IBM Software Group

z/OS® V1R9 Communications Server

Generic resources resolution enhancements

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This presentation discusses the Generic Resources resolution enhancements for the z/OS V1R9 Communications Server..

Background information

- Generic Resources (GR) is a SNA session distribution function available to VTAM® applications in a sysplex.
  - ▶ Purpose = high availability and load balancing.
  - ▶ Allows multiple applications to be known by the same generic name.
  - ▶ Applications must be modified to use SNA API commands to register and manage their generic name.
  - ▶ When users logon using a generic name the session is distributed among eligible generic resource applications.
- Session distribution is determined during session initiation in a process called generic resource resolution.
  - ▶ Performed at the first VTAM APPN node in the sysplex that receives the session initiation request and has access to the generic resource Coupling Facility structure.

Generic Resources purpose is to provide high availability and load balancing. Generic Resource resolution is the process of identifying a specific generic resource instance. Generic Resources is an expansion of the older VTAM USERVAR function.

For those of you familiar with TCPIP, Generic Resources is analogous to the Distributed Dynamic Virtual Internet Protocol Address (DDVIPA) function in TCP/IP.

Background information

- Typical generic resource applications are CICS®, IMS™, DB2®, TSO, and session managers
- Generic resource resolution is done as follows:
  - ▶ If an affinity exists between the LU and a specific instance of a generic resource (because of a previous or existing parallel session), then the session setup is directed to the same GR instance.
  - ▶ Otherwise :
    - ✓ Determine all eligible GR instances, and using the MVS Work Load Manager (WLM) select the best GR instance.
    - ✓ Call the generic resource exit ISTEXCGR to potentially override the MVS WLM selection and set GR resolution flags. GR resolution flags only affect the next GR Resolution.
- If no affinity exists then generic resource resolution can be modified by the GR resolution flags that are set in the GR Exit

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The default generic resource resolution process is to first use an affinity to direct sessions from the same LU to the same generic resource instance. An affinity is created when the first session between an LU and a generic resource is started. An affinity maps the LU name and generic resource name to a specific instance of the generic resource. If no affinity has been created yet, then the MVS Work Load Manager is called to identify the best generic resource instance. If the generic resource exit (ISTEXCGR) is active then it is called to potentially select a different generic resource instance than was selected by the MVS Work Load Manager and set generic resource resolution flags affecting the next generic resource resolution.

If no affinity exists then generic resource resolution can be modified by the GR resolution flags that are set in the GR Exit. If the GR flag GRRFNPLL is OFF (default) and if the Origin Logical Unit (OLU) is a Local SNA or Local non-SNA LU on this host, then prefer generic resources on this host. Prefer means that if one or more GR instances is active on this host then only these GR instances are considered for GR resolution. However if no GR instance is active on this host or GRRFNPLL is ON then all active GR instances are eligible for GR resolution. If the GR flag GRRFNPLA is OFF (default) and if the Origin Logical Unit (OLU) is an application on this host, then prefer generic resources on this host. If the GR flag GRRFWLMX is ON (default), then call the MVS Work Load Manager to identify the best eligible generic resource instance. Otherwise identify the best GR instance based on lowest active and pending session counts. If the GR flag GRRFUVX is ON (default ON for first call then set OFF by the default GR exit), then call the Generic Resource exit to identify the specific generic resource and set GR exit flags that will influence the next GR resolution. If all defaults are used and the default GR exit is not modified to select a generic resource instance, then the GR identified by WLM is used.

Problem: GR exit flags cumbersome, limited

- Users are reluctant to code and maintain the assembler level GR exit, even to only set the GR exit flags.

- Since the GR exit flag settings only affect the next GR resolution, they can not be used to differentiate GR resolution behavior for different GR applications.

- Users have the ability to code a GR exit to perform GR resolution using any criteria, but they are very reluctant to code and maintain a complex assembler level exit.

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The main point is that setting generic resource resolution flags in assembler level programs is not very usable. Also the flags cannot be changed in any meaningful way for different generic resources, since you can never know what generic resource will need to be resolved for the next session.

Problem: Duplicate load balancing DDVIPAA and GRCICS
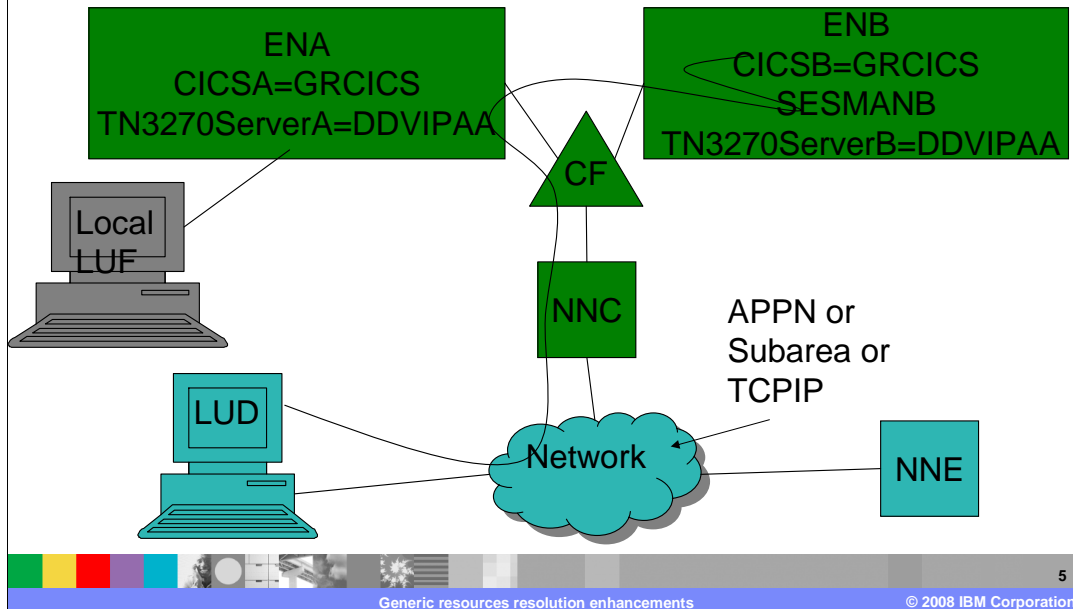
Multiple load balancing functions for what are different stages of the same session could result in unnecessarily long session paths. During session setup it is possible that a session will pass through multiple load balancing functions (for example, TN3270 using DDVIPA, Session Manager using GR, and final application using GR). This could result in a final session path that needlessly passes through multiple hosts with little or even detrimental workload distribution value.

This shows a TCPIP connection that has been distributed to the TN3270 server A using DDVIPA workload distribution. In turn a SNA session is started from TN3270 server A to session manager SESMANB. A target generic resource application GRCICS is then selected at the session manager and it does a CLSDST-PASS to generic resource GRCICS. Generic resource resolution selects generic resource instance CICSB. Given that load balancing was done once for the connection to TN3270 server A it may be beneficial for the generic resource resolution done during CLSDST PASS processing at ENB to prefer a generic resource instance on the Origin Logical Unit host: that is CICSA on ENA. There is no way to do this today, unless you make substantial changes to the generic resource exit.

Solution - Create GR preferences table definitions

- Create a GR Preferences table to allow users to more easily define generic resource resolution preferences.
  - Allow GR preferences to be defined for each GR name.
  - Allow default GR preferences to be defined.
  - Create a new GR preference function PASSOLU that causes GR names resolved during CLSDST-PASS processing to prefer GR instances on the OLU host.
- A new VBUILD type GRPREFS has been created to identify the generic resource preferences table.
- A new definition statement GRPREF has been defined within the GRPREFS table to define GR resolution preferences. A GRPREF statement can be defined for each GR name. A nameless GRPREF statement can be used to define default GR preferences.
  - Five operands can be defined on the GRPREF definition statement.
    - ✓ GREXIT=YES|NO   (DEFAULT=NO)
    - ✓ LOCAPPL=YES|NO (DEFAULT=YES)
    - ✓ LOCLU=YES|NO   (DEFAULT=YES)
    - ✓ PASSOLU=YES|NO (DEFAULT=NO)
    - ✓ WLM=YES|NO   (DEFAULT=YES)
  - Except for the new function of PASSOLU these operands default to the same behavior as the corresponding GR EXIT flags.
- The GRPREFS table can be activated by an operator command or it can be started at VTAM initialization by adding it to the VTAM Config List
  - Only one GRPREFS table can be active at a time. It cannot be inactivated, rather only replaced by activating a new table.

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You can now create a generic resources preferences table to define generic resource preferences for each generic resource name.

The PASSOLU generic resource resolution preference was created to allow generic resource resolution to prefer generic resource instances on the OLU host. This is most useful for session managers in the sysplex that CLSDST-PASS to generic resources.

The new VBUILD type is GRPREFS. The new definition statement GRPREF can be used to identify the generic resource preferences of each generic name. A nameless GRPREF can be defined to identify default generic resource preferences.

The old generic resource exit flags map functionally to the new generic resource preferences operands. Generic resource preference PASSOLU is the new generic resource preferences operand.

PASSOLU can be specified with a value of YES or NO. A value of YES - For third-party-initiated (CLSDST PASS) sessions, indicates generic resource resolution will prefer generic resource instances located on the OLU host (the host that has the session that is being passed). If no generic resource instances are available on the OLU host, then all instances of the generic resource are eligible for resolution. A value of NO - Indicates all instances of the generic resource are eligible for resolution (default).

PASSOLU does not correspond to any old generic resource exit flag function. PASSOLU could be useful if the original OLU had been load balanced before initiating a session to a session manager that will do a CLOSE DEST PASS to a generic resource. Note that both the LOCAPPL and LOCLU generic resource preferences could affect the PASSOLU preference. If either of the LOCAPPL or PASSOLU preferences are set to YES, then a CLOSE DEST PASS session from a local application to a generic resource will prefer a generic resource on the local host. If either of the LOCLU or PASSOLU preferences are set to YES, then a CLOSE DEST PASS session from a local LU to a generic resource will prefer a generic resource on the local host.

You can activate a GRPREFS table using the VARY NET,ACT,ID= command where the name of the table is the VTAMLST member name that contains the generic resource preferences definitions.

You can also start the GRPREFS table using the VTAM Config List using the same name. Since a table cannot be inactivated, to effectively inactivate a table activate a generic resource preferences table with a nameless entry and no operands.

Display GRPREFS example

```
D NET,GRPREFS
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = GR PREFERENCES TABLE
IST075I NAME = GRHOST01, TYPE = GR PREFERENCES
IST924I -------------------------------------------------------------
IST2210I GR PREFERENCE TABLE ENTRY = **NAMELESS**
IST2202I GREXIT   = NO        WLM    = YES       LOCLU  = YES
IST2204I LOCAPPL  = YES       PASSOLU = NO
IST924I -------------------------------------------------------------
IST2210I GR PREFERENCE TABLE ENTRY = GRCICS
IST2202I GREXIT   = NO        WLM    = NO        LOCLU  = YES
IST2204I LOCAPPL  = YES       PASSOLU = YES
IST924I -------------------------------------------------------------
IST2210I GR PREFERENCE TABLE ENTRY = GRTSO
IST2202I GREXIT   = YES       WLM    = YES       LOCLU  = YES
IST2204I LOCAPPL  = YES       PASSOLU = NO
IST314I END
```

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You can display the entire GRPREFS table using the D NET,GRPREFS command. The generic resource preferences definition without a name is designated in the display by **NAMELESS**.

The **NAMELESS** entry identifies the defined default generic resource preferences. If no generic preference table is defined to VTAM the generic resource preferences displayed will indicate **DEFAULT**.

Display a GR application's GR preferences example

- **Display the GRPREFS used by GR APPLGR**

```
D NET,ID=APPLGR
 IST097I DISPLAY ACCEPTED
 IST075I NAME = APPLGR, TYPE = GENERIC RESOURCE
 IST1359I MEMBER NAME        OWNING CP   SELECTABLE  APPC
 IST1360I NETA.APPL1         SSCP1A        YES        NO
 IST2210I GR PREFERENCE TABLE ENTRY = **NAMELESS**
 IST2202I GREXIT  = NO       WLM      = YES      LOCLU    = YES
 IST2204I LOCAPPL = YES      PASSOLU  = NO
 IST314I END
```

Generic resources resolution enhancements

The existing D NET,ID=generic resource name output has been enhanced to include the generic resource preferences associated with the generic name. Messages IST2210I, IST2202I, and IST2204I have been added to the previously existing display.

Things to think about

- GR flag settings from the GR exit will be ignored.
- If you currently do not use the GR EXIT or use the sample GR EXIT unchanged then there is no migration impact.
- If you use the GR EXIT only to set the GR flags differently from the default exit, then you must either define a default or specific GR Preference Table entries with equivalent settings.
- If you use the GR EXIT to perform GR resolution then you must define default or specific GR Preference Table entries that set GREXIT=YES.
- If you use session managers in relay mode in your sysplex, then consider setting LOCAPPL=NO to direct the GR resolution to the most beneficial target in the sysplex.
- If you use TN3270 servers that already have distributed connections and session managers in pass-through mode on different hosts, then consider setting PASSOLU=YES to direct the GR resolution to the most beneficial target.

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The primary migration impact will be for users that use the exit today to set the generic resource exit flags differently than the settings in the default generic resource exit. If so then at a minimum you must code a default generic resource preference table entry using a nameless entry with generic resource preferences that match your current generic resource exit flag settings. If your generic resource exit does generic resource resolution you must also set the generic resource preference GREXIT=YES.

If your session manager runs in relay mode and is skewing sessions to a single generic resource instance, then set LOCAPPL=NO. If your TN3270 LUs are already load balanced and you use a session manager in pass-through mode on different hosts, then set PASSOLU = YES.

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