express Edition

DB2 Express-C

DB2 server editions

DB2 Enterprise Edition

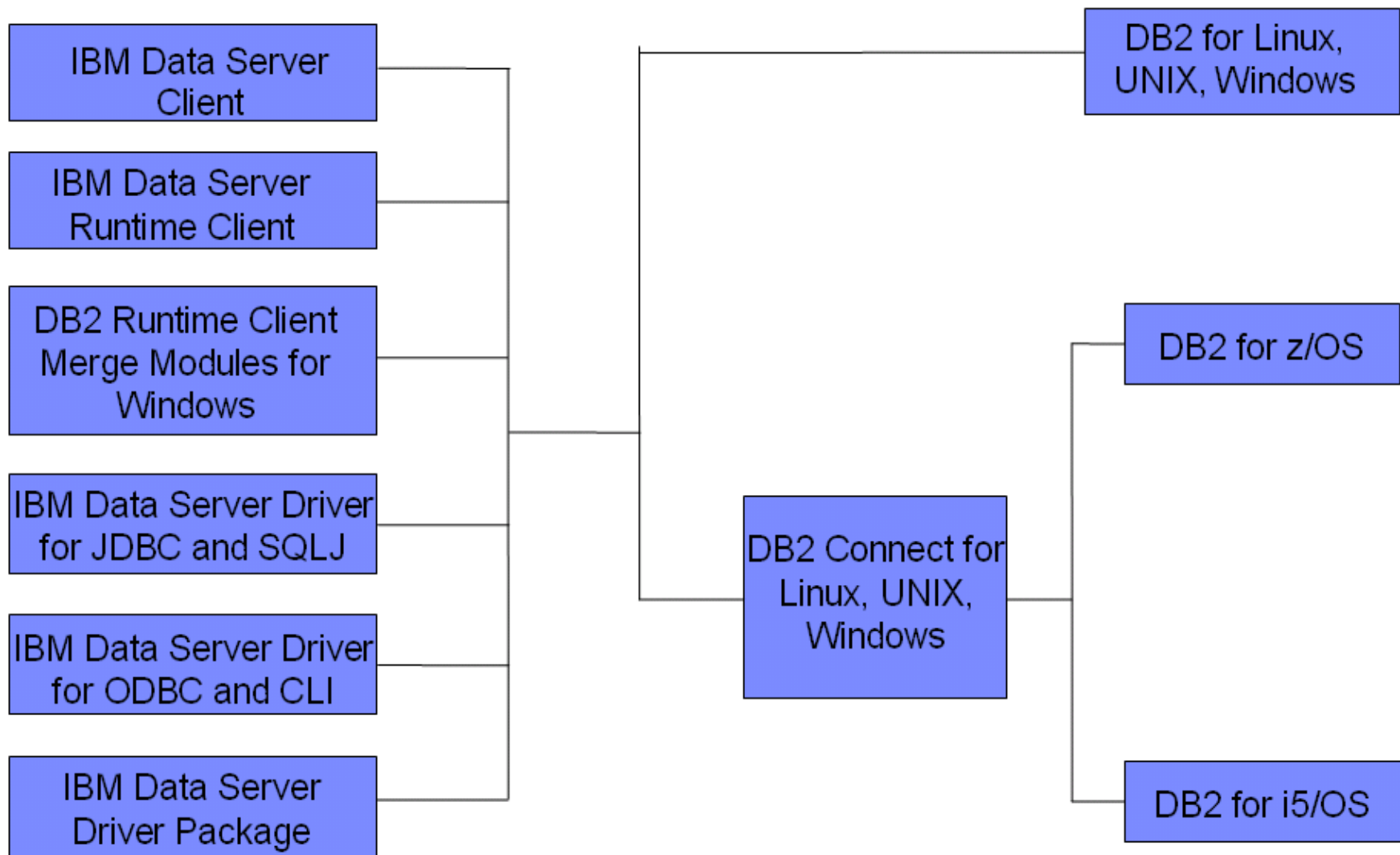
DB2 Workgroup Edition

DB2 Express Edition

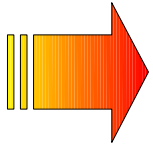
DB2 Express-C

Latest version for DB2 on Linux, UNIX and Windows is DB2 9.7

DB2 clients and drivers



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What is DB2 Express-C?

- **Free version of DB2 database server**
- **The “C” in the name stands for “Community”**
- **Free to develop, deploy, and distribute...no limits!**
 - NO user limit
 - NO DB2 instance limits
 - NO database size limit

Where can DB2 Express-C run?

- **Windows**

- Windows workstation platforms (XP, Vista, Windows 7)
- Windows server platforms (2003, 2008)

- **Linux**

- Red Hat, Suse, Ubuntu and more

- **Mac OS X (beta)**

- **Solaris**

- **Supported on 32-bit and 64-bit systems**

What are DB2 Express-C requirements?

- **Minimum requirements**

- Memory:
 - 256MB, 512MB (DB2 GUI tools), 1GB (recommended)
- Disk:
 - Depends on number and size of databases to create
 - On Linux, 2GB on /tmp is recommended

- **Maximum requirements:**

- System of any size
- Uses at most 2 cores and 2 GB of RAM

Downloading DB2 Express-C: ibm.com/db2/express

United States [change]

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Information Management > Data Management > DB2 Product Family > DB2 for Linux, Unix and Windows >

DB2 Express-C

Free to develop, free to deploy, free to distribute

Free Database! New Version!
→ Download v9.7

Get Help on the Online Forum
→ Learn more

Highlights

- Get Support and Extra Features
- FREE Book: Getting Started with DB2 Express-C
- Videos: Learn DB2 Express-C in one day
- Free Tool: Administer DB2 with Data Studio
- ChannelDB2 Community
- PlanetDB2 Blogs

Related links

- DB2 Application Development
- developerWorks DB2
- IDUG worldwide community
- DB2 Information Center

DB2 Express-C

- Full-function relational and [XML](#) data server
- Simple, [flexible](#), powerful, and reliable
- [Download](#) and deploy at no charge
- [Support](#) available for added peace-of-mind

Next steps

DB2 on Amazon Cloud

Video demos can be found in: db2university.com

Installing DB2 Express-C (Demo)

DB2 Setup Launchpad

Welcome

Release Information

Installation Requirements

Upgrade Information

► **Install a Product**

Exit

Install a Product



Click Install New to launch the DB2 Setup wizard for the desired product and to install the product to a new location. If you want to update, upgrade, or add features to an existing product, click Work with Existing. You can also launch other product installations by clicking Install for the corresponding product.

DB2 Express-C Version 9.7

DB2 Express-C contains a full-function DB2 data server, which provides an entry-level product for the Small and Medium Business (SMB) market. It comes with simplified packaging, and is easy to transparently install from within an application. It is available on Linux and Windows platforms, is fully compatible with, scalable to, and has all the autonomic manageability features of its higher priced family of offerings.

DB2 Express-C comes with pureXML(TM) data storage capabilities and delivers flexible access to XML data using XQuery, XPath and SQL. It is optimized for powering Web Services, Web 2.0, and SOA based solutions. If you require IBM support and maintenance subscription for this no-charge data server, you can purchase DB2 Express-C with renewable 12 Months Subscription. For more information, see <http://www.ibm.com/db2/express>.

Install New

Work with Existing

Database Management and Application Development Tools

A suite of GUI tools for managing DB2 for Linux, UNIX, and Windows data and data-centric applications is available to install. Individually these tools provide powerful capabilities that target specific data management roles and tasks; more importantly, the components interoperate seamlessly, enabling cross-role collaboration, productivity, and effectiveness.

IBM

Video demos can be found in: db2university.com

DB2 First Steps & SAMPLE database (Demo)



First Steps for DB2 Database for Linux, UNIX, and Windows



Welcome to First Steps for DB2 for Linux, UNIX, and Windows. First Steps directs you to the tasks that you should perform after you install the DB2 product.

Check for news about Product Updates.

[Start Check for Product Updates](#)

Select the option which best describes your situation to be directed to information most relevant to you:

- You are new to DB2, and you want to learn more about the product.

Create the SAMPLE database



[Create SAMPLE database](#)

Create your own database.



[Create new database](#)

- Access product information.



[New to DB2 data server products](#)

- You are upgrading from a previous version of DB2, and you want to learn about the enhancements in the new release and how you can take advantage of them.

- Access product information.



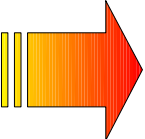
[Upgrading from a previous version](#)

**To start DB2 First Steps,
use the command:**

db2fs

Video demos can be found in: db2university.com

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- DB2 Express-C overview
-  ▪ **The DB2 Command Line Processor (demo)**
- The DB2 Environment
- Configuring DB2
- Working with scripts
- Connecting to a DB2 server
- Data movement utilities

DB2 Command Line Processor / DB2 Command Window

The screenshot shows two overlapping windows. The top window, titled 'DB2 CLP - DB2COPY1', displays the directory path 'C:\Program Files\IBM\SQLLIB\BIN>'. The bottom window, titled 'DB2 CLP - DB2COPY1 - db2', shows the command 'db2' being executed. The output text includes copyright information for IBM Corporation (1993, 2007) and DB2 Client 9.7.2. It provides instructions on how to use the command prompt, including examples for connecting to a sample database and binding a sample bundle. It also lists keywords for the CATALOG DATABASE command and explains how to exit interactive mode or list command options. The prompt 'db2 => _' is visible at the bottom left.

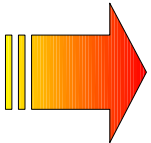
DB2 Command Window
(For Linux it would be the Linux shell)

DB2 Command Line Processor (CLP)

Video demos can be found in: db2university.com

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- The DB2 Command Line Processor (demo)

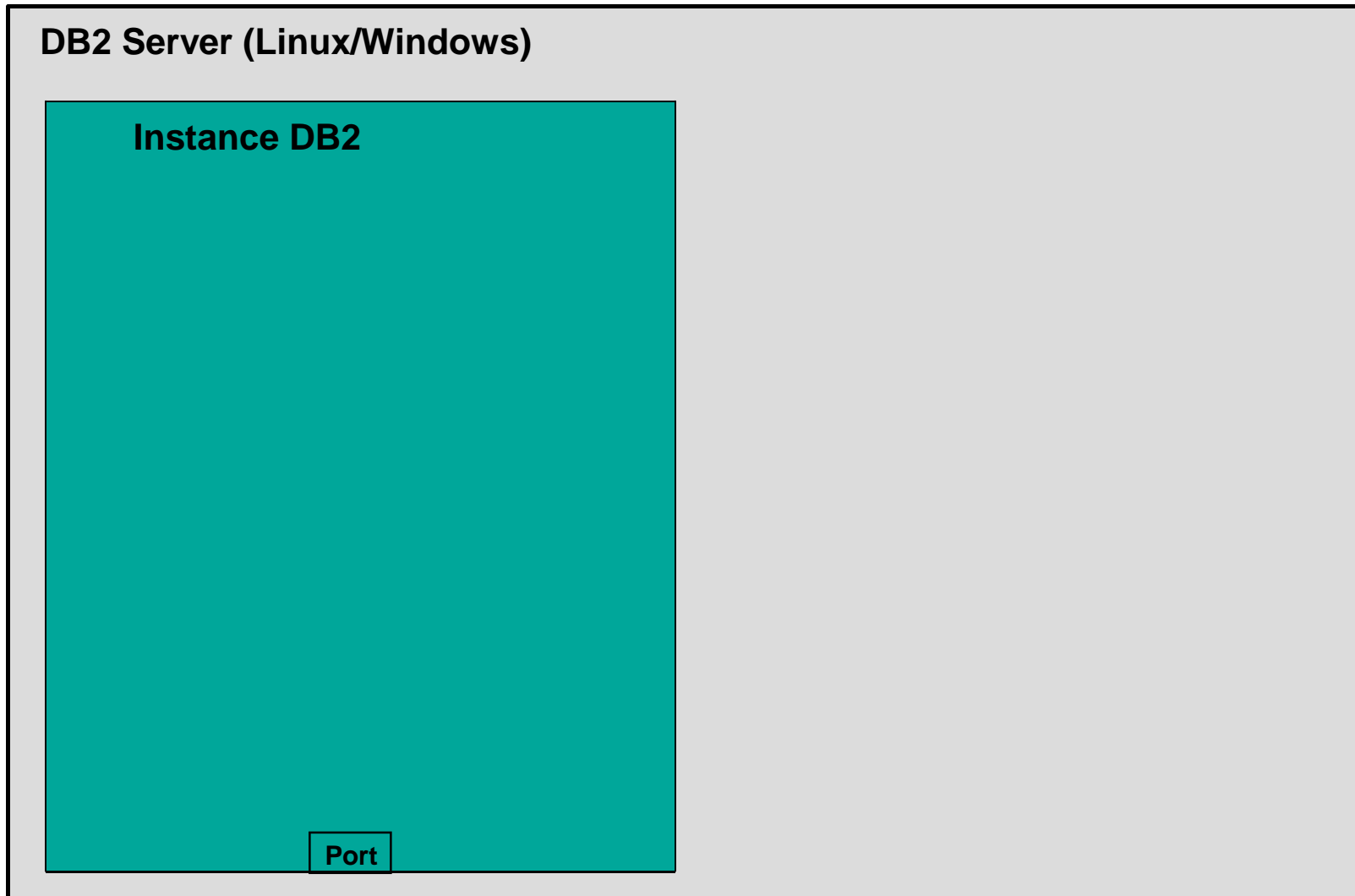


- **The DB2 Environment**
- Configuring DB2
- Working with scripts
- Connecting to a DB2 server
- Data movement utilities

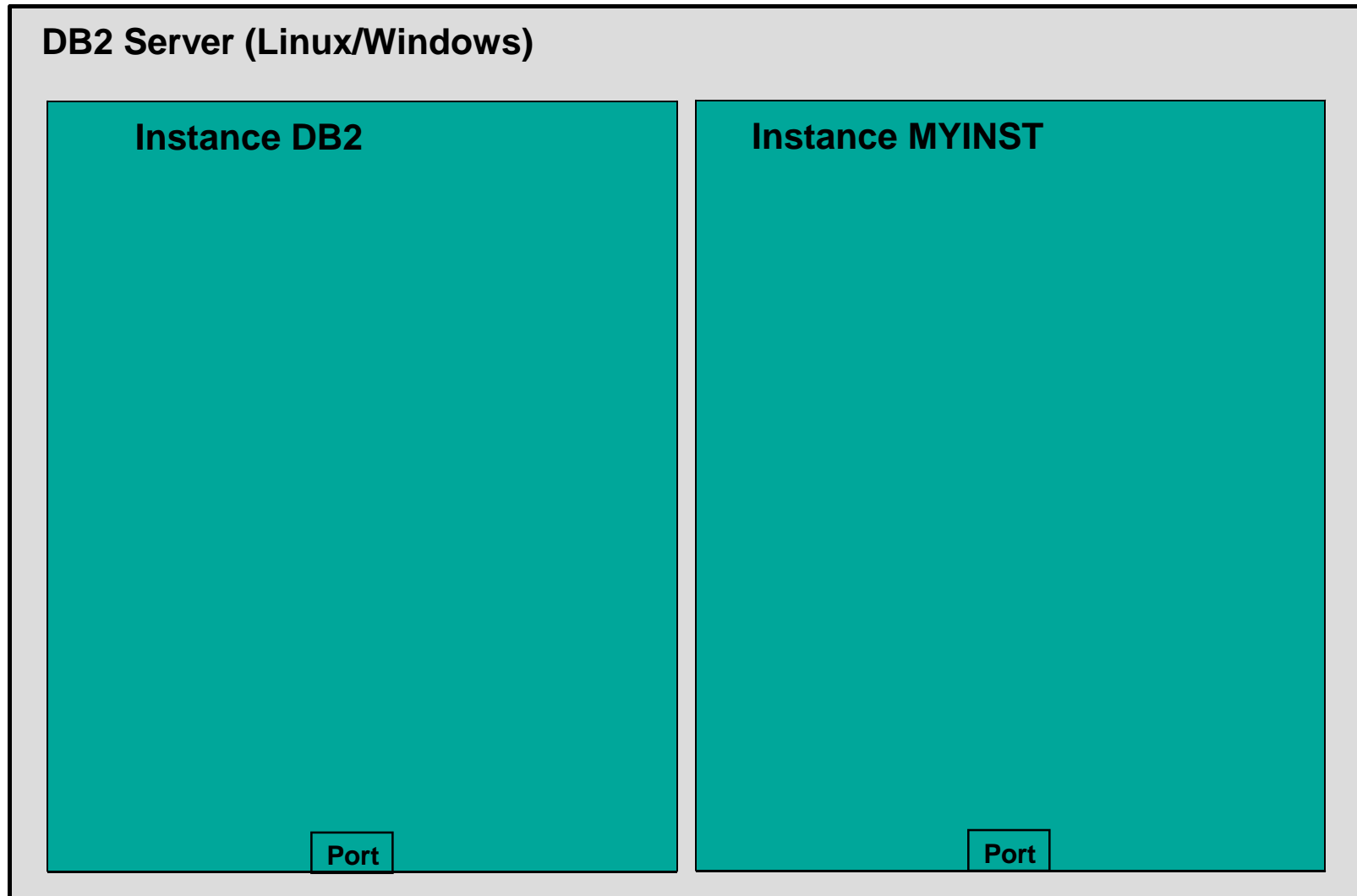
The DB2 environment

DB2 Server (Linux/Windows)

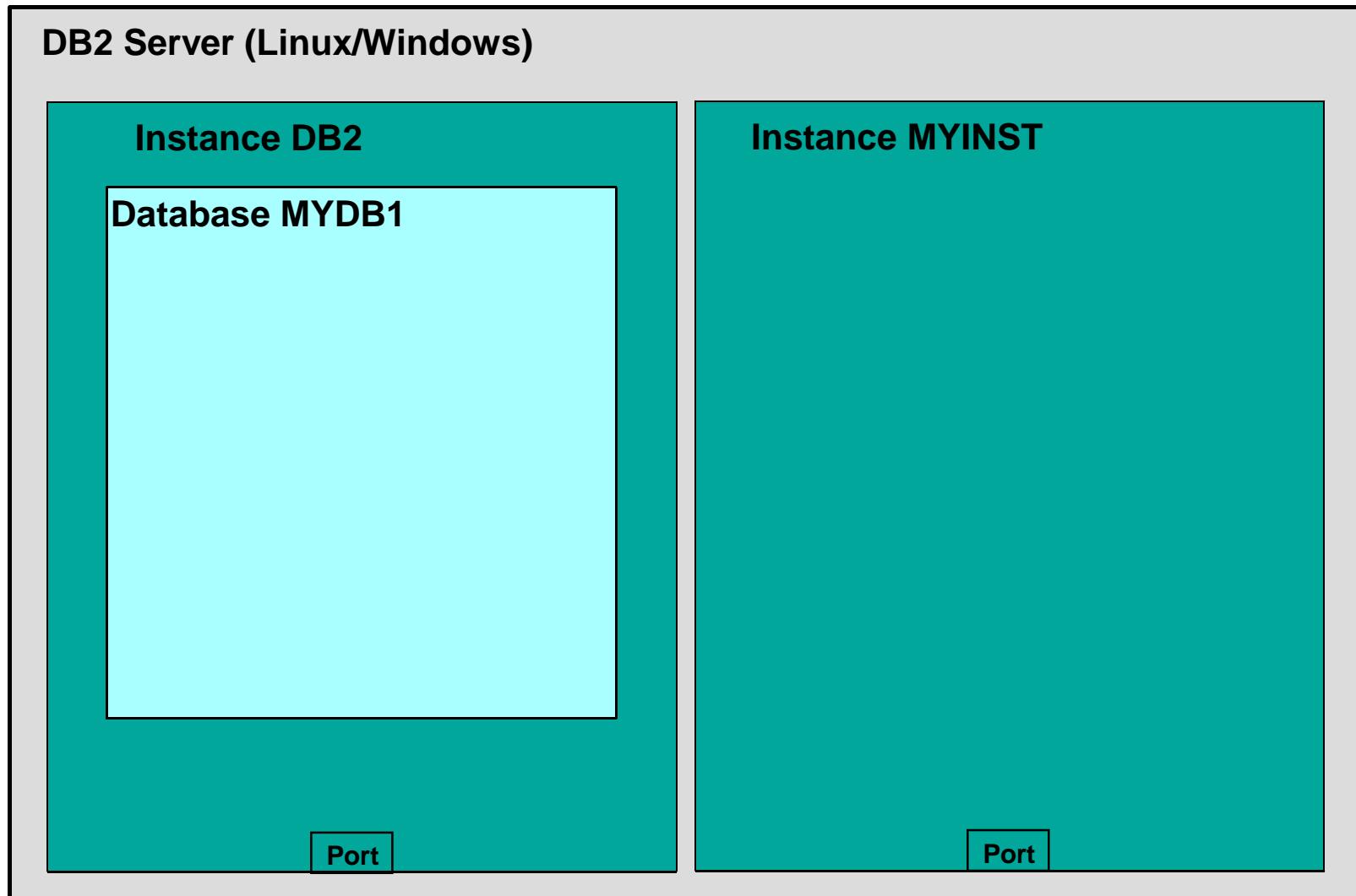
The DB2 environment



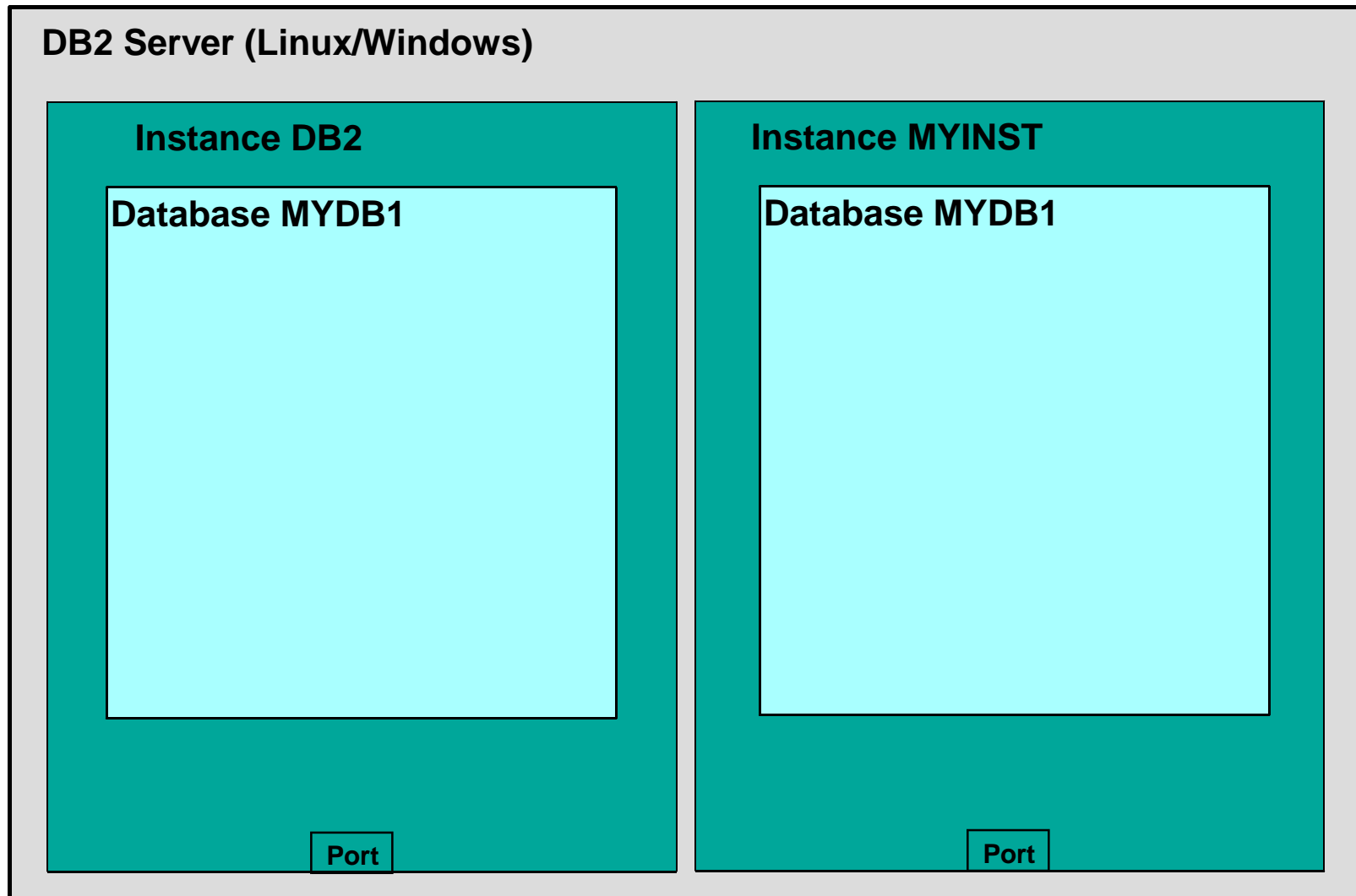
The DB2 environment



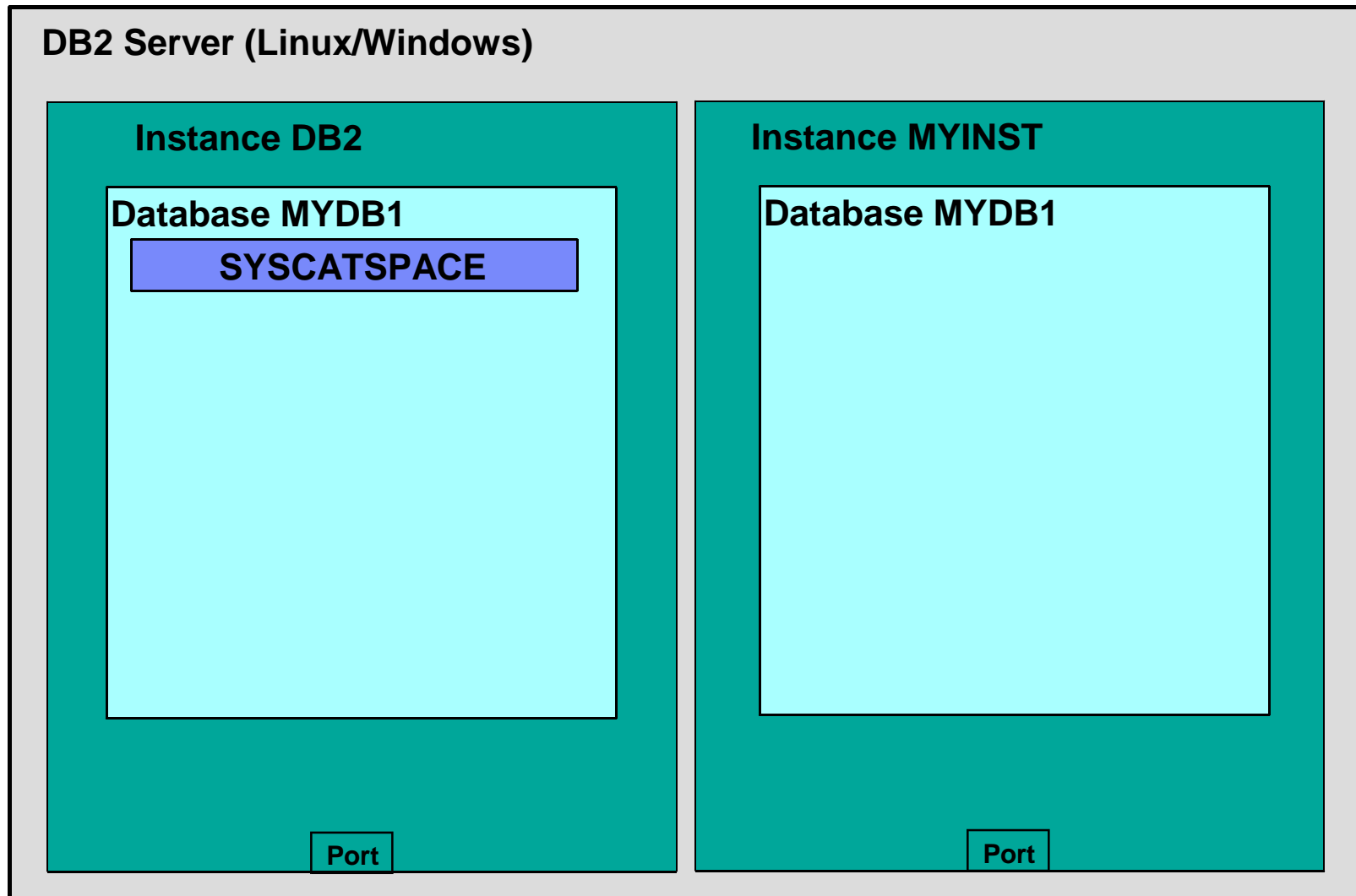
The DB2 environment



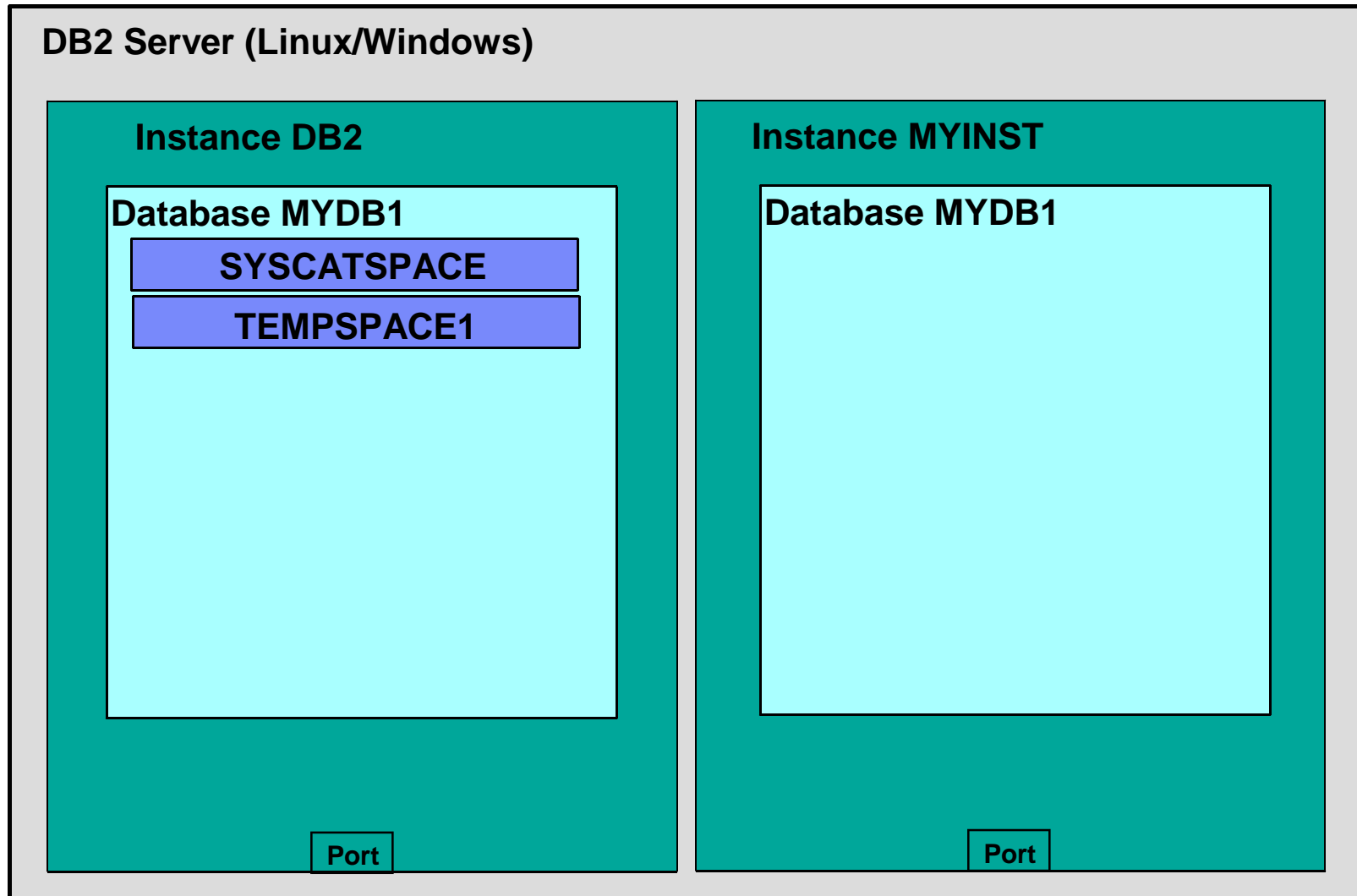
The DB2 environment



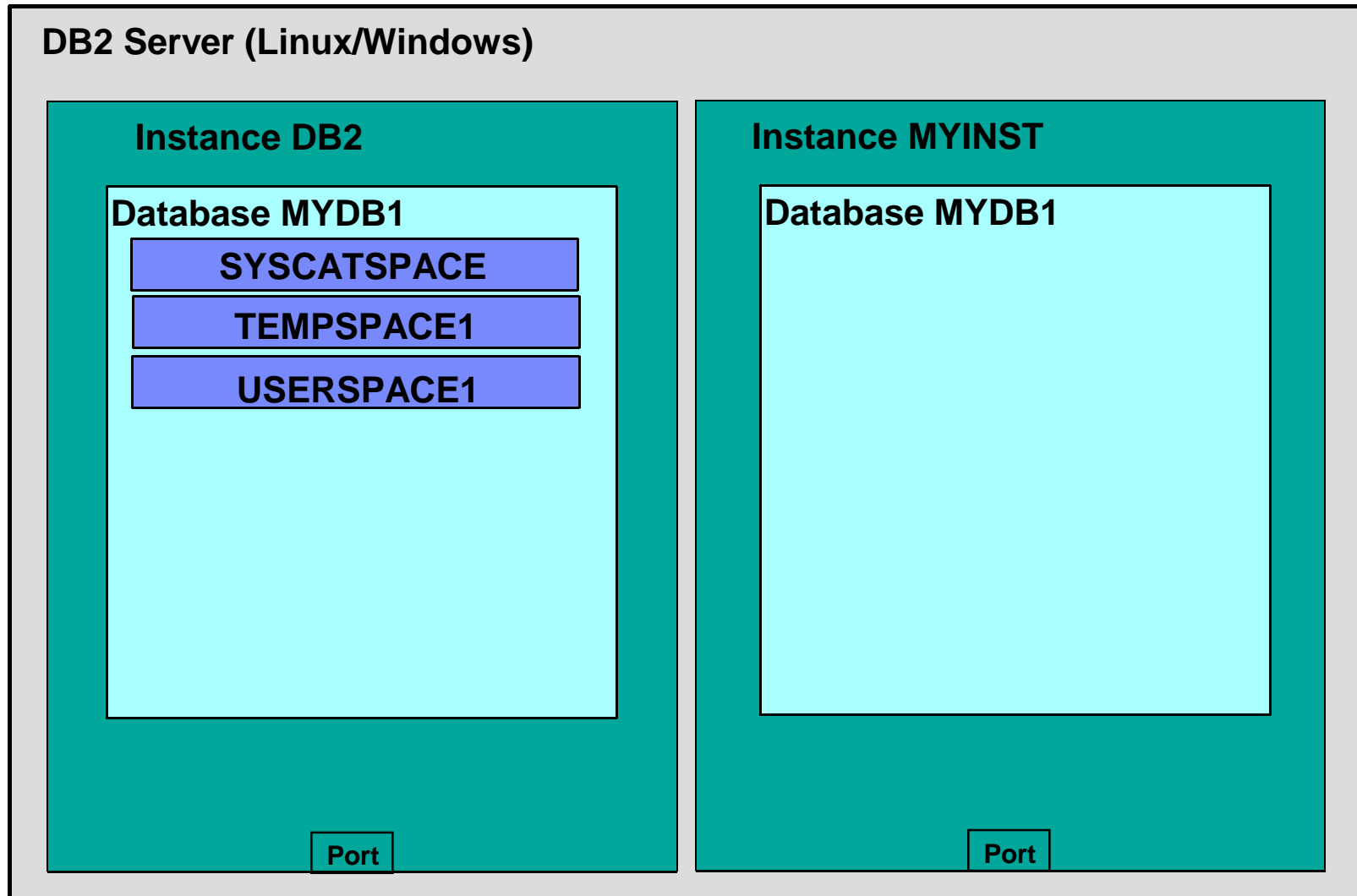
The DB2 environment



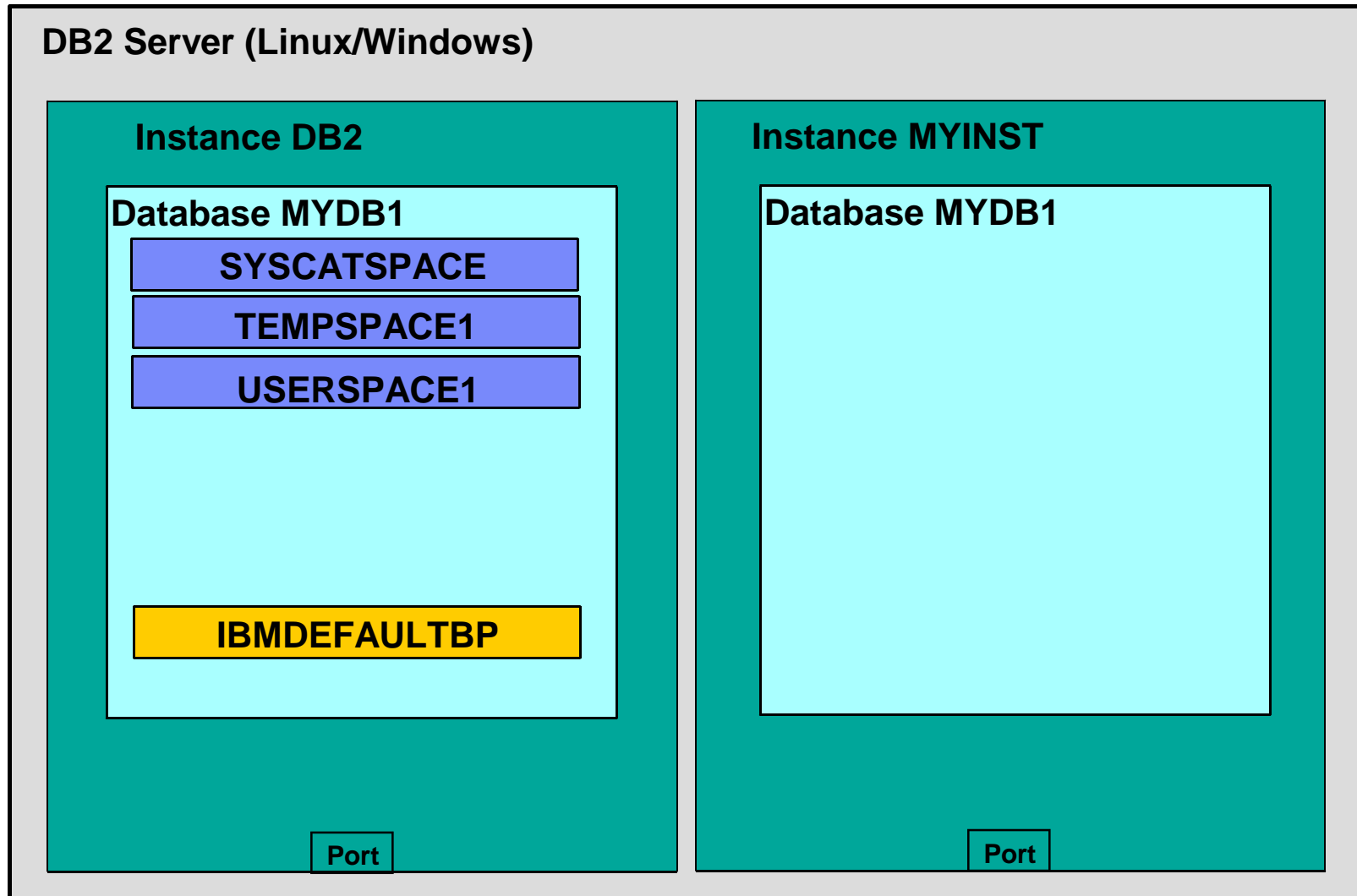
The DB2 environment



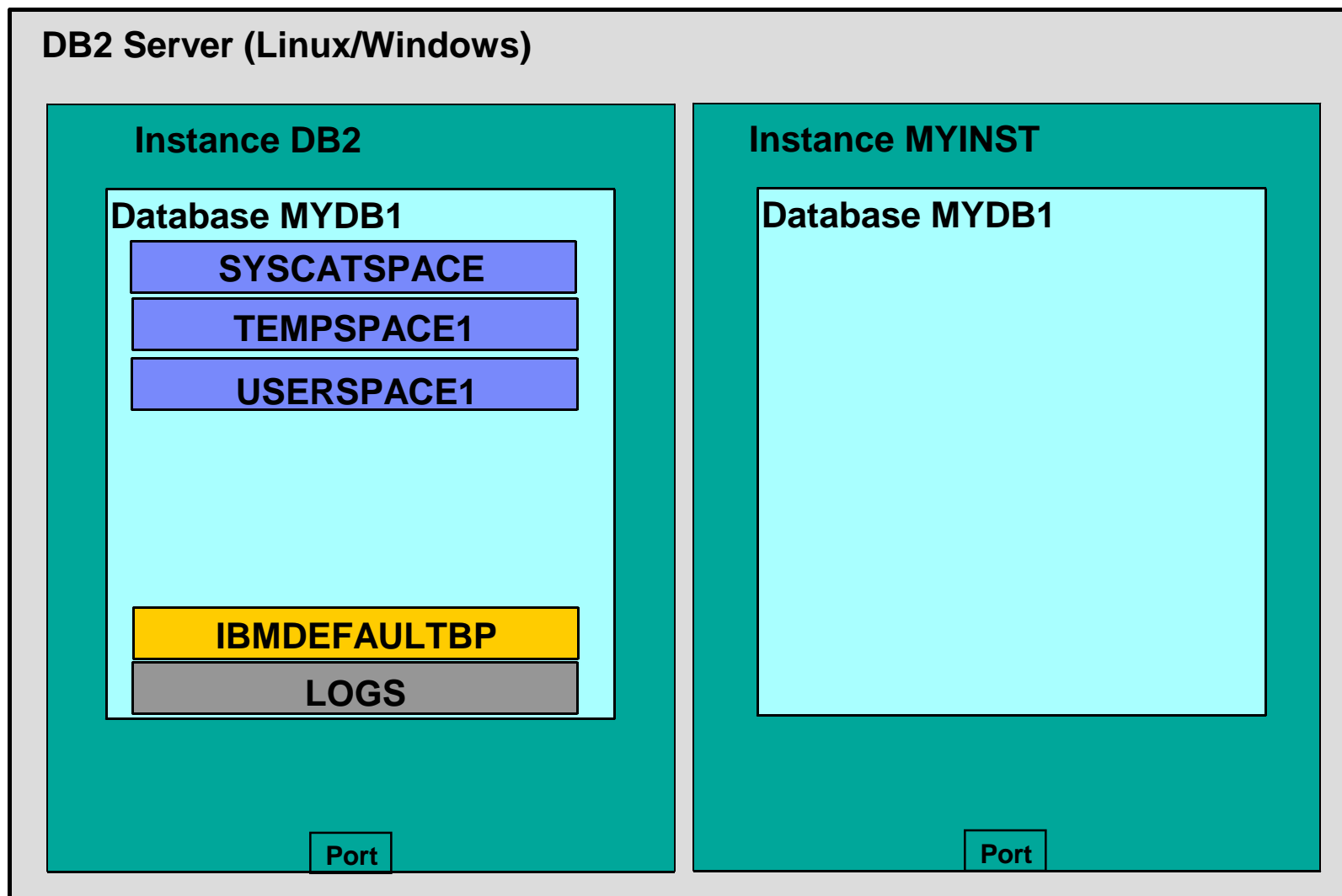
The DB2 environment



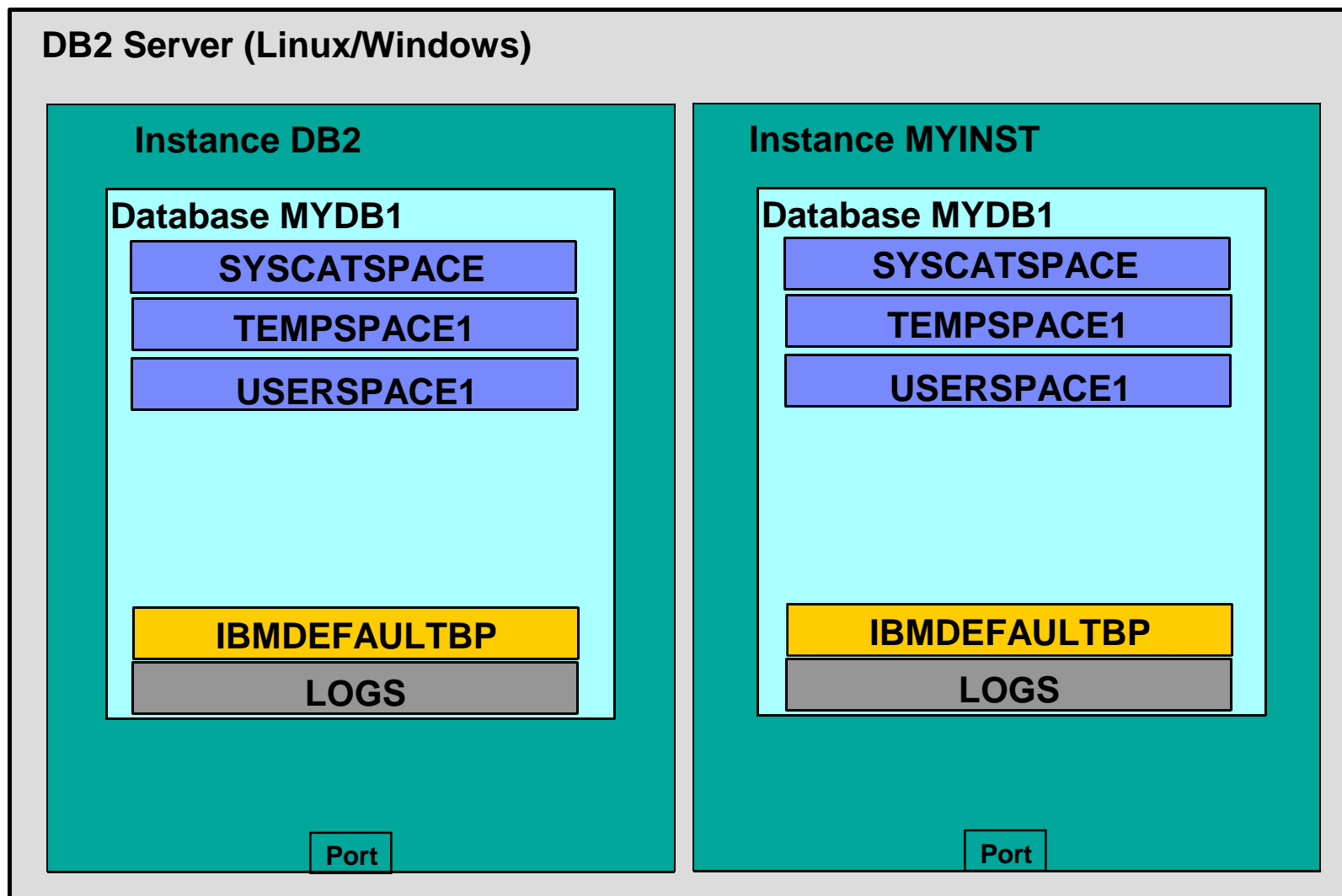
The DB2 environment



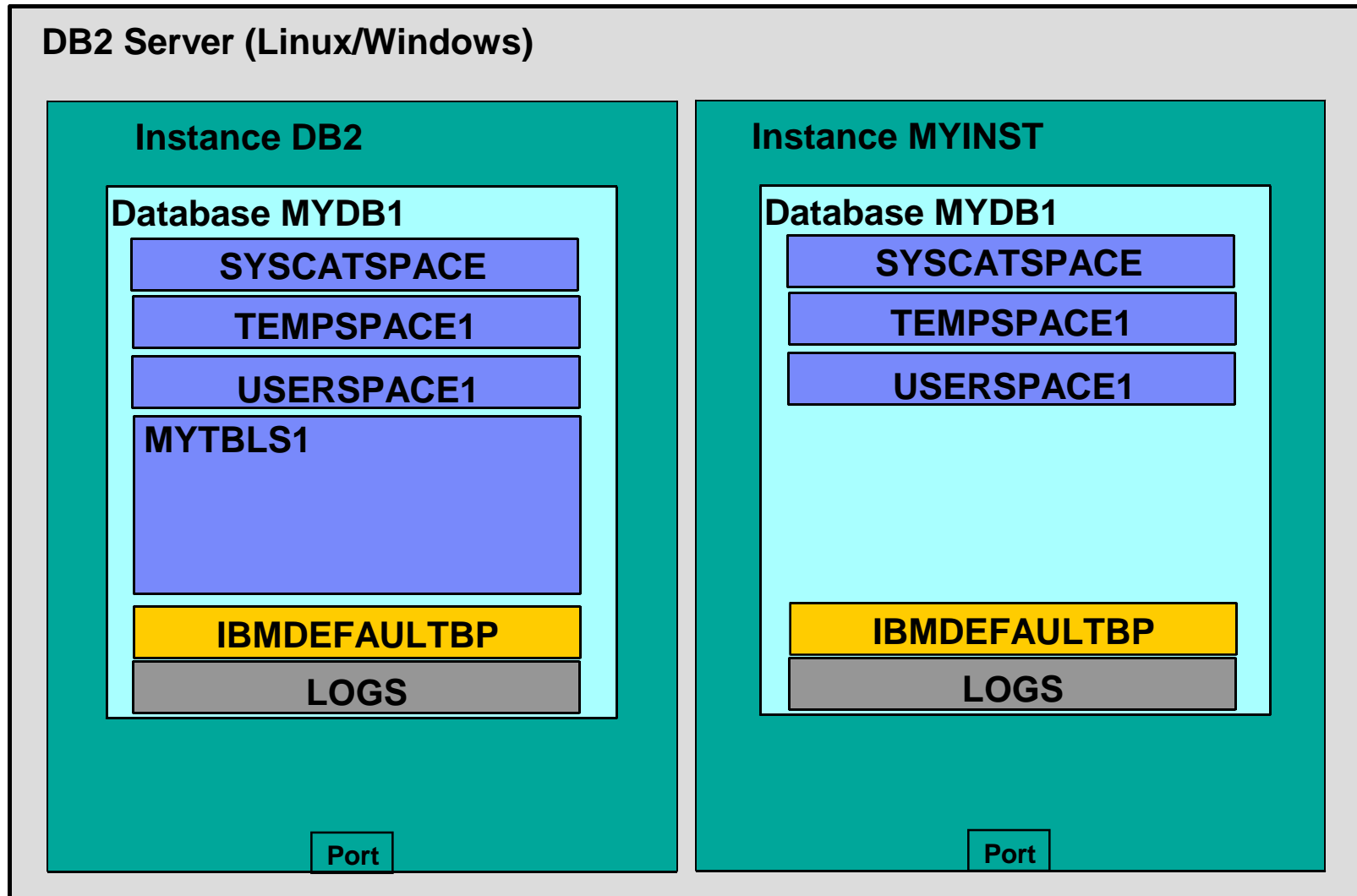
The DB2 environment



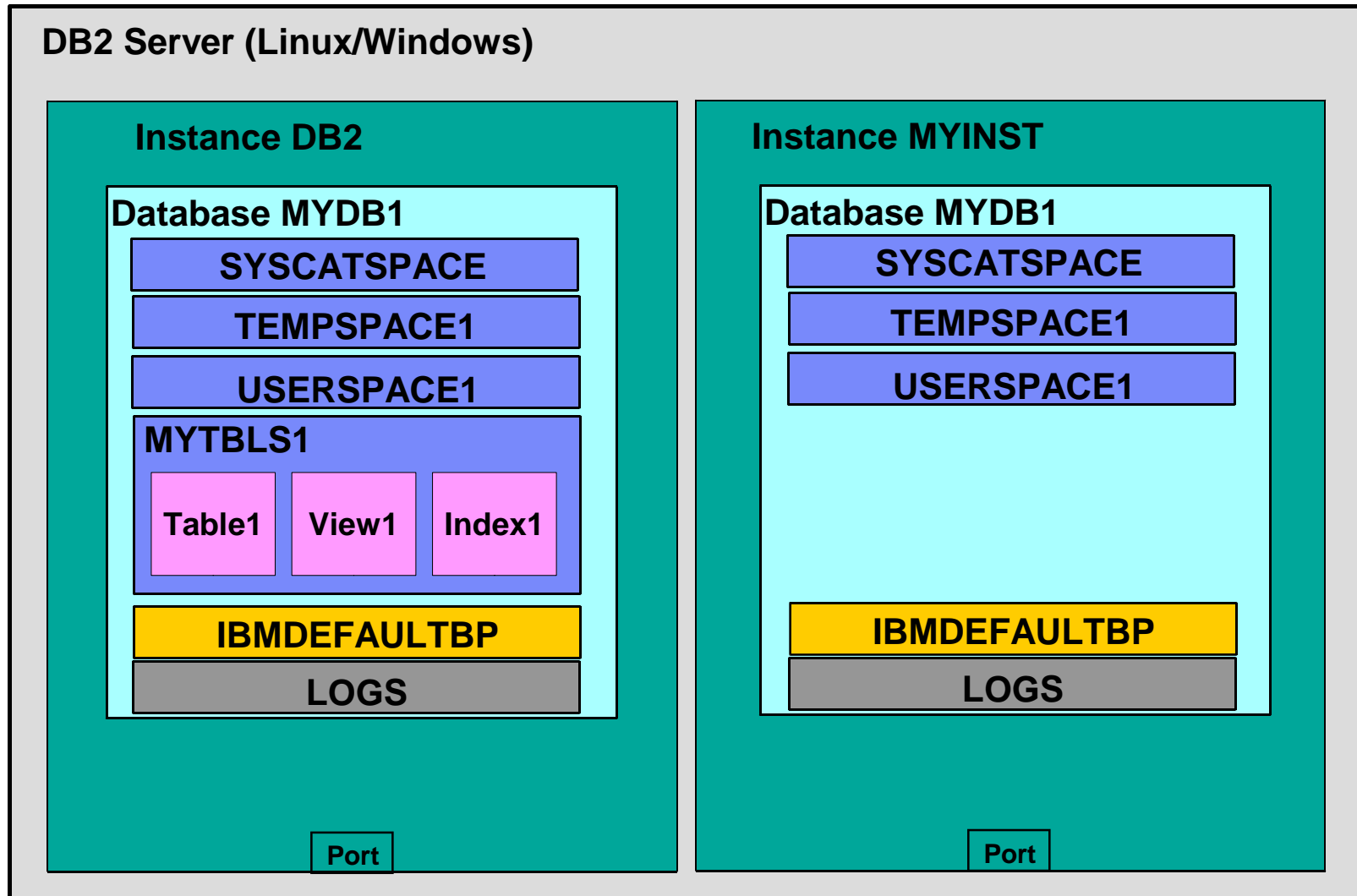
The DB2 environment



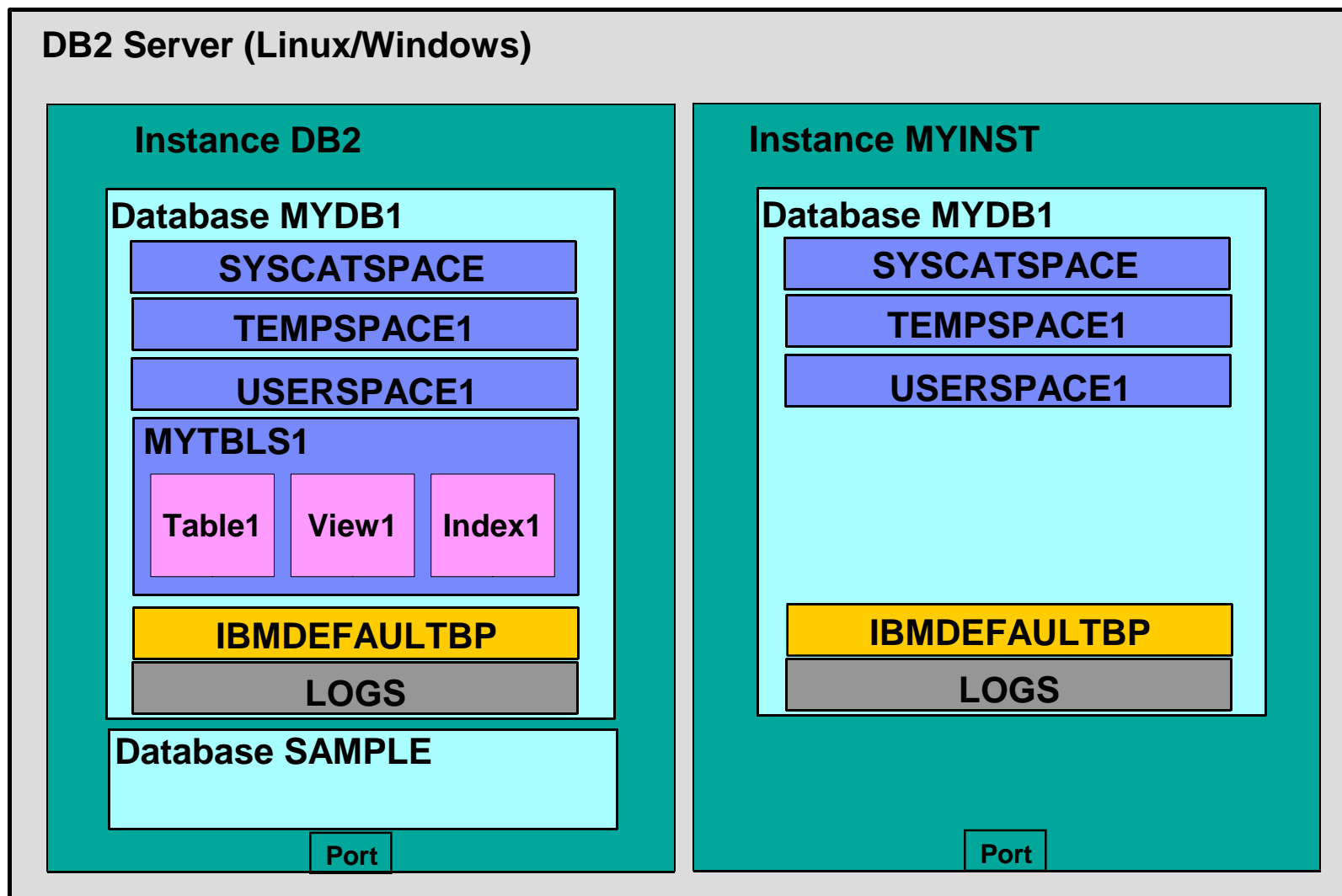
The DB2 environment



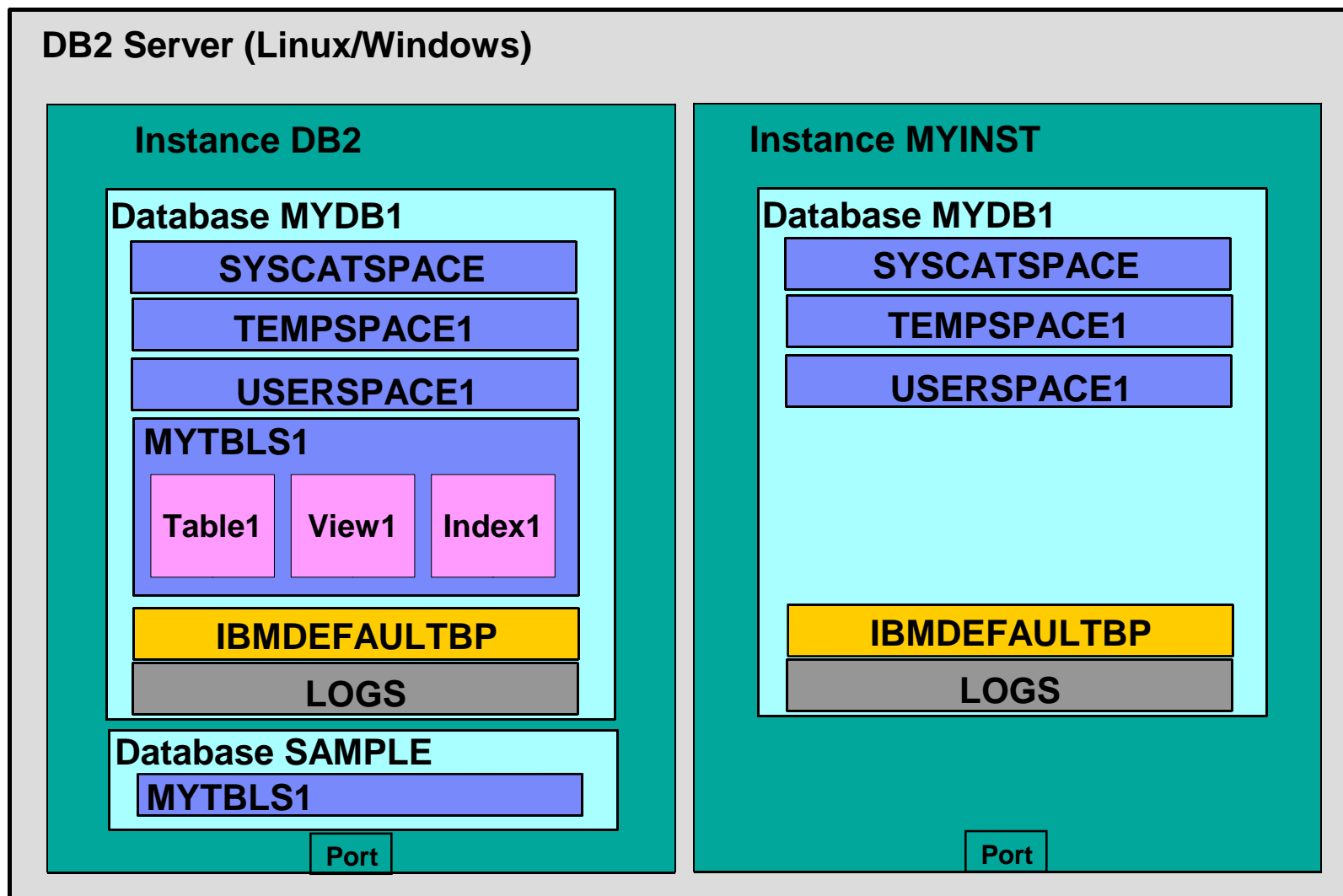
The DB2 environment



The DB2 environment



The DB2 environment



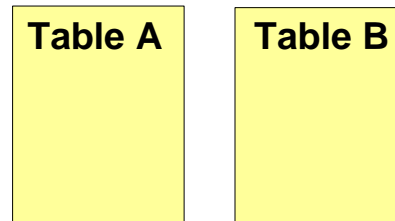
Summary of instance-level commands

Command	Description
<code>db2start</code>	Starts the current instance
<code>db2stop</code>	Stops the current instance
<code>db2icrt</code>	Creates a new instance
<code>db2idrop</code>	Drops an instance
<code>db2ilist</code>	Lists the instances you have on your system
<code>db2 get instance</code>	Lists the current active instance

Summary of database-level commands

Command/SQL statement	Description
<code>db2 create database</code>	Creates a new database
<code>db2 drop database</code>	Drops a database
<code>db2 connect to <database_name></code>	Connects to a database
<code>db2 create table/create view/create index</code>	SQL statements to create table, views, and indexes respectively

Table spaces



Logical

Physical

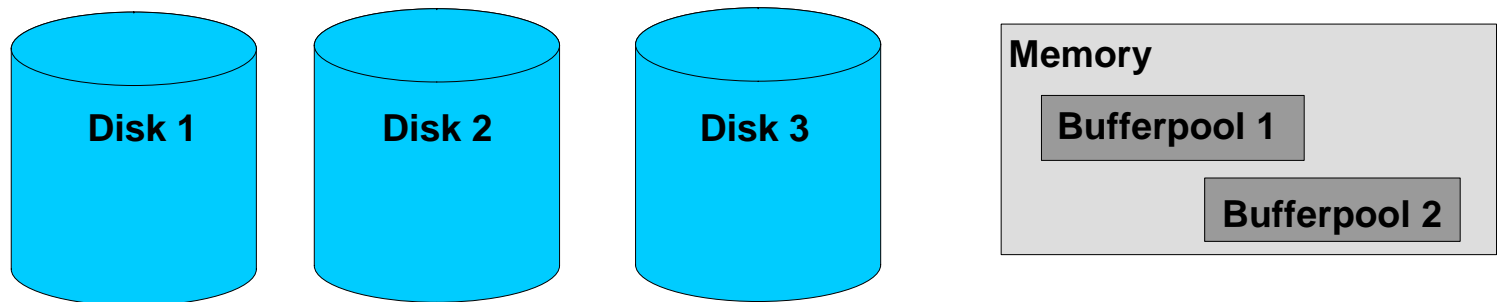
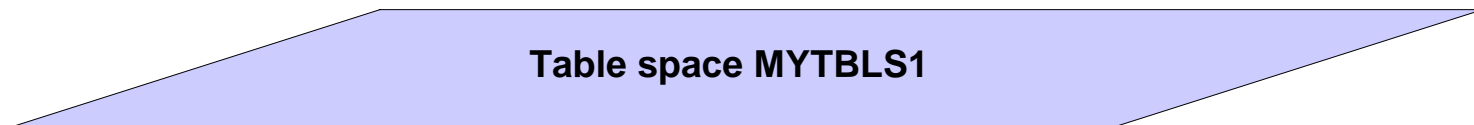
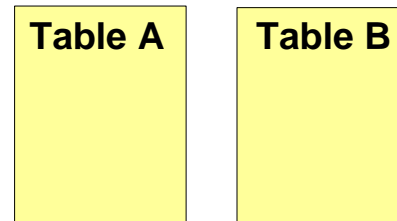


Table spaces



Logical

Physical

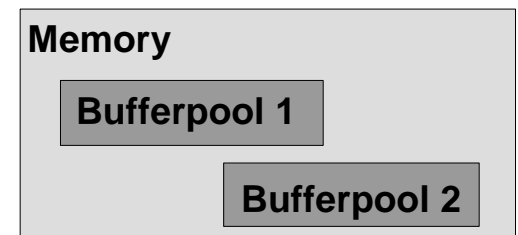
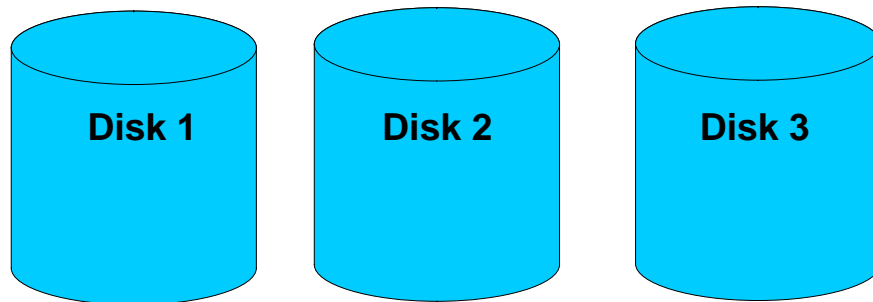


Table spaces

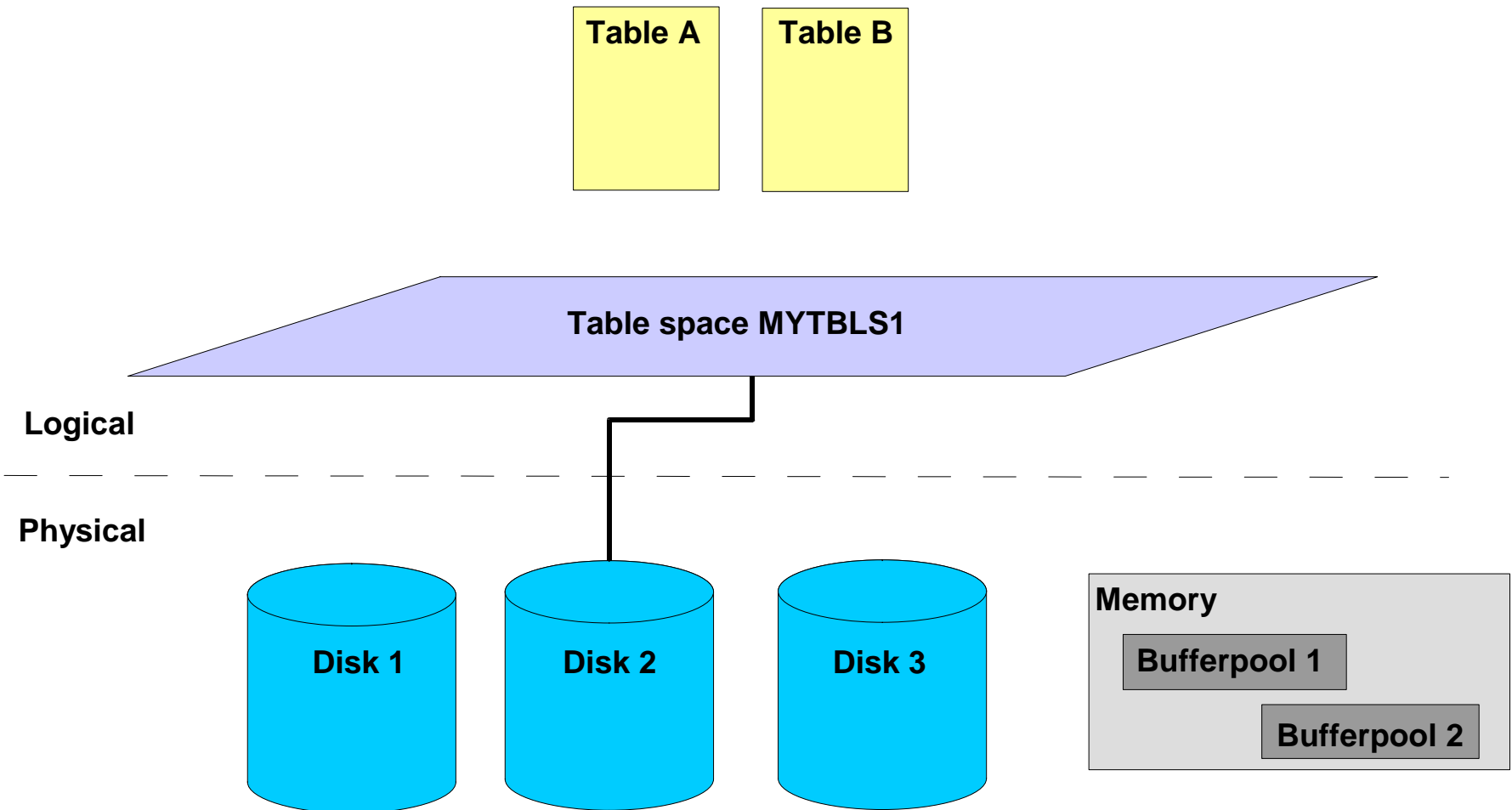


Table spaces

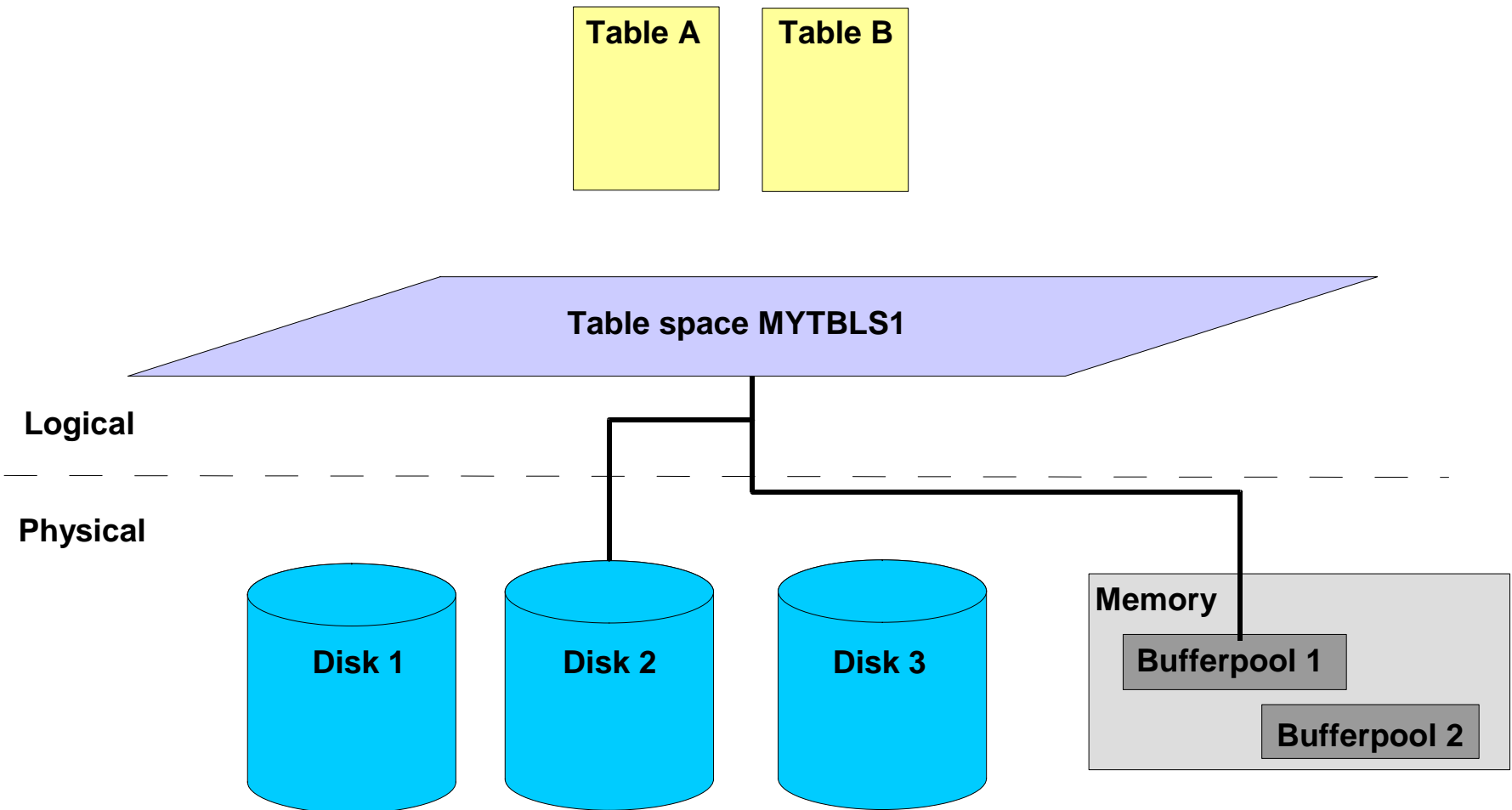


Table spaces

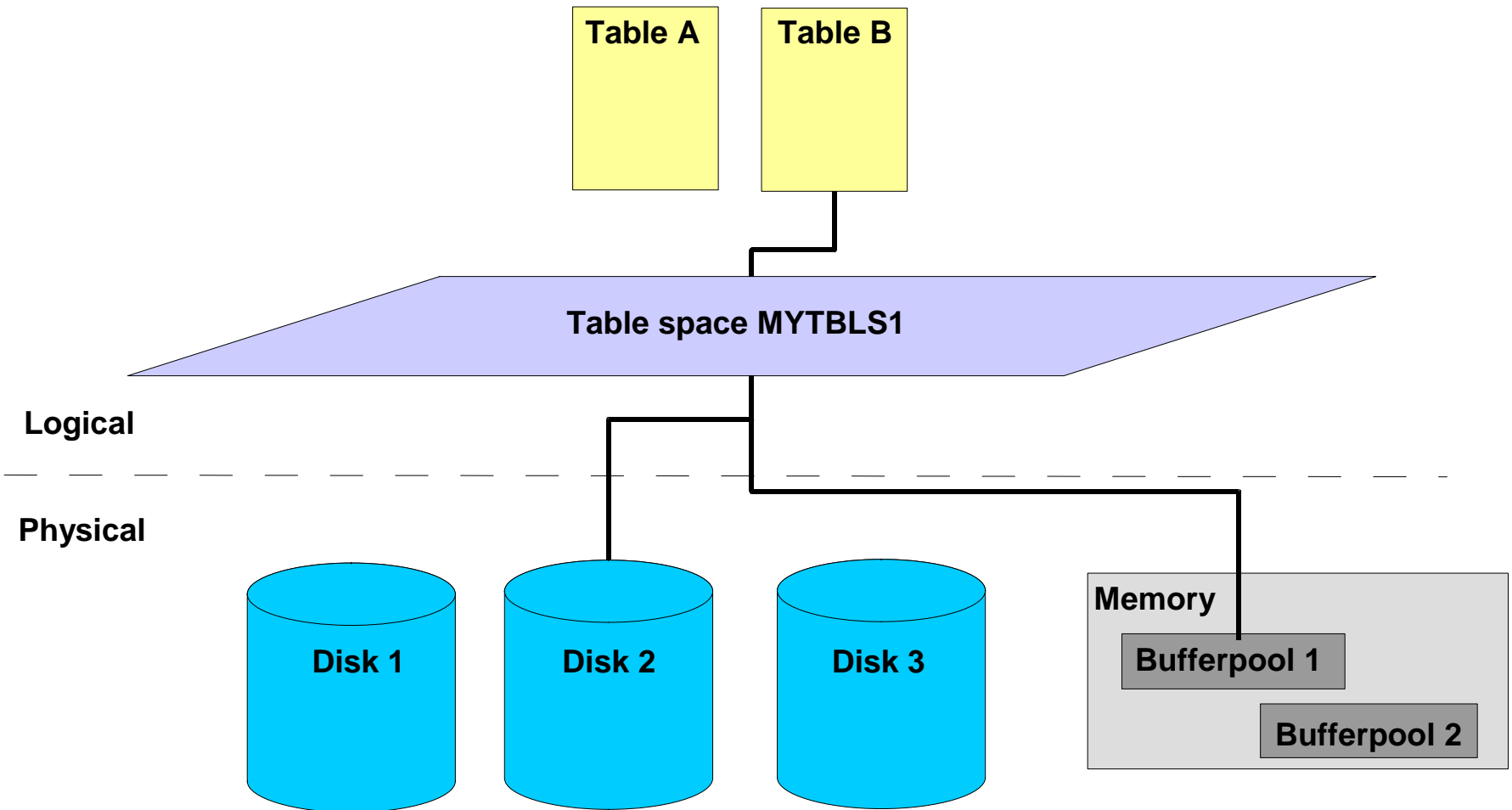


Table Space Management

MANAGED BY SYSTEM (SMS)

- Managed by the operating system
- Containers are directories

MANAGED BY DATABASE (DMS)

- Managed by DB2.
- Containers are files or raw devices pre-allocated

MANAGED BY AUTOMATIC STORAGE

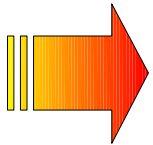
- Intended as a “single point of storage management” for table spaces
- Create a database and associate a set of storage paths with it
- No explicit container definitions are provided
- Containers automatically created across the storage paths
- Growth of existing containers and addition of new ones completely managed by DB2

Buffer Pool Basics

- **Real memory cache for table/index data**
- **Reduces direct sequential I/O**
- **At least one buffer pool required per database**
- **Allocates memory in units of 4K,8K,16K and 32K pages**
- **At least one matching bufferpool for a table space based on page size**
- **STMM (Self-tuning memory manager) can automatically resize the bufferpool as needed**

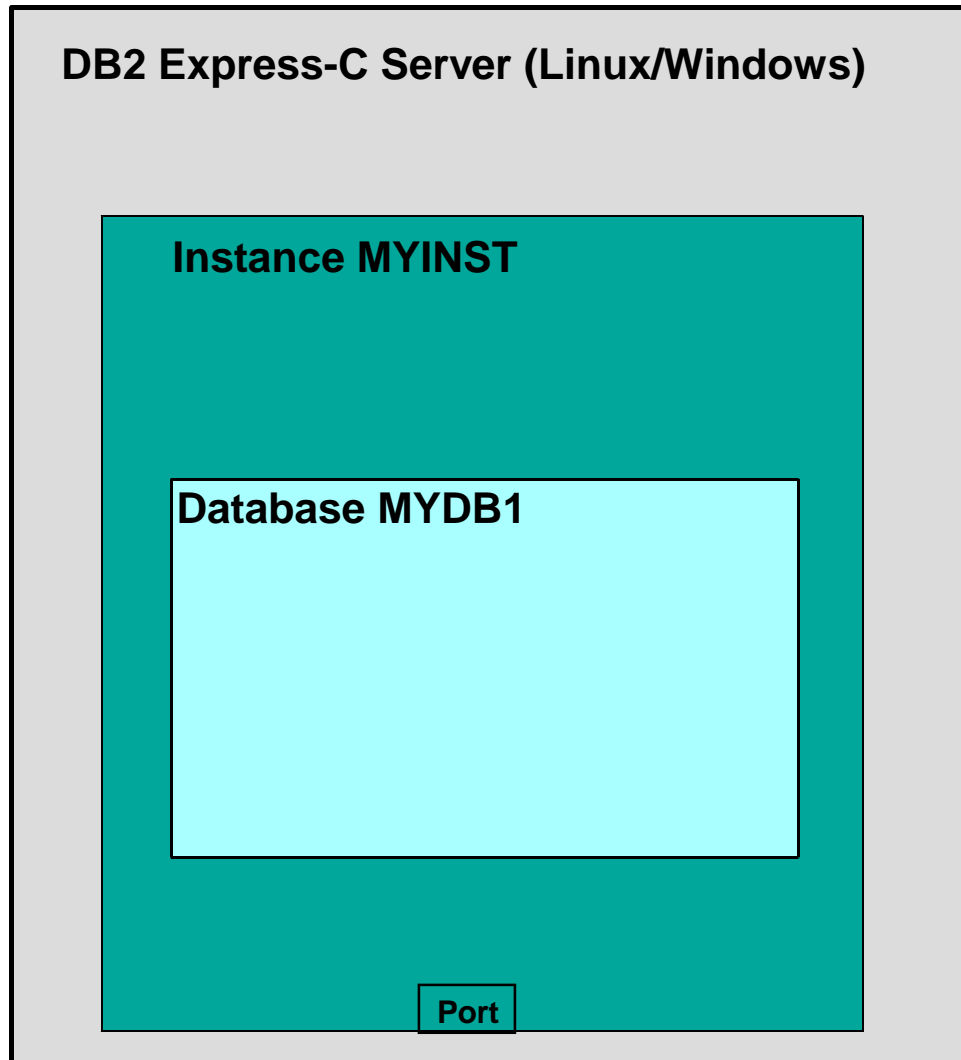
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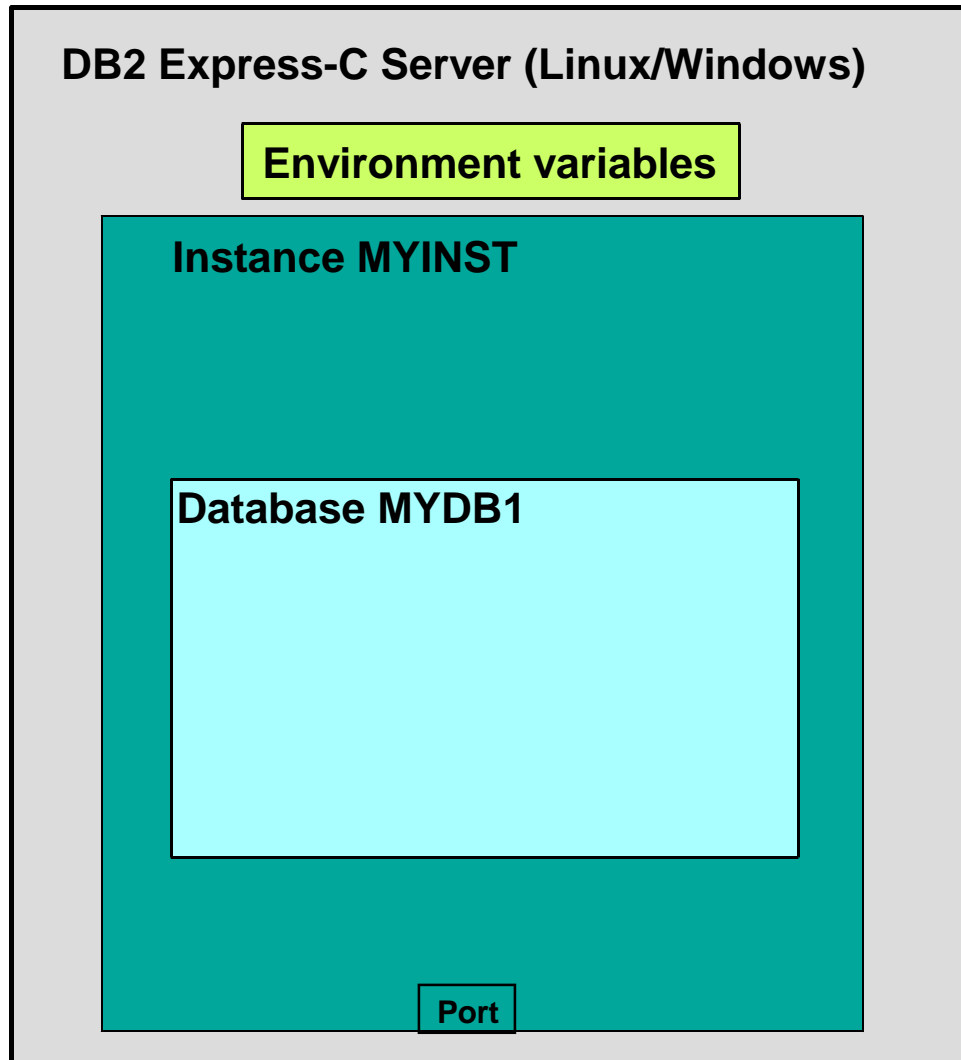


- **Configuring DB2**
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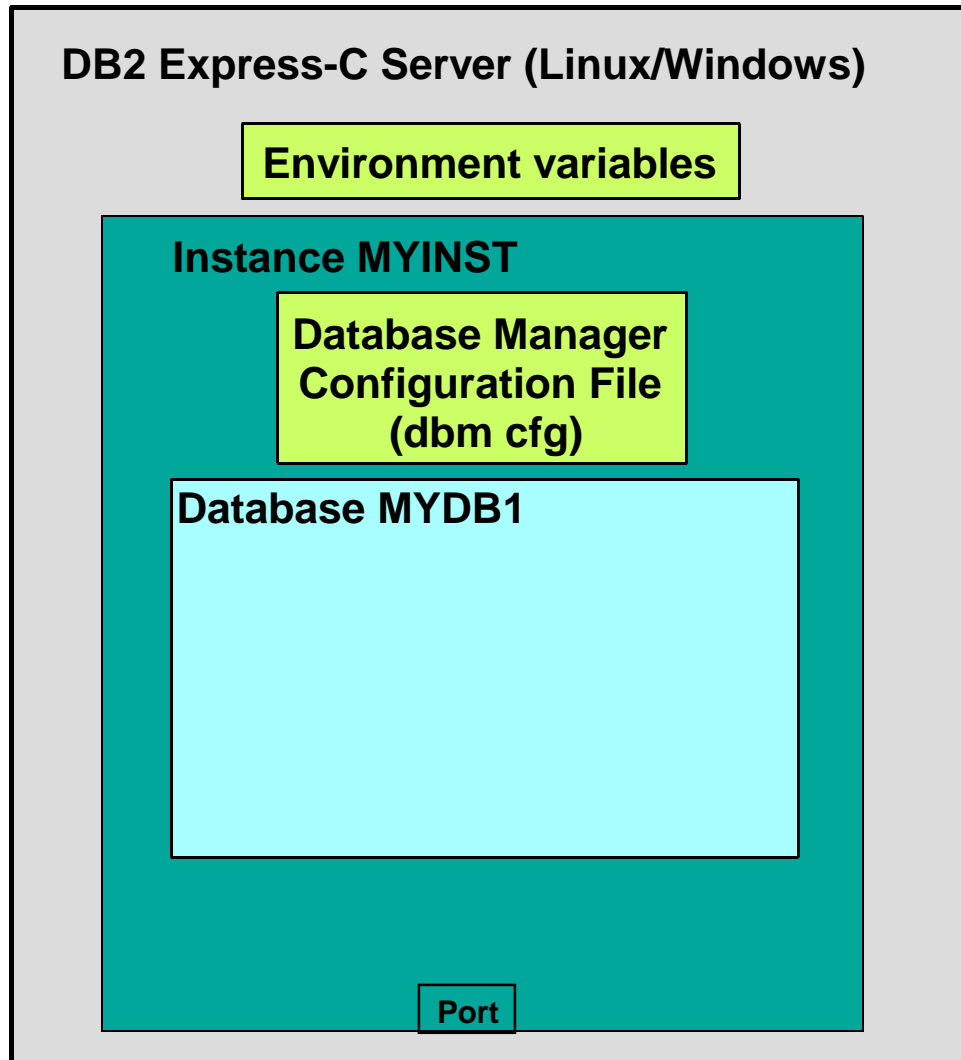
DB2 configuration



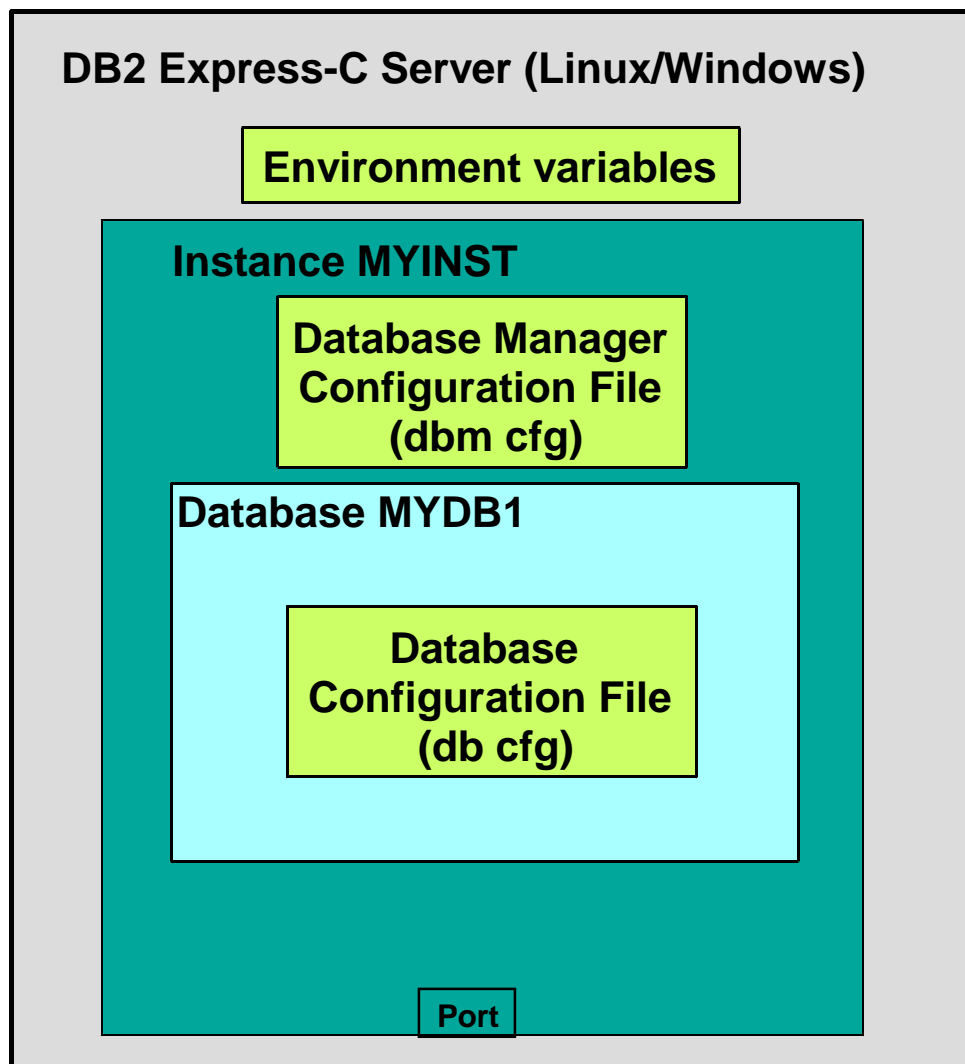
DB2 configuration



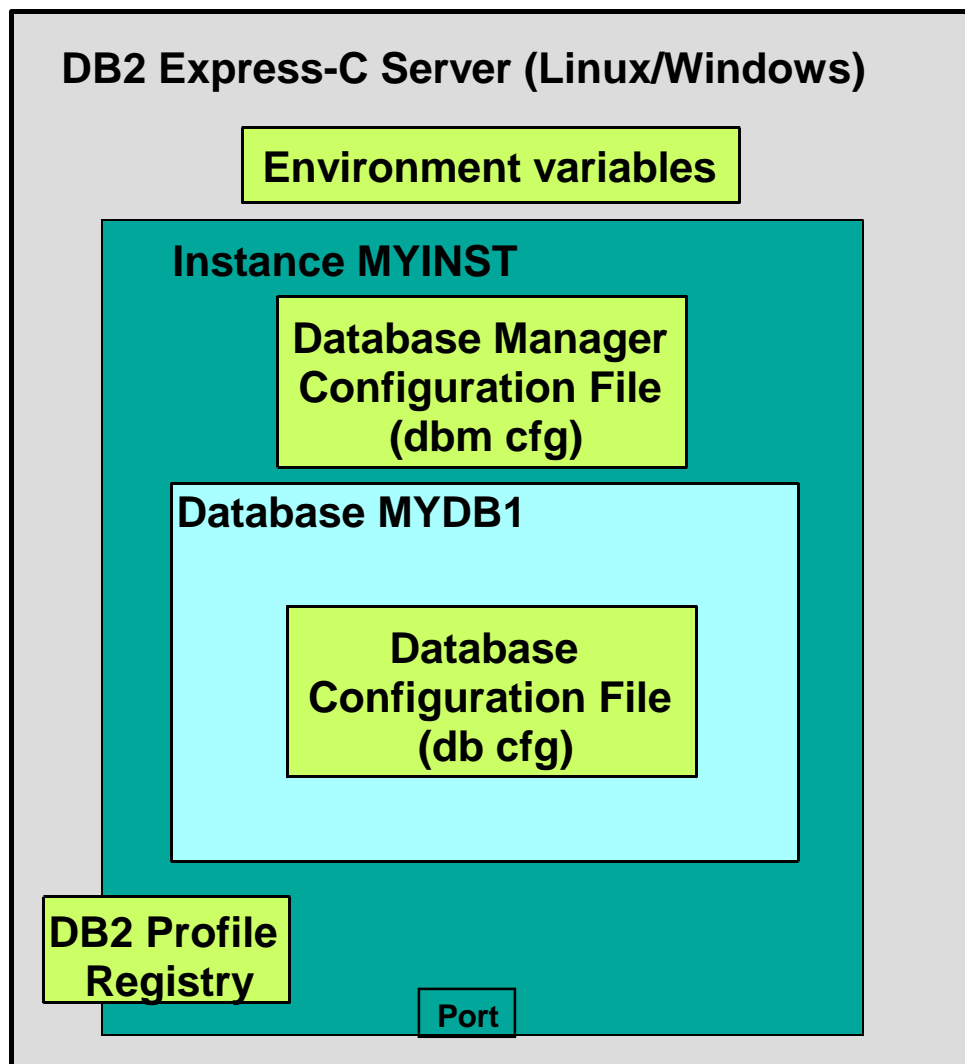
DB2 configuration



DB2 configuration



DB2 configuration



Summary of commands for DB2 configuration

Commands to manipulate the dbm cfg (instance-level)

Command	Description
<code>db2 get dbm cfg</code>	Retrieves information about the dbm cfg
<code>db2 update dbm cfg using <parameter_name> <value></code>	Updates the value of a dbm cfg parameter

Commands to manipulate the db cfg (database-level)

Command	Description
<code>get db cfg for <database_name></code>	Retrieves information about the db cfg for a given database
<code>update db cfg for <database_name> using <parameter_name> <value></code>	Updates the value of a db cfg parameter

Summary of commands for DB2 configuration

Commands to manipulate the DB2 Profile Registry

Command	Description
<code>db2set -all</code>	Lists all the DB2 profile registry variables that are currently set
<code>db2set -lr</code>	Lists all the DB2 profile registry variables
<code>db2set <parameter>=<value></code>	Assigns a parameter with a given value

Note:

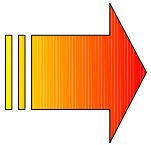
There should not be spaces at all between the equal sign and the parameter name, and the value in a db2set command. For example:

`db2set db2comm = tcpip` ❌ (incorrect)

`db2set db2comm=tcpip` ✅ (correct!)

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SQL Scripts

- **Pros**

- Simple to understand
- Platform independent

- **Cons**

- Script parameters not supported

A Basic SQL Script

script1.db2

```
CONNECT TO SAMPLE;
```

```
DROP TABLE arfchong.mytable;
```

```
CREATE TABLE arfchong.mytable
```

```
( col1 INTEGER NOT NULL,
```

```
  col2 VARCHAR(40),
```

```
  col3 DECIMAL(9,2));
```

```
SELECT * FROM arfchong.mytable;
```

```
COMMIT;
```

Executing SQL Scripts

- An SQL script can be executed from the DB2 Command Window (Windows), Linux shell, or IBM Data Studio
- To run the previous script from the DB2 Command Window or Linux shell, use the following command:

```
db2 -t -v -f script1.db2 -z script1.log
```

- t indicates statements use the default statement termination character (semicolon)
- v indicates verbose mode; which echoes the command being executed
- f indicates the following filename contains the SQL statements
- z indicates the following message filename will store the output

Using a different statement termination character

```
CREATE TABLE  
  arfchong.mytable  
  
  ( col1 INTEGER NOT NULL,  
    col2 VARCHAR(40),  
    col3 DECIMAL(9,2)  
  ) ;
```

Using a different statement termination character

procs.db2

```
CONNECT TO SAMPLE!  
CREATE PROCEDURE P1(  
    BEGIN  
        DECLARE X INT;  
        SET X = 1;  
    END!
```

- Execute as follows:

db2 -td! -v -f procs.db2 -z procs.log

Operating system scripts

- **Pros:**

- Greater flexibility
- Additional logic possibilities
- Supports parameters/variables

- **Cons:**

- Platform-dependent

A Simple Operating System (Shell) Script

create_database.bat

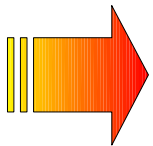
```
set DBPATH=c:  
set DBNAME=MYDB  
set MEMORY=25  
db2 CREATE DATABASE %DBNAME% ON %DBPATH% AUTOCONFIGURE USING  
MEM_PERCENT %MEMORY% APPLY DB AND DBM  
db2 CONNECT TO %DBNAME% USER %1 USING %2  
del schema.log triggers.log app_objects.log  
db2 set schema user1  
db2 -t -v -f schema.db2 -z schema.log  
db2 -td@ -v -f triggers.db2 -z triggers.log  
db2 -td@ -v -f functions.db2 -z functions.log
```

Execute as follows:

```
create_database.bat myuserid mypassword
```

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Directories

- **System database directory**

list db directory

- **Local database directory**

list db directory on <drive/path>

- **Node directory**

list node directory

- **DCS directory**

list dcs directory

Requirements to connect to a DB2 server

I) Local connections

System DB directory is automatically populated with the info to connect when issuing CREATE DATABASE command

II) Remote connections

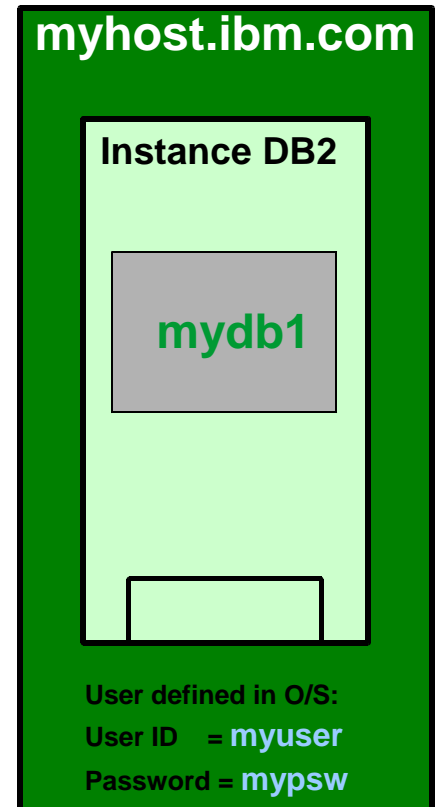
Setup required at the server:

- 1) Turn on TCPIP listeners
- 2) Specify DB2 instance port

Setup required at the client:

- 1) Create entry in client's node directory
- 2) Create entry in client's system db directory

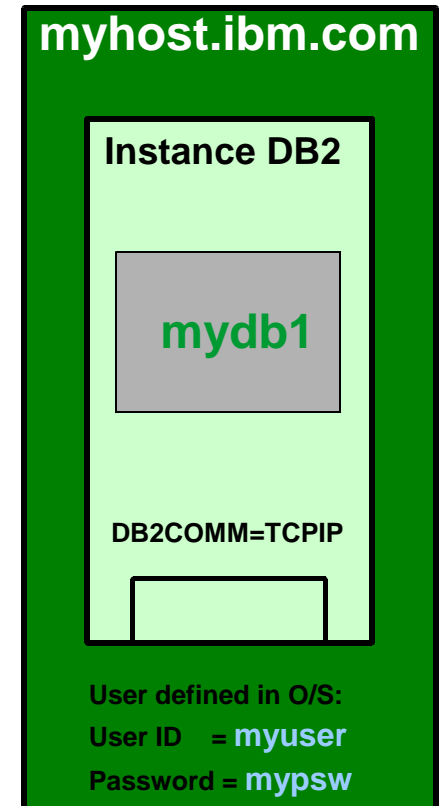
Remote connections - Setup required at the server



Remote connections - Setup required at the server

1) Turn on TCP/IP listeners

db2set DB2COMM=TCPIP



Remote connections - Setup required at the server

1) Turn on TCP/IP listeners

db2set DB2COMM=TCPIP

2) Specify DB2 instance port

update dbm cfg using svcename 50000

or

update dbm cfg using svcename db2c_DB2

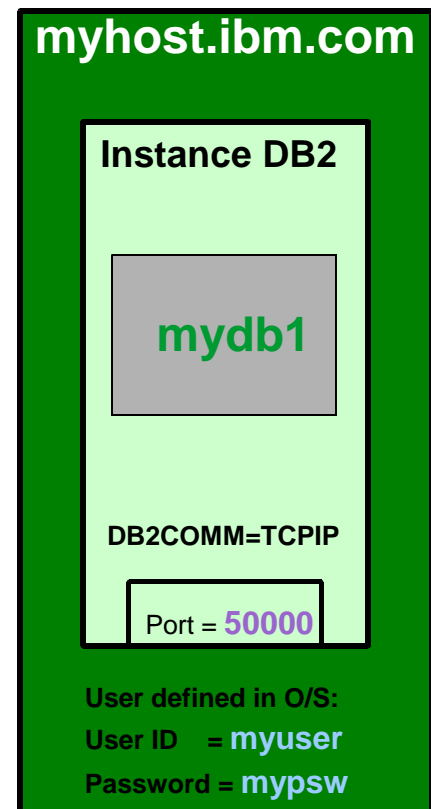
If you use a service name, ensure to update these files at the client:

Linux: /etc/services

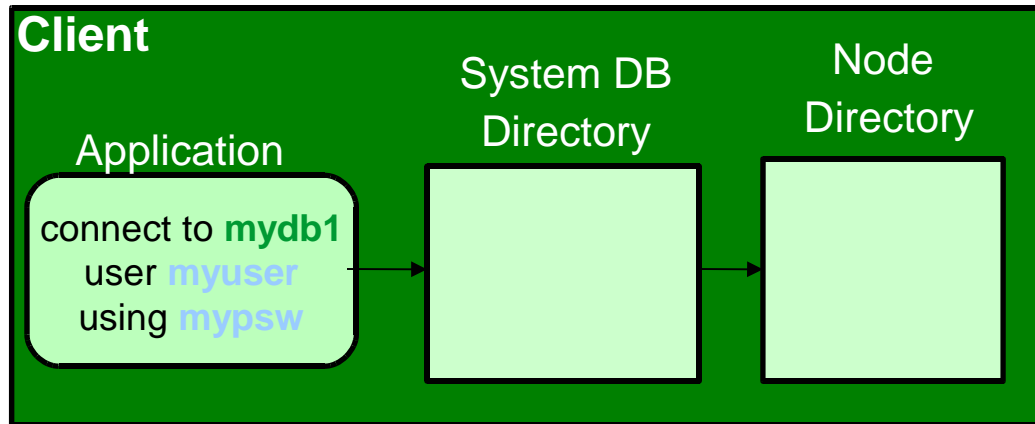
Windows: c:\winnt\system32\drivers\etc\services

Example entry in the services file:

db2c_DB2 50000/tcp

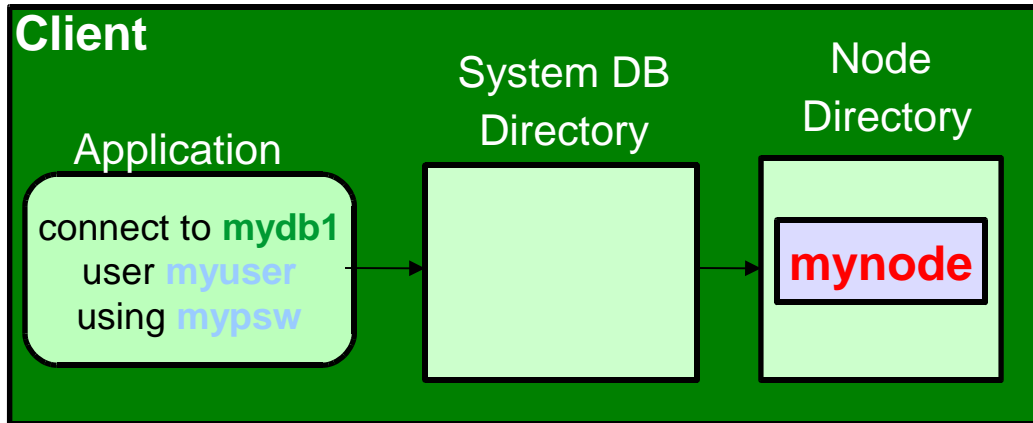


Remote connections - Setup required at the client



Two commands to run at the client:

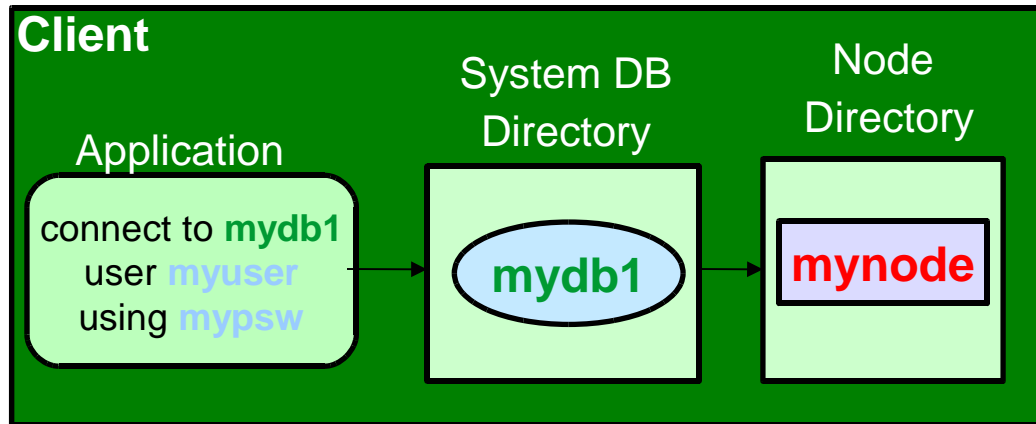
Remote connections - Setup required at the client



Two commands to run at the client:

```
1) catalog tcpip node mynode
   remote myhost.ibm.com server 50000
```

Remote connections - Setup required at the client

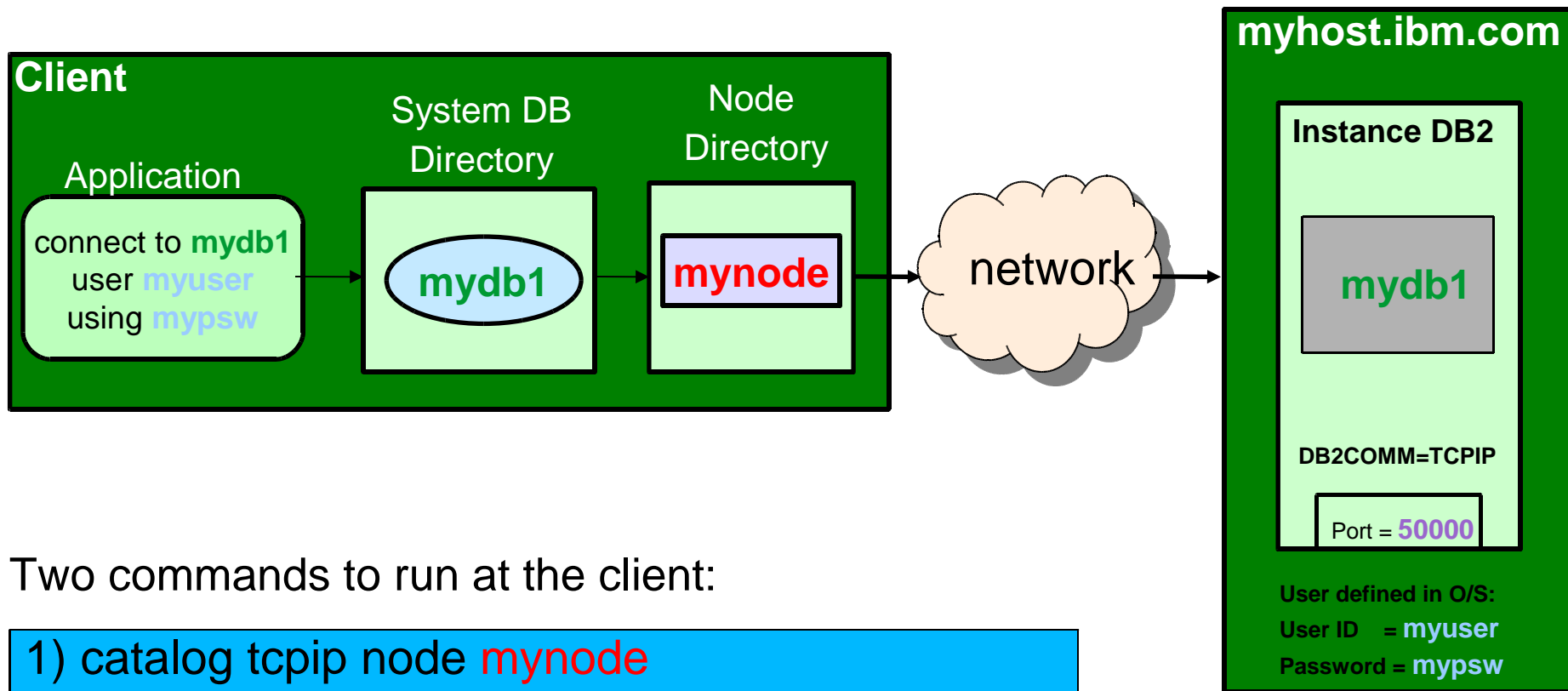


Two commands to run at the client:

1) catalog tcpip node **mynode**
remote myhost.ibm.com server **50000**

2) catalog database **mydb1** at node **mynode**

Putting both setup together – Client and server



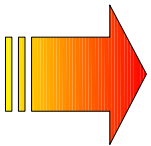
Two commands to run at the client:

1) catalog tcpip node **mynode**
remote myhost.ibm.com server 50000

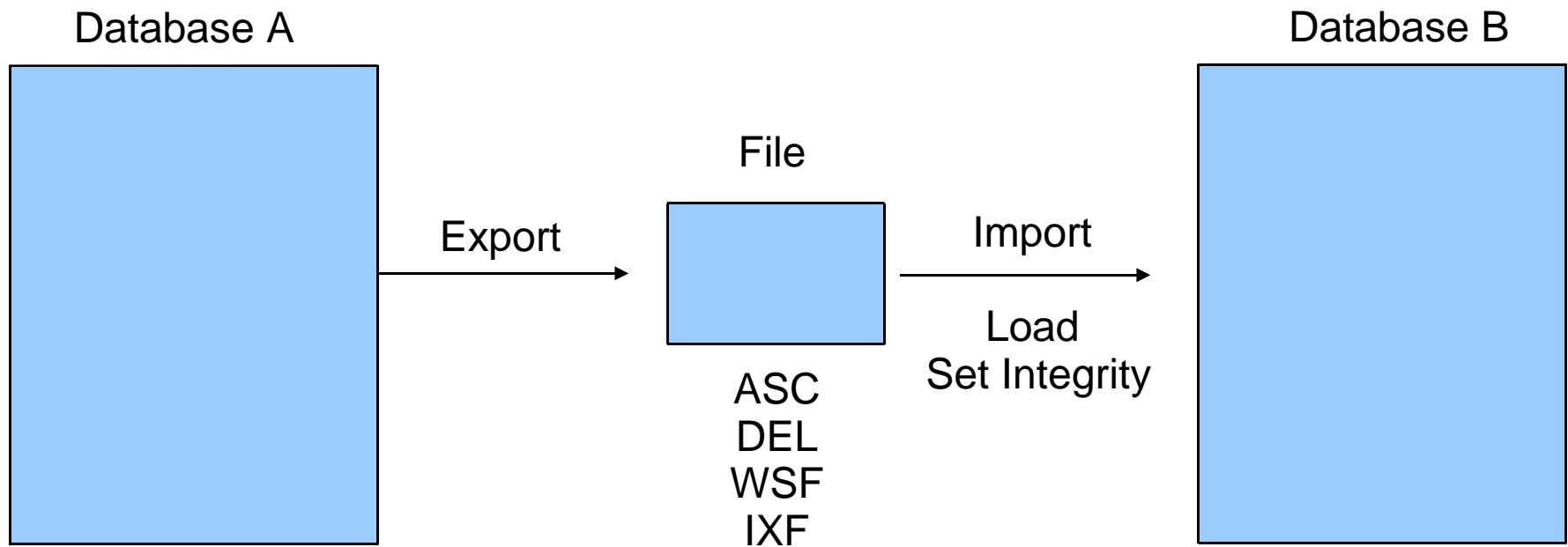
2) catalog database **mydb1** at node **mynode**

Agenda

- DB2 server editions, clients and drivers
- DB2 Express-C overview
- The DB2 Command Line Processor (demo)
- The DB2 Environment
- Configuring DB2
- Working with scripts
- Connecting to a DB2 server
- **Data movement utilities**



Data movement utilities



Data movement utilities

- EXPORT, IMPORT, LOAD
- db2move
 - Easily export/import/load/copy set of tables & data (IXF)
- db2look
 - Extracts:
 - DDL
 - Permissions
 - Database statistics
 - Table space characteristics



Thank you!