COMP 3400 Mainframe Administration[1]

Christian Grothoff
christian@grothoff.org

http://grothoff.org/christian/

[1] These slides are based in part on materials provided by IBM's Academic Initiative.

SMP/E

- z/OS tool for managing the installation of software products and to track modifications

- Code and its modifications are located in the SMP/E databased called the *consolidated software inventory* (CSI)

- CSI consists of one or more VSAM data sets

SMP/E Features

SMP/E controls changes at the component level:

- Selects proper “levels” of code to be installed from a large number of potential changes
- Calls system utilities to install the changes
- Keeps records of installed changes
- Can display status of software
- Allows reversal of changes

Elements

Elements are the basic building blocks of the z/OS system:

- Object modules
- Source code
- Macros
- Help-panels
- CLISTs and REXXs

Elements are associated with and dependend upon other products or services installed on the same z/OS system.

System Modifications (SYSMODs)

- SYSMOD contains the information SMP/E needs to install and track system modifications
- SYSMODs are a combination of elements and control information

Modification Text

- Contains the elements supplied by the SYSMOD
- Often only specifies the differences

Modification Control Statements (MCS)

- Indicate what elements are updated or replaced
- Specify how the SYSMOD relates to product software and other SYSMODs
- Designated by “++” as the first two characters

Types of SYSMODs

FUNCTION Adds a new product or function

PTF IBM correction to all z/OS installations

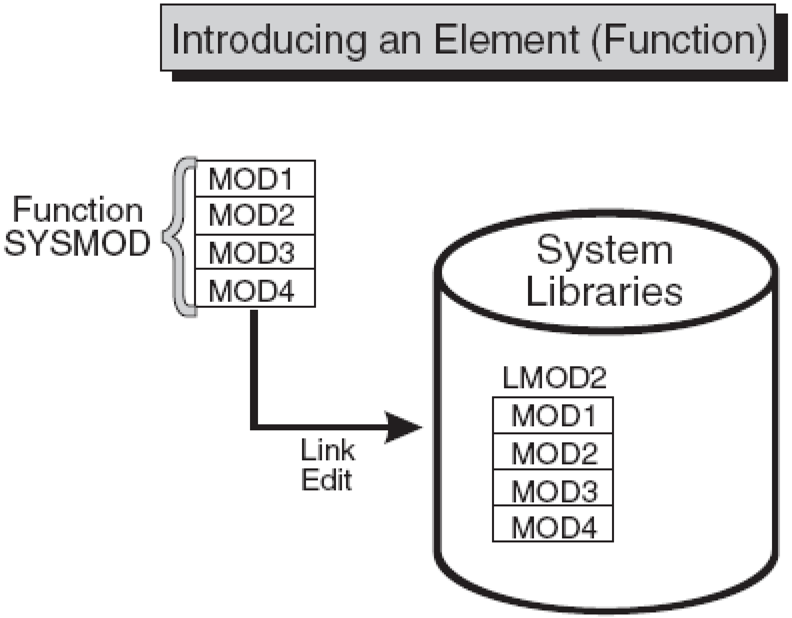
APAR Temporary fix to a specific z/OS installation

USERMOD Installation-provided modification

Function SYSMODs

- Function SYSMOD adds new elements to a system
- Function SYSMODs can provide new products, new version or release of a product or updated fucntions for an existing product
- All other types of SYSMODs are dependent upon the function SYSMOD

Example: Function SYSMODs



Program Temporary Fixes (PTFs)

- Provided by IBM when a problem with a software element is discovered
- PTF SYSMOD contains “tested” fix for a problem; they should be installed even if you did not (yet) experience the particular problem they fix
- PTF SYSMOD is used to install the PTF
- PTF SYSMODs require presence of certain function SYSMODs

Authorized Program Analysis Report (APAR)

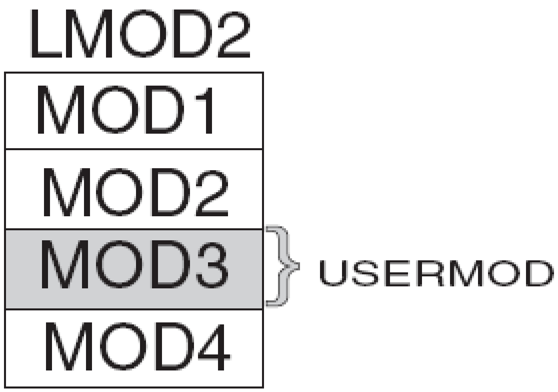
- Used to correct serious problems before PTF is ready for distribution
- APARs may just contain workarounds and could cause other problems; they should only be installed if you are experiencing a serious problem
- APAR can require the installation of other PTF or APAR SYSMODs

USERMOD SYSMODs

- Allow you to tailor IBM code to meet your specific needs
- Can replace, update or introduce elements
- Can have function, PTF, APAR or USERMOD SYSMODs as prerequisites

Example: USERMOD SYSMODs

Customizing an Element (USERMOD)



Prerequisites and corequisites

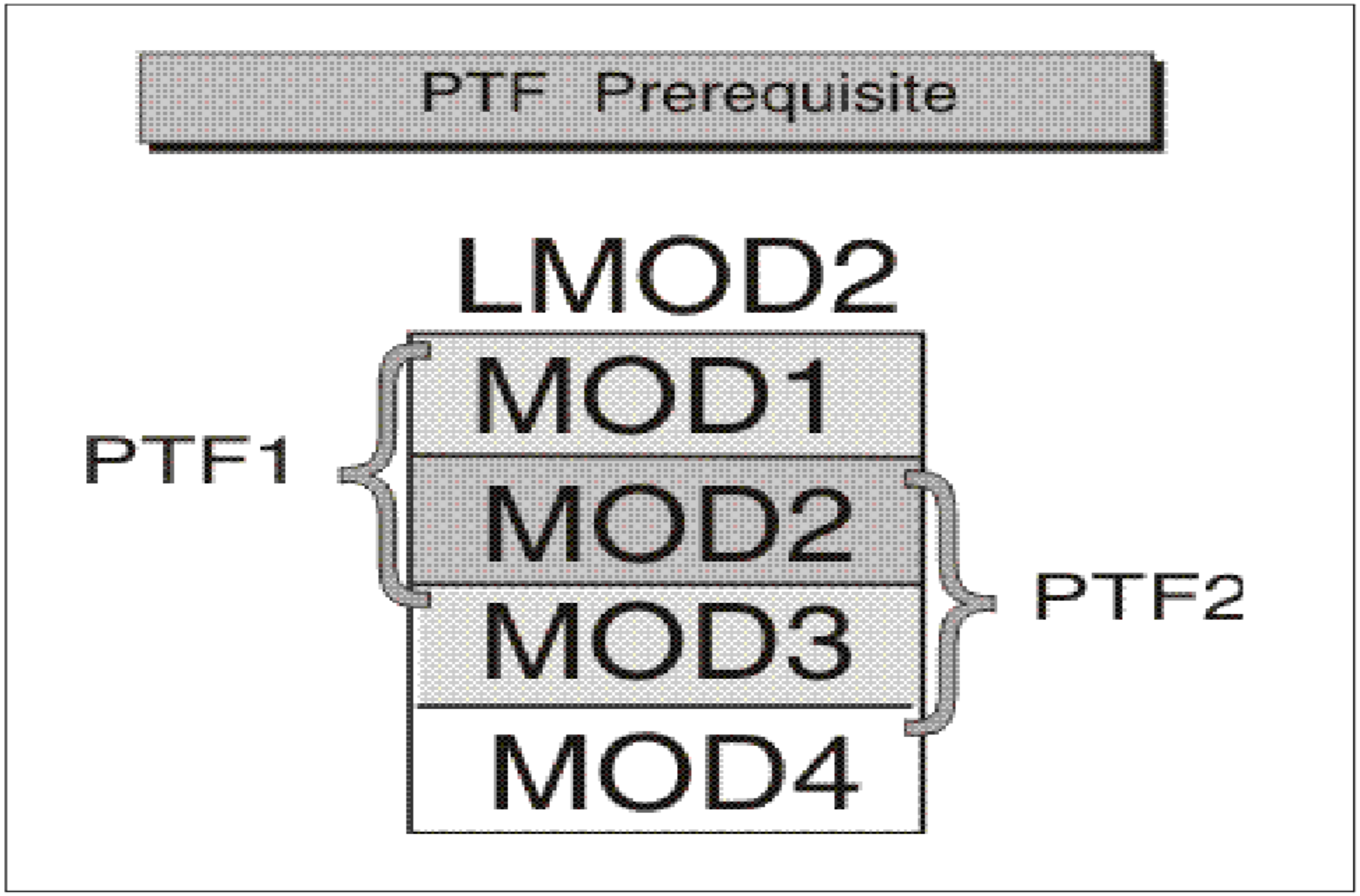
- *Base function SYSMODs* add or replace an entire system function (and should have no dependencies)

- *Dependent function SYSMODs* provide an addition to an existing system function and have a base function SYSMOD as a prerequisite

- PTF SYSMODs can have function and PTF SYSMODs as prerequisites and other PTF SYSMODs as corequisites

- APAR SYSMODs can have APAR, PTF and function SYSMODs as prerequisites and other APAR SYSMODs as corequisites

Example: PTF prerequisites



Tracking Elements of the System

- Need to manage prerequisites and corequisites
- The same module might be part of many different load modules

⇒ Replacing a module may require updates to many load modules!

Modification Identifiers

Each element is associated with three modification identifiers:

- Function Modification Identifier (FMID)
- Replacement Modification Identifier (RMID)
- Update Modification Identifier (UMID)

SMP/E uses modification identifiers to identify elements and their various modifications and updates.

Common MCSes: SYSMOD type

The first MCS is used to specify the type of the SYSMOD:

```
++USERMOD
```

Common MCSes: VER

++VER is a required statement which describes the environment necessary for installing the SYSMOD:

```
++VER(system-and-release-ID)
  PRE(prerequisite-PTFs)
  REQ(related user mods)
  SUP(user-mods incorporated into this one)
```

Common MCSes: JCLIN

```
++JCLIN
  /* JCL used to link-edit the affected
     load modules */
.
```

Common MCSes: ZAP and MOD

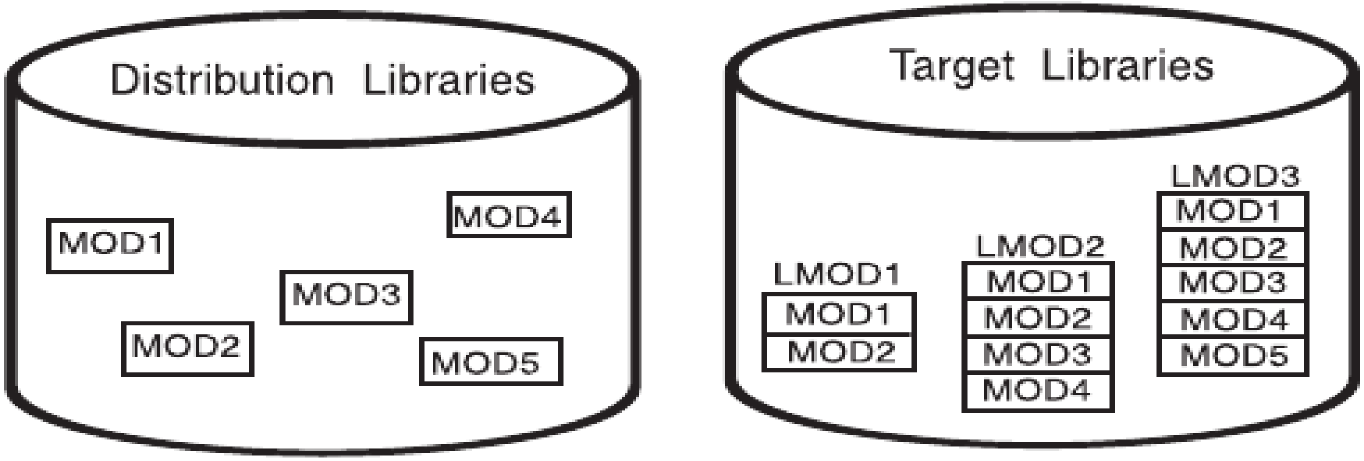
```
++MOD(MODULEB)         /* Name of module */
   DISTLIB(AOS12)      /* ddname of DLIB */
...
... Object module for MODULEB
...
```

`MOD` is followed by the object deck whereas ZAP is followed by a set of *superzap* control statements.

Where SMP/E Keeps Data

- Distribution libraries – all the elements used as input for running your system (important for backup)
- Target libraries – executable code needed to run the system
- Consolidated Software Inventory (CSI) – information about the structure of the z/OS system

SMP/E Libraries



The Consolidated Software Inventory

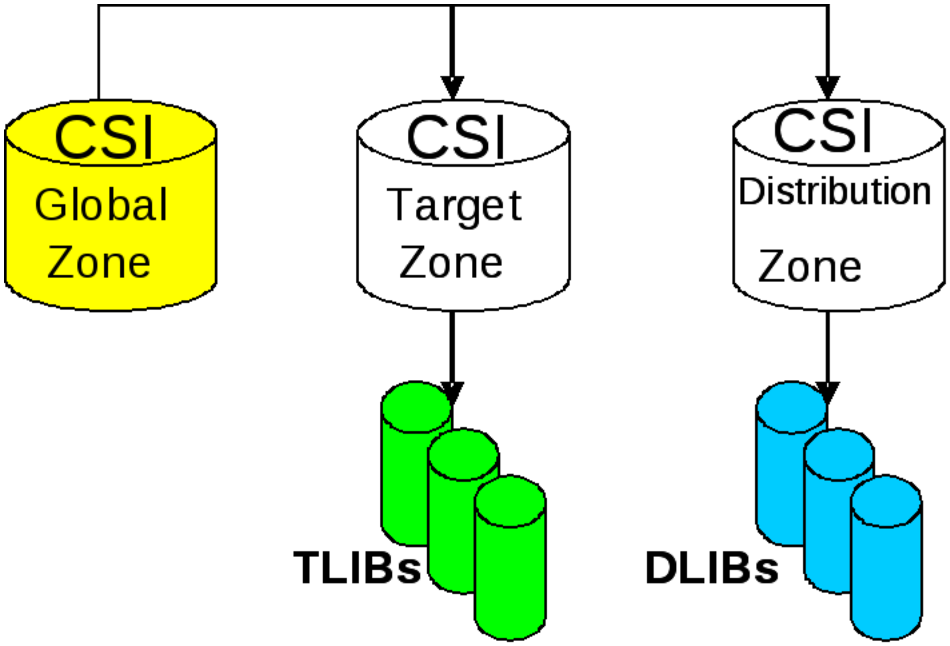
The CSI contains entries for the elements in the distribution and target libraries, grouped into zones:

- Global zone
- Target zone(s)
- Distribution zone(s)

SMP/E Commands for Zones

- ZONECOPY – create a copy of a zone (for example, to create a zone for testing)
- ZONEEXPORT – serialize a zone to a sequential data set (for example, for backups)
- ZONEDELETE – delete a zone
- ZONEMERGE – merge one zone into another
- ZONERENAME – rename a zone

SMP/E zones and libraries



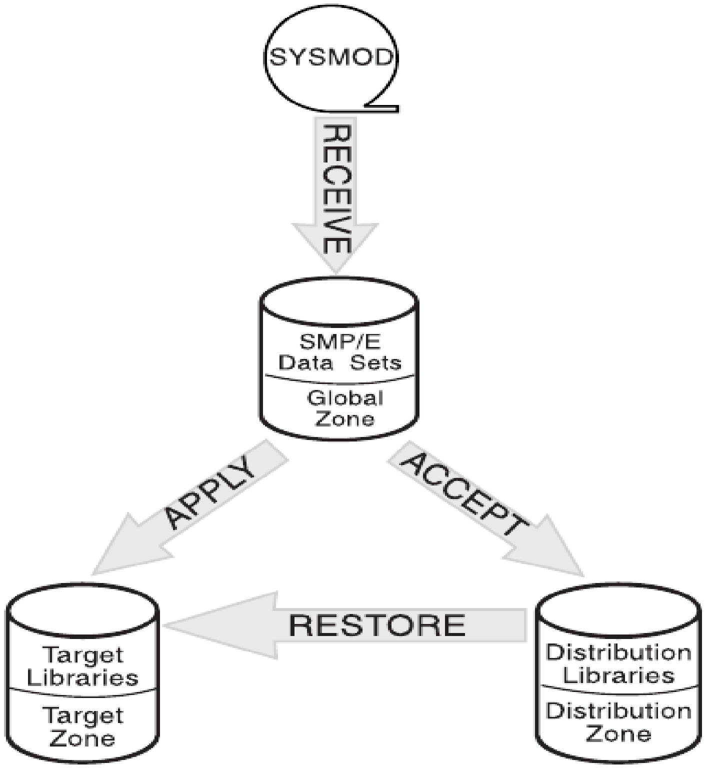
SMP/E Commands

RECEIVE Place a SYSMOD in to the SMP/E library and create CSI entries for it

APPLY *Select* received SYSMODs for installation in the target libraries (TLIBs); SMP/E ensures that prerequisites are also installed in the proper sequence using the correct functional levels.

ACCEPT Take *selected* SYSMODs and install them into the associated distribution libraries.

SMP/E Commands



Examples: RECEIVE

```
SET BDY(GLOBAL).  // work in global zone
RECEIVE.          // receive everything
RECEIVE HOLDDATA. // ... only hold data
RECEIVE SYSMODS.  // ... only SYSMODS
RECEIVE FORFMID(HOP0001). // ... specific product
```

Example: RECEIVE in JCL (1/2)

```
//jobname   JOB ...
//RECEIVE   EXEC PGM=GIMSMP
//SMPCSI    DD DSN=SMPE.GLOBAL.CSI,DISP=SHR
//SMPOUT    DD SYSOUT=*
//SMPRPT    DD SYSOUT=*
//SMPPRINT  DD SYSOUT=*
//SMPCNTL   DD *
  SET BOUNDRY(GLOBAL).
  RECEIVE SYSMODS HOLDDATA
    ORDER(ORDERSERVER(ORDRSRVR)
      CONTENT(PTFS(UQ12345,UQ98765))
      FORTGZONES(ZOS14)).
```

Example: RECEIVE in JCL (2/2)

```
//ORDRSRVR  DD *
  <ORDERSERVER
   url="https://gw.boulder.ibm.com/projects/ecc/ws/"
   keyring="MRWKRNG"
   certificate="SMPE Client Certificate">
  </ORDERSERVER>
/*
```

In addition to the specified PTFs “UQ12345” and “UQ98765” all requisites that are not already present will also be received.

Examples: APPLY

```
SET BDY(ZOSTGT1).           // specify target zone
APPLY PTFS.                 // apply all PTF SYSMODs
APPLY SELECT(UQ12345).      // ... specified PTF
APPLY APARS USERMODS.       // ... all APARs & USERMODs
APPLY PTFS FORFMID(HOP0001) // ... PTFS for product HOP001
APPLY ... CHECK.            // simulate only
```

Examples: RESTORE

```
SET BDY(ZOSTGT1).                 // specify target zone
RESTORE SELECT(UZ001).            // remove PTF UZ001
RESTORE SELECT(UZ001) GROUP.      // ... PTF UZ001 and deps
```

Examples: ACCEPT

```
SET BDY(ZOSTGT1).     // specify target zone
ACCEPT PTFS.          // accept all PTFs
ACCEPT SELECT(UZ001). // ... specified PTF
```

Questions

?