

z/OS 3.2 IBM Education Assistant

Solution Name: Sysplex Distributor Support for zCX 2.0

Solution Element(s): zCX

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Agenda

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Trademarks

- See url <http://www.ibm.com/legal/copytrade.shtml> for a list of trademarks.
- Additional Trademarks:
 - None

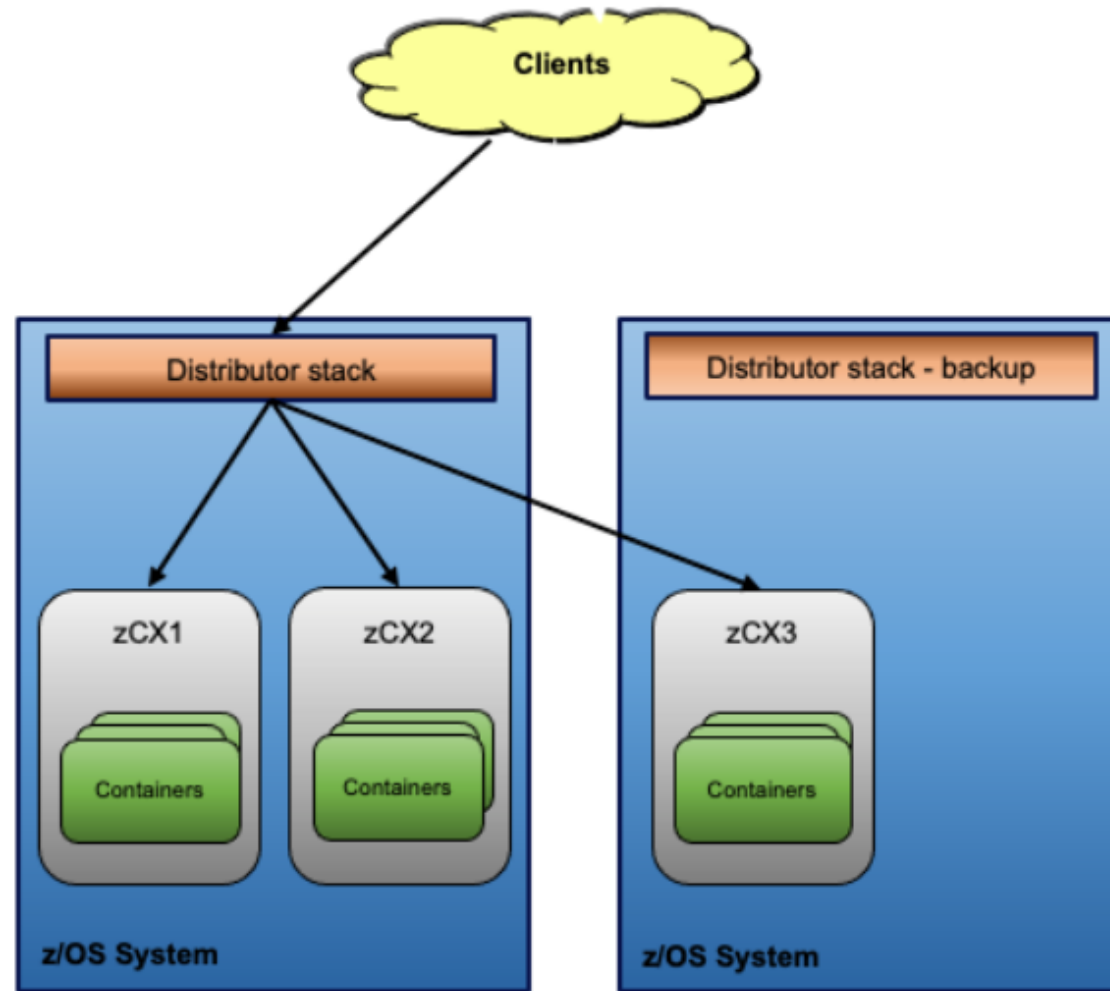
Objectives

- zCX Sysplex Distributor support extends the zCX for Containers dynamic VIPA network communication to allow for network load distribution among targeted zCX instances within a z/OS sysplex.
- It extends the capabilities of dynamic VIPAs to enable distribution of incoming TCP connections to ensure high availability of a particular service running on multiple zCX for Containers instances.

Overview

- Who (Audience)
 - zCX for Containers clients currently using external load balancers to manage highly available solutions
- What (Solution)
 - Exploit CommServer Sysplex Distributor support for IBM z/OS Control Plane Appliance (zCPA) for zCX for Containers instances
- Wow (Benefit / Value, Need Addressed)
 - Provides high availability for mission critical containerized applications/services deployed on multiple zCX for Containers instances without the need of an external load balancer.
 - Minimizes the window where containerized applications/services deployed in zCX for Containers instances are unavailable when there is a zCX for Containers address space failure, planned/unplanned maintenance (IPL, AS restart, zCX upgrade workflow) or during an outage of the z/OS LPAR/zCX for Containers instances.

Solution



Usage & Invocation

1. Update the TCP/IP profile(s) for Sysplex Distributor and restart the TCP/IP stack(s) to activate the updates.
2. Configure participating zCX for Container instances to enable Sysplex Distributor and start or restart the participating zCX for Containers instances to activate the updates.
3. Deploy the containerized application on the participating zCX for Container instances.
 - The z/OS Sysplex Distributor stack dynamically learns when containerized applications are deployed successfully inside the participating zCX for Container instances on the z/OS systems and includes them as a target for distribution and load balancing.
4. Use the Sysplex Distributor Distributed DVIPA to communicate with the containerized application.

Interactions & Dependencies

- Software Dependencies
 - CommServer zCPA Sysplex Distributor Support
- Hardware Dependencies
 - None
- Exploiters
 - zCX for Containers clients

Upgrade & Coexistence Considerations

- To exploit this solution, all systems in the Plex must be at the new z/OS level: No
- This solution is available for z/OS 2.5 and z/OS 3.1 systems via APARs OA66764, OA66765, OA66026, OA66884
- zCX for Container instances running on z/OS 2.4 placed into the Sysplex Distributor configuration are ignored.
- zCX for Containers instance port 1702 is used to communicate with Sysplex Distributor and cannot be used by any zCX for Containers container.
 - A zCX admin must validate that no existing zCX for Containers containers are using port 1702 before enabling Sysplex Distributor support.
 - Containers using port 1702 must be removed and recreated with a different port mapping.

Port Validation Example

```
admin@xxxxxxx:~$ docker run -d -p 10.0.0.1:1702:1702 501e388aee4a  
9f771d1fe566d4c7d9aa442dcae6e9bc85a20dd0eab2f1173b959c7dae641010
```

```
admin@xxxxxxx:~$ docker container port 9f771d1fe566  
1702/tcp -> 10.0.0.1:1702
```

```
admin@xxxxxxx:~$ docker container stop 9f771d1fe566  
admin@xxxxxxx:~$ docker container rm 9f771d1fe566
```

```
admin@xxxxxxx:~$ docker run -d -p 10.0.0.1:1602:1702 501e388aee4a  
99a130f117e94e70033cfb1a8aa07ce45c6abead3d0ca6aca656a310501c1589
```

```
admin@xxxxxxx:~$ docker container port 99a130f117e9  
1702/tcp -> 10.0.0.1:1602
```

Installation & Configuration

- Your TCPIP stack profile(s) must be updated to define the Sysplex Distributor Distributed DVIPA via a **VIPADefine** statement and which zCX instances are to be load balanced via a **VIPADISTRIBUTE** statement.
 - An example TCP/IP profile snippet is provided on the next slide
- Restart the affected TCPIP stack(s) or use the **VARY TCPIP,,OBEYFILE** command to update TCP/IP profile configuration changes dynamically without stopping and restarting the TCP/IP address space.
- Use the **netstat VIPADCFG / -F** report to validate distributable DVIPA is configured correctly.
- Use the **netstat VDPT / -O** report to view the dynamic VIPA destination port table information and confirm target destination is available for load balancing distribution.

Example TCP/IP Profile

```
VIPADYNAMIC
;
; zCX instance DVIPAs
VIPADEFINE 255.255.255.255 10.2.1.51 ZCX
VIPADEFINE 255.255.255.255 10.2.1.52 ZCX
VIPADEFINE 255.255.255.255 10.2.1.53 ZCX
;
; Sysplex Distributor Distributed DVIPA
; This is the external address used by the application
VIPADEFINE 255.255.255.0 192.168.1.222
;
; Sysplex Distributor routing information
; This routes traffic to the listed zCX instances
VIPADISTRIBUTE EXTTARG 192.168.1.222 DESTIP 10.2.1.51 10.2.1.52 10.2.1.53
;
ENDVIPADYNAMIC
```

VIPADISTIBUTE Notes

- ROUNDROBIN is the only supported distribution method
- DESTIP specifies VIPARANGE DVIPAs for z/OS Container Extensions (ZCX), not dynamic XCF IP addresses
 - DESTIP ALL not allowed
- TIMEDAFFINITY and OPTLOCAL will be ignored
- PORT statement not allowed

zCX Instance Configuration

- zCX Sysplex Distributor support is disabled by default, zCX admins desiring to use this support must configure the CommServer Sysplex Distributor on every participating zCX for Containers instance to enable Sysplex Distributor support.
- The zCX provision.xml and reconfigure.xml z/OSMF workflows have a new input category "zCX Sysplex Distributor Configuration" for users to enable or disable Sysplex Distributor for a zCX for Containers instance.
- There are two new workflow variables, "ZCX_SDA_ENABLE" and "ZCX_SDA_DRDVIPAV4"
 - The Sysplex Distributor IPv4 address can not be the same as instance IPv4 address

zCX Sysplex Distributor Configuration

- zCX Root and Config Storage Configuration
- zCX Instance Directory Storage Configuration

* Enable Sysplex Distributor Usage: ⓘ - Enable the Sysplex Distributor for IBM zCX appliance instance:

TRUE

Sysplex Distributor IPv4 address: ⓘ - The Sysplex Distributor IPv4 address for IBM zCX appliance instance:

10.0.0.1

New zCX Instance

- Use the zCX provision.xml z/OSMF workflow to provision a new zCX for Containers instance
 - On the "zCX Sysplex Distributor Configuration" category
 - To enable Sysplex Distributor support, set "Enable Sysplex Distributor Usage" to **True**
 - To disable Sysplex Distributor support, leave "Enable Sysplex Distributor Usage" as **False**
 - If "Enable Sysplex Distributor Usage" field is True, provide the Sysplex Distributor Distributed IPv4 DVIPA in the "Sysplex Distributor IPv4 address" field

Existing zCX Instance

- If the zCX for Containers instance is not at least version 2.0.0, use the zCX upgrade.xml z/OSMF workflow to upgrade the zCX for Containers instance
- Use the zCX reconfigure.xml z/OSMF workflow to modify the zCX for Containers instance
 - On the "zCX Sysplex Distributor Configuration" category
 - To enable Sysplex Distributor support, set "Enable Sysplex Distributor Usage" to **True**
 - To disable Sysplex Distributor support, set "Enable Sysplex Distributor Usage" to **False**
 - If "Enable Sysplex Distributor Usage" field is True, provide the Sysplex Distributor Distributed IPv4 DVIPA in the "Sysplex Distributor IPv4 address" field

Summary

- This support enables high availability for mission critical containerized applications/services deployed on multiple zCX for Containers instances without the need of an external load balancer.

Appendix

- zCX User's Guide online
 - <https://www.ibm.com/docs/en/zos/3.1.0?topic=collections-zos-container-extensions>
 - Planning for zCX section
 - <https://www.ibm.com/docs/en/zos/3.1.0?topic=zcx-zos-communications-server-sysplex-distributor-support>
 - Networking section
 - <https://www.ibm.com/docs/en/zos/3.1.0?topic=workflows-network-considerations>
- CommServer Sysplex Distributor Support
 - <https://www.ibm.com/support/pages/node/7152251>
 - <https://www.ibm.com/support/pages/apar/PH62487>