

### Discussion Topics

This briefing is designed to give you only an overview of Sybase and the PDPS database for IR1. More formal training will be provided by the Sybase vendor at a later date. This overview consists of:

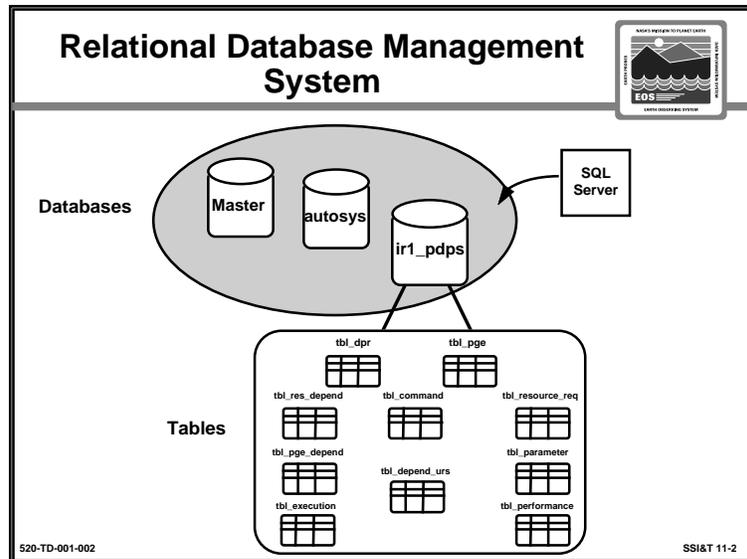
- basic structure and fundamentals of Sybase
- ir1\_pdps database tables
- logging into ir1\_pdps
- isql and scripts
- system procedures
- custom scripts
- transaction log
- error log
- database administration

#### References:

*SA Companion User's Guide (Sybase), 10.0.1, Sybase Inc., 1994*

*System and Database Administration, Student Guide, Volumes 1 & 2, Sybase Inc., 1993*

*Fast Track to Sybase, Student Guide, Volumes 1 & 2, Version 2.1, Sybase Inc, 1994*



### Discussion Topics

Logging into the SQL Server will provide access to a number of databases (e.g. IR1 PDPS database, AutoSys database, Master database). Within each database are a series of tables which contain data.. For example, the IR1 PDPS database contains 10 different tables.

These tables are related to each other in various ways:

- one-to-one
- one-to-many
- many-to-many

More information on the IR1 PDPS database will be provided in a moment.

## Sybase Tables



- **Tables**
  - Column Name
  - Datatype
  - Column Property

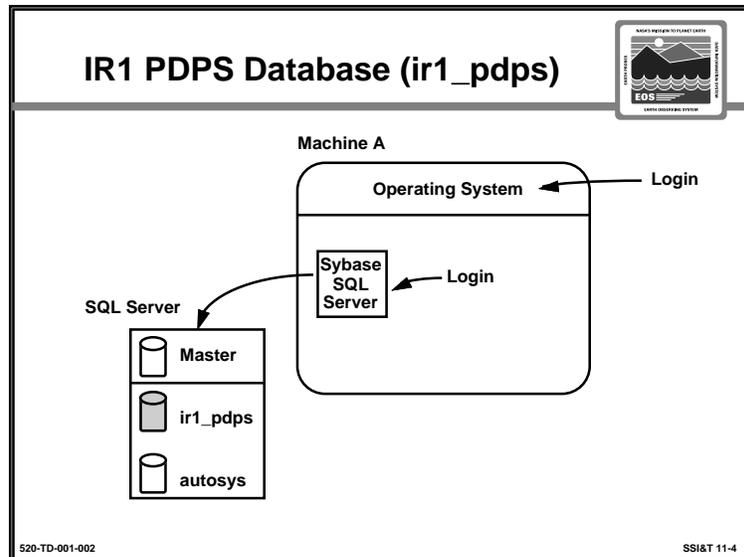
| Column Name   | Datatype | Column Property |
|---------------|----------|-----------------|
| dpr_id        | char(36) | NOT NULL        |
| pdps_version  | char(32) | default "NONE"  |
| creation_date | datetime | NOT NULL        |

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### Discussion Topics

- Tables contain columns which consist of:
  - column name,
  - system or user-defined datatype (e.g., type of data, size, and storage format of columns), and
  - column property (e.g., rules, and defaults). If a data value is “null”, the value is unknown; “not null” is the SQL system default column property

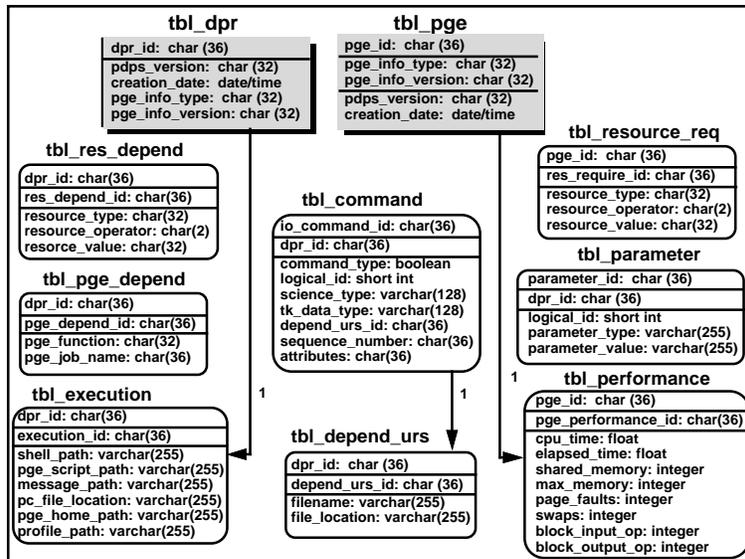
*(Fast Track to SYBASE, Student Guide, Vol. 1, p. 5-2, 5-10, Ver 2.1, (1994), Sybase, Inc.)*
  
- This example shows the dpr\_id table from the IR1 PDPS database



### Discussion Topics

Sybase is the “engine” of the system and is located at each of the DAACs on the database server. As stated previously, both the autosys and IR1\_pdps databases are managed by a single Sybase SQL Server. A Sybase SQL Server is a set of one or more cooperating processes that manage one or more databases and provide database access to multiple users.

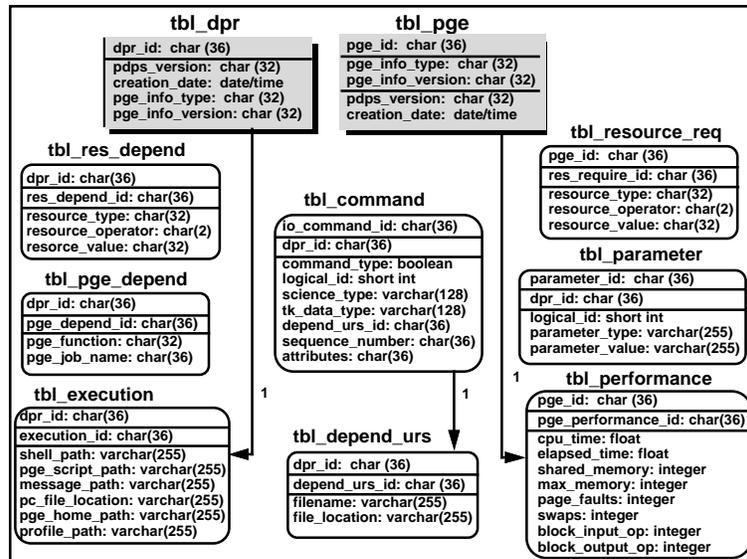
- Typically, once you have logged into the SQL Server, you will automatically be connected to the “*Master*” database. *Master* contains system tables and information about who can connect to the Server. These tables contain information for the overall configuration of the database server and all database objects associated with the server.
- The user can change this default to pdps or autosys database by typing:  
`sp_modifylogin login_name, option, value`  
 (e.g. `sp_modifylogin irl_trng, defdb, ir_pdps`)



### Discussion Topics

**ir1\_pdps database schema.** The ir1\_pdps database consists of ten tables holding related info.

- **tbl\_dpr** - This table stores information about each Data Processing Request (DPR) and has connections to tbl\_command, tbl\_parameter, tbl\_res\_depend, tbl\_execution, and tbl\_depend\_urs. When the DPR request is made, the DPR table is created and a copy of members belonging to a selected PGE from each of these tables is made and attached to requested DPR. The DPR table itself contains:
  - pdps\_version            the version of the software
  - creation\_date            date created
  - pge\_info\_type            the pge that was selected for the DPR
  - pge\_info\_version        the version of the PGE
- **tbl\_pge** - This table is exactly the same as the DPR table except that it serves the initial registration of the PGE into the data base from the PCF file
- **tbl\_res\_depend** - This table holds information on any resource dependencies that are applicable to PGE and DPR. For example, machine = dps1sgiedf states that the PGE should be run on dps1sgiedf. It contains three members:
  - resource\_type            e.g. machine
  - resource\_operator        e.g. =
  - resource\_value            e.g. dps1sgiedf
  - Note: In the current version only the machine name is supported. Later this can be expanded to include disk size etc.
- **tbl\_pge\_depend** - This table hold information on dependencies that a current DPR might have on previous dependencies and provides a way to link the execution of DPRs. For example, one would like to run a particular PGE only if a certain other PGE has run successfully. The table contains:
  - pge\_function            SUCCESS or FAILURE
  - pge\_job\_name            name of the PGE



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- **tbl\_execution** - This table hold information on some of the variables that are needed to run the PGE. User should be concerned with only three:
  - pge\_script\_path full path to the PGE executable
  - pc\_file\_location full path to the PCF file that gets generated
  - profile\_path full path to the resource file that gets written after the pge execution
- **tbl\_command** - This table contains information on all the file descriptions in the PCF file. Note: the dpr\_id field refers to both pge\_id in tbl\_pge and the dpr\_id in tbl\_dpr. The user should only be concerned with the following members:
  - logical\_id The logical ID of the file science type (e.g., MODIS)
  - tk\_data\_type There are about six different types of files in the PCF eg. PRODUCT\_INPUT\_FILE
  - depend\_urs\_id user does not directly relate to this parameter but it acts as a pointer to file mappings in the UR table. File mappings are the directory path and the file name.
  - attributes There is a file attribute field in the PCF where user can put some description about the file.
- **tbl\_depend\_urs** - As mentioned above, this table has a one to one mapping with the commands table. Note: the dpr\_id field refers to both pge\_id in tbl\_pge and the dpr\_id in tbl\_dpr. This table contains:
  - filename name of the file in the PCF file\_location path to the file
- **tbl\_resource\_req** - the general resource requirements for a PGE type (i.e., part of the PGE Profile), as opposed to the tbl\_res\_depend which is the resources required by an individual instance (i.e., a run) of a PGE.
- **tbl\_parameter** - In PCF there is a section where user can define some parameters of the format name = value. This table therefore contains:
  - logical ID the ID of the parameter defined in the PCF
  - parameter\_type name of the parameter
  - parameter\_value value of the parameter eg. 10220 HOSTNAME monet
- **tbl\_performance** - This table is intended for Release A (i.e for future use)

### Fundamental Database Environment Variables



- **SYBASE** - specifies the path name of the Sybase directory
- **DSQUERY** - specifies the name of the Sybase SQL Server for all client applications.

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Fundamental database environment variables:

- **SYBASE** - This specifies the path name of the Sybase directory
  - The Sybase directory contains all files associated with Sybase configuration and operational files.
  - The interfaces file must reside on the Database Server, the (other) SSI&T Workstation (Sun), and the SSI&T Processor (SGI). Each entry in the file tells the host machine how to connect to a SQL Server. This file is normally located in the Sybase directory.
- **DSQUERY** - This specifies the name of the Sybase SQL Server for all client applications.

## Setting Environment Variables



```
> login
> password
> setenv SYBASE/vendor/Sybase
> setenv DSQUERY nickalus_srvr
> cd $SYBASE/bin

> set path = ($PATH $SYBASE/bin)
```

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Before you are able to access Sybase, you need to set your environmental variables. These variables can be customized by the user

#### **Exercise: Login and set your environmental variables**

- Type x host + and machines IP address on local machine (command tool)
- Login to the Sun (dps3sunedf): telnet 192.150.28.116
- Password
- setenv for SYBASE and DSQUERY
- include \$SYBASE/bin in your path
- If you need to set path = (\$PATH \$SYBASE/bin)

### Logging into Ir1 PDPS Database



- **Login:** `isql -Uir1_trng`
- **Password:** `ir1_trng`
  - 1> `use ir1_pdps`
  - 2> `select dpr_id from tbl_execution`
  - 3> `go`

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### Discussion Topics

**Accessing SQL Server with the isql Client.** It has the following features:

- “isql is an ‘interactive SQL’ utility.
- handles the connection to SQL Server
- accepts input from the keyboard or input from a file containing Transact-SQL commands
- sends ASCII text to the server
- displays the results fo the query (returned rows and messages) on screen, with basic formatting.” (*Fast Track to SYBASE, Student Guide, Vol. 1, p. 3-4, Ver 2.1, (1994), Sybase, Inc.*)

To access Sybase, you must login by typing:

```
- isql -Uir1_trng
```

- Password:

```
- ir1_trng
```

- Once you have logged in, you are automatically in your default database. If you want to access another database, type in **use *database\_name***:

```
- use ir1_pdps (note: ir1_pdps is the default for the ir1_trng account)
```

- To select data from the database tables, use the select command (for example):

```
- select dpr_id from tbl_execution
```

```
- go
```

**Exercise:** direct class to use select command to bring up ir1\_pdps tables

## Useful System Procedures



- **Stored Procedures**
  - > `sp_help [object_name]`
  - > `sp_helpdb [object_name]`
  - > `sp_helptext [object_name]`
  - > `sp_helpindex[object_name]`
  - > `sp_who`
  - > `sp_adduser` (\*sa only)
  - > `sp_addlogin` (\*sa only)
  - > `sp_modifylogin`
  - > `sp_helpdevice [device_name]`
  - > `sp_helpuser [user_name]`

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### Discussion Topics

Stored procedures are SQL statements that provide a method of accessing and manipulating the data stored in the tables. For example,

- the “`sp_help`” reports information about the specified table such as the field names within the tables.
- “`sp_helpdb`” displays the size, owner, database ID, creation date, and option settings for a particular database or for all databases
- “`sp_helptext view_name`” reports the text used to create a stored procedure, trigger, etc.
- “`sp_helpindex`” provides index information on a table
- “`sp_who`” displays currently logged on users
- “`sp_adduser`” adds a user (only sa can do this)
- “`sp_addlogin`” adds a user login (only sa can do this)
- “`sp_modifylogin`” allows you to modify user login
- “`sp_helpdevice [device_name]`” displays information about a specified device
- “`sp_helpuser [user_name]`” displays information about a specified user

*(Fast Track to SYBASE, Student Guide, Vol. 2, p. Ch 11, Ver 2.1, (1994), Sybase, Inc.)*

## Custom Scripts for Users



- **Viewing DPRs and PGEs**
  - > `sp_view_dpr`
  - > `sp_view_pge`
- **Deleting DPRs and PGEs**
  - > `sp_delete_dprs`
  - > `sp_delete_pges`

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### Discussion Topics

- To view a Data Processing Requests (DPR) or PGE,
  - `sp_view_dpr` - procedure to view a (specific) dpr and all related information from child tables
  - `sp_view_pge` - procedure to view a pge and all related info. contained in child tables
- The accumulation of DPRs in the PGE database can eventually lead to the database becoming full.
  - The custom Sybase stored procedure, `sp_delete_dprs` is used to delete unwanted DPRs and all related information from child tables.
- If a PGE needs to be deleted,
  - `sp_delete_pges` - procedure to delete a pge and all related information from child tables (note: this procedure should be performed carefully, and will probably not occur frequently)

## Transaction Log



- Each SQL Server database has its own transaction log
- System table = *syslogs*
  - managed exclusively by SQL Server
  - contains a record of changes made in the database in the order in which they occur
  - SA can check how full *syslogs* is:  
`>dbcc checktable (syslogs)`
- Any transaction may generate a corresponding insertion into the *syslogs* table for the affected database
- Transaction Log maintenance (automatic)
  - > `sp_interimthresholdaction`
  - > `sp_thresholdaction`

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A transaction log is updated for all transactions that occur within the database. This log is used to perform a complete database recovery in the event of a media failure.

- the start and end of transactions are recorded
- before and after images of all data modifications are recorded
- **syslogs** is a table in the SQL Server database (*Master*) that is shared by all users
- when a transaction is written to **syslogs**, SQL Server guarantees that the transaction can be recovered

(*Fast Track to SYBASE, Student Guide, Vol. 1, p. 9-6, Ver 2.1, (1994), Sybase, Inc.*)

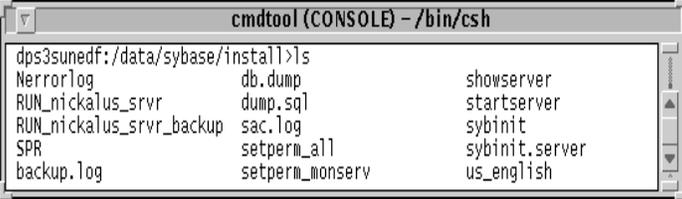
- The System Administrator has the ability to check how full the *syslogs* are by typing:  
`dbcc checktable (syslogs)`
- **Transaction Log Maintenance.** Since the transaction log records all changes to its database, it grows in size over time, and can cause problems when full. The transaction log must be dumped periodically. Custom scripts have been written to clear the transaction logs for the PDPS databases automatically:
  - `sp_interimthresholdaction` - Clears out the PDPS Sybase transaction log when it is approximately 50% full.
  - `sp_thresholdaction` - Clears out the PDPS Sybase transaction log when it is close to stopping the Sybase server.

## Error Log



- To access the Sybase error log, type (from UNIX):

```
> cd/$SYBASE/install
> ls
```



```
cmdtool (CONSOLE) - /bin/csh
dps3sunedf:/data/sybase/install>ls
Nerrorlog          db.dump           showserver
RUN_nickalus_svr  dump.sql          startserver
RUN_nickalus_svr_backup sac.log           sybinit
SPR                setperm_all       sybinit.server
backup.log         setperm_monoserv us_english
```

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### Discussion Topics

Sybase errors are logged at the system console and on the SQL Server error log. To display the errorlog, type: `cd/$SYBASE/install`

- the Sybase error log and the custom “Event Logger” are separate items.
- Sybase does, however, serve as the database for the “Event Logger”, but not in real-time.

## Using isql Client with Prepared ASCII Files



### Sample Script

```
create procedure sp_view_dpr
  (@dprId          char(36))
as
  declare @run_date          datetime

  declare @dpr_pdps_version char(32)
  declare @dpr_creation_date datetime
  declare @dpr_pge_info_type char(32)
  declare @dpr_pge_info_version char(32)

  select @run_date=getdate()
  /* DPR TABLE */
  select dpr_pdps_ver, pdps_version
```

- To read in an ASCII file containing a query or queries (script) for execution by isql, type:  
`isql -U login_name -P password -i file_name`

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### Discussion Topics

- Script files are text files containing one or more batches of Transact-SQL code, each terminated by “go”
- Scripts can be used to create or alter databases, add logins and users, create objects, set permissions, load small amounts of data, etc.
- To read in an ASCII file containing a query or queries (script) for execution by isql, type:  
`-isql -U login_name -P password -i file_name`

## Database Administration (M&O)



- **Tasks**
  - Database backup  
`dump database database_name to dump_device`
  - Database restoral  
`load database database_name from dump_device`
  - Startup and shutdown of the SQL Server
  - Transaction Log maintenance
  - Adding users to the database
  - Adding logons
  - Deleting users from the database
  - Grant/revoke permissions
- **Roles**
  - System Administrator (sa)
  - System Security Officer (SSO)
  - Operator
  - Database Owner (DBO)

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### Discussion Topics

The Database Administrator is responsible for the overall health of the database. This person can restrict database access through database privileges and can enforce security through auditing the database. In order to perform any database administration, you must have granted permissions access to do so.

- The operations staff are responsible for performing database backups. Database backup is required for two reasons. First, the database must be backed up on a regular basis in order to protect the data from loss due to system failure. Second, database backup must be done in order to preserve the database configuration set up by one instrument team, prior to turning the system over to another instrument team.
  - **Database backup** is accomplished with the **dump database** command. This should be done when the database is in single-user mode or is not in use.
  - **Database restoration** is accomplished with the **load database** command.
- Other server/database administration procedures can be found in the System Administration Manual and the SYBASE SQL Server Reference Manual Vols 1&2. These procedures include:
  - Startup (`$SYBASE/install`) and shutdown of the SQL Server
  - Transaction Log Maintenance
  - Adding Users to the database
  - Adding logins (account)
  - Deleting users from the database
  - Grant/revoke permissions
- Different Sybase Roles (see Chapter 2 in the System Administrator's Guide for details). These roles are not currently set up in the IR1 PDPS database -- it is up to the sites to determine if they want to set up these roles.

## Sybooks



```
> $SYBASE/sybooks
```

- Two environment variables:
  - `setenv SYBROOT $SYBASE/sybooks`
  - `setenv EBTRC $SYBROOT/sun5m/.ebtrc`

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### Discussion Topics

How to set environment variables and gain access to Sybase on-line documentation