Documentation Bulletin

Severity Level	Info	Bulletin Number	CGBU_018115
Issue Date	2/2/2016	**Expires**	DSR 7.2 Customer Documentation Set
Title	Incorrect PCRF Pool Upgrading information in DSR 5.1, 6.0, 7.0, and 7.1		
Product	DSR	**Release**	6.0
Priority	FYI	**Related Bugs**	Bug 21675604
Impacts Compatibility	NO	**Product Line(s):** *(Only if Impacts Compatibility = YES)*	N/A
Author	M. Garrell	**Part No. Affected**	E53472, E63633
Markets	ALL		

Approved By/Date	5-Feb-2016
Information Development Manager	Terri Boykin

Problem Description

The *Policy and Charging Application User's Guide* for DSR Release 5.1, 6.0, 7.0, and 7.1 contains an Appendix about PCRF Pool Upgrading that incorrectly states information about PCRF Pooling Upgrading.

Impact

The customer may be confused by information regarding PCRF Pool Upgrading in the *Policy and Charging Application User's Guide*

Needed Actions

The *Policy and Charging Application User's Guide* for DSR Release 6.0, 7.0, and 7.1 contains an Appendix about PCRF Pool Upgrading that incorrectly states information about PCRF Pooling Upgrading.

Initial Installation for PCRF Pooling

Note: PCRF Pools and PCRF Sub-Pool Selection Rules are only configured at the NOAM.

When a DSR release, including PCRF Pooling is initially installed (not upgraded from a previous release that did not include PCRF Pooling) and Policy DRA is activated, PCRF Pooling is enabled by default.

Note: Use the explanations and procedures in the Diameter Configuration online help and the *Diameter User Guide* to complete the configuration of the Diameter Configuration components for the system.

The following must be performed prior to using the software for policy signaling:

1. Diameter must be configured according to the appropriate release documentation.
2. Policy and Charging Application feature must be activated.
3. Policy DRA must be enabled.
4. PCRF Pooling must be configured; consider:

- The PCRF Pooling capability is enabled by default and cannot be disabled.
- A Default PCRF Pool is pre-configured and cannot be deleted. This PCRF Pool can be used or not used, similar to the Default PRT table.
- The Default PCRF Pool is not mapped to a PRT table by default. The PCRF Pool to PRT Mapping table uses the Not Selected choice for PRT by default.
- When Access Point Names are configured, they must be mapped to a configured PCRF Pool.

If PCA is activated on a DSR that was upgraded to a release that supports PCRF Pooling and the PCA activation occurs after the upgrade is completed and accepted, the considerations listed above apply to the initial install. Activation of PCA on a network where the upgrade is not completed and accepted on all servers is prohibited by the activation script.

Upgrading for PCRF Pooling

This section discusses upgrade of a Policy DRA network from a release that supports Policy DRA, but does not support PCRF Pooling, to a release that does support PCRF Pooling. This information is limited to cases in which the Policy DRA feature has been activated prior to upgrading to a release that supports PCRF Pooling.

A graceful upgrade is supported when moving to a DSR release that includes PCRF Pooling.

A graceful update ensures:

- Existing bindings are not adversely affected by the in-service upgrade.
- Policy DRA business logic continues to execute the previous release logic until PCRF Pooling is explicitly enabled.
- Split bindings are not created.
- PCRF Pooling configuration can be performed before or after enabling PCRF Pooling with no unexpected behavior.
- If PCRF Pooling is enabled with no configuration changes, the Policy DRA behavior will be the same as prior to PCRF Pooling being enabled (assuming that all APNs were already configured).
- If PCRF Pooling is configured prior to enabling PCRF Pooling, existing bindings are honored until they are released normally. Only new bindings are routed according to the PCRF Pooling behavior.

Configuration Changes Caused by Upgrading to PCRF Pooling

After upgrading to a DSR release that supports PCRF Pooling, but prior to enabling the PCRF Pooling functionality, the following changes to Policy DRA configuration are completed automatically by the upgrade software:

- A single PCRF Pool called "Default" has been created. This can be seen on the NOAMP GUI at **Policy and Charging > Configuration > Policy DRA > PCRF Pools**.
- All configured APNs are mapped to the Default PCRF Pool. This can be seen on the NOAMP GUI at **Policy and Charging > Configuration > Access Point Names**.
- The PCRF Pooling functionality is NOT Enabled. This can be seen on the NOAMP GUI at **Policy and Charging > Configuration > Policy DRA > Network-Wide Options**.
- There are no PCRF Sub-Pool Selection Rules configured on the NOAMP GUI at **Policy and Charging > Configuration > Policy DRA > PCRF Sub-Pool Selection Rules**.
- The Default PCRF Pool is mapped at each site to the same PRT table that was configured for new

bindings on the SOAM GUI at Policy and Charging > Configuration > Policy DRA > Site Options in the field called Peer Route Table Name. The new mapping can be seen on the SOAM GUI at **Policy and Charging > Configuration > Policy DRA > PCRF Pool To PRT Mapping.**

- The new Error Condition to be used when a binding capable session initiation request arrives with an unconfigured APN or no APN defaults to Diameter response code 3002. This can be seen on the SOAM GUI at Policy and Charging > Configuration > Policy DRA > Error Codes for the error condition Missing Or Unconfigured APN.

On a system that is upgraded to PCRF Pooling, there are three phases to consider:

1. System upgraded, but PCRF Pooling not yet enabled
2. PCRF Pooling enabled and database migration in progress
3. PCRF Pooling enabled and database migration completed (this phase is equivalent to a fresh install with PCRF Pooling)

System upgraded, but PCRF Pooling not yet enabled

After upgrade (and during the upgrade), but prior to enabling PCRF Pooling, no behavior changes from the prior release.

- All signaling business logic from the prior release is still used.
- All PCRF Pooling data can be safely configured without affecting ongoing signaling.
- All bindings and sessions are maintained over the upgrade.
- All new bindings are created in the old binding tables.
- APN to PCRF Pool mappings are not yet used.
- The APN present in session initiation requests is ignored except for the purpose of establishing the proper Stale Session Lifetime as was done in the prior release.
- All sessions with the same binding key are routed to the same PCRF.

PCRF Pooling enabled and database migration in progress

PCRF Pooling functionality is enabled from the NOAMP GUI at **Policy and Charging > Configuration > Policy DRA > Network-Wide Options** by checking the Enable PCRF Pooling checkbox. PCRF Pooling can only be enabled once all servers in the network have been successfully upgraded to the release supporting PCRF Pooling and the upgrade has been accepted on all servers. The GUI will not allow PCRF Pooling to be enabled until this state has been achieved.

Once PCRF Pooling is enabled, the following occurs:

• Binding capable session initiation requests arriving with no APN, or an APN that is not configured in **Policy and Charging > Configuration > Access Point Names**, are responded to using the Diameter error response configured for the Missing Or Unconfigured APN condition at **Policy and Charging > Configuration > Policy DRA > Error Codes**.

- PCRF Pool selection occurs.
- The binding database is consulted to determine if a suitable existing binding should be used:
  - If there is a binding in the IMSI-Only table for the IMSI, that binding is used, else
  - If there is a binding in the IMSI+APN table for the IMSI and APN, that binding is used, else
  - If there is a binding in the IMSI+APN table for the IMSI and PCRF Pool, that binding is used, else
  - Create a new binding.

- If a binding is found in the IMSI-Only table, the binding timestamp must be consulted as was done prior to the PCRF Pooling release in order to determine if the binding is Early or implicitly Final.
- If a binding is found in the IMSI+APN table, the binding state explicitly indicates whether the binding is Early or Final; no timestamp comparison is necessary.
- If a binding capable session initiation request is designated as an Early Slave and PCRF Pooling is Enabled, polling of the binding database occurs instead of the pre-PCRF Pooling session polling.
    - There is no longer a need for routing the slave binding capable session initiation request to the mated pair where the master session was created.
    - There is no longer a use for the PDRA-Early-Binding AVP.
- If a new binding is necessary, it is created using the new IMSI+APN table, and includes the IMSI, APN, and PCRF Pool.
- If a new binding was created, the Policy DRA application asks the routing layer to route using the PRT table mapped to the selected PCRF Pool or Sub-Pool.
- If an existing binding was selected, the Policy DRA application asks the routing layer to route using the PRT precedence:
    - PRT associated with the ingress Peer Node, OR
    - PRT associated with the Diameter application-id, OR
    - The Default PRT, OR finally
    - Connections associated with the egress Peer Node
- When a binding capable session is successfully established (i.e. by success response from PCRF)
    - The PCRF that answered is written to the binding such that all subsequent requests that match the binding are routed to the same PCRF.
    - Alternate keys are created
- Binding dependent session initiation requests using IPv4 or IPv6 as correlation keys are handled.
- Binding dependent session initiation requests using MSISDN as correlation key work.
- Both MSISDN-Only and MSISDN+APN binding tables are audited.
- Both old and new IPv4 and IPv6 binding tables are audited.

Note: It is possible to determine the progress of the migration of data from the IMSI Only table by looking at the Records Visited statistic in the audit reports contained in event 22716. The records visited number shows how many IMSI Only records still remain. If no event 22716 occurs for the ImsiAnchorKey table, the migration is complete.

PCRF Pooling enabled and database migration completed

Once there are no more records in the old binding tables (ImsiAnchorKey, MsisdnAlternateKey, Ipv4AlternateKey, and Ipv6AlternateKey), the migration period is considered to be complete. Note that because these tables are partitioned across a number of binding SBR server groups, each server group makes the determination independently as to whether migration has completed. There is no global indicator that shows that migration has completed across the entire binding database.

Once migration has completed for a binding SBR server group:

- All new bindings are created in the IMSI+APN, MSISDN+APN, and the new IP Address tables (ImsiApnAnchorKey, MsisdnApnAlternateKey, Ipv4AlternateKeyV2, and Ipv6AlternateKeyV2).

- Early Binding Master sessions are explicitly updated when they become Final; there is no more implicit transition to Final.
- All Early Binding polling occurs at the binding database, eliminating the need to route an Early Binding Slave Diameter request to the mated pair of the Early Binding Master session with the PDRA-Early-Binding AVP included.
- Binding dependent session initiation requests using MSISDN as correlation key must include a configure APN, or binding correlation for the MSISDN key will fail.
- Auditing of the IMSI-Only, MSISDN-Only, and old IP Address tables ceases.
- Memory for the portion of the database owned by that server group for the IMSI-Only, MSISDN-Only, and old IP Address tables (actually, the old DB Part fragments) is freed.

For more information, see the *Policy and Charging Application User's Guide* on the OTN at http://docs.oracle.com/en/industries/communications/.