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XDR static and dynamic configuration

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Aerospike's Cross-Datacenter Replication (XDR) service is for inter-cluster replication of namespaces, sets, or bins. XDR is included with Aerospike Enterprise Edition. The XDR service is built into the Aerospike Server Daemon, `asd`.

For a theoretical and architectural overview, see [XDR Architecture \(/docs/architecture/xdr.html\)](/docs/architecture/xdr.html).

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The act of sending data from one datacenter to another is sometimes called *shipping*.

- A cluster from which records are shipped is called a *source* cluster.
- A cluster to which records are shipped is called a *remote* or *destination* or *target* cluster.

In many examples, to represent the user-defined name of a datacenter, the abbreviation "DC" is often used, like DC1, DC2, and so on.

Static configuration vs dynamic configuration

You can configure XDR in several ways: statically or dynamically.

- *Static configuration* for XDR means that all the XDR-related parameters are included in the Aerospike configuration file, as shown in [Basic static XDR stanza: xdr, dc, node-address-port, and namespace \(/docs/operations/configure/cross-datacenter/index.html#basic-static-xdr-stanza-xdr-dc-node-address-port-and-namespace\)](#).
- *Dynamic configuration* for XDR means that the XDR-related parameters are set with the `asinfo set-config` command while the system is already running. See [Dynamic configuration with asinfo \(/docs/operations/configure/cross-datacenter/index.html#dynamic-configuration-with-asinfo\)](#).

Aerospike recommends dynamic configuration of XDR to have all nodes start shipping at the same time. It is of course a good practice to also make the changes in the configuration file for preserving the configuration through subsequent restarts.

Basic static XDR stanza: xdr, dc, node-address-port, and namespace

The basic `xdr` stanza of the configuration file:

- Enables XDR.
- Defines target datacenters, including IP addresses and ports of cluster nodes.
- Specifies namespaces to ship.

```
xdr {
  dc dataCenter1 {
    node-address-port someIpAddress1 somePort1
    namespace nameSpaceName1A {
      ...
    }
    namespace nameSpaceName1B {
      ...
    }
  }
  dc dataCenter2 {
    node-address-port someIpAddress2 somePort2
    namespace nameSpaceName2A {
      ...
    }
    namespace nameSpaceName2B {
      ...
    }
  }
  ...
}
```

Explanation

Parameter	Default value	Description
xdr	No value is required.	Enables XDR and encloses all other XDR-related parameters.

Parameter	Default value	Description
		You yourself declare a variable name of the datacenter that follows the <code>dc</code> parameter.
<code>dc</code> (/docs/reference/configuration#dc)	None	The <code>xdr</code> stanza can include multiple <code>dc</code> sub-stanzas. The maximum number of <code>dc</code> definitions is 64. Specifies the IP address and port of a node in the remote datacenter.
<code>node-address-port</code> (/docs/reference/configuration#node-address-port)	None	The <code>dc</code> sub-stanza can include multiple <code>node-address-port</code> specifications. Most of these examples show only one <code>node-address-port</code> . The port specification can be followed by a Transport Layer Security (TLS) variable name you define. See Securing XDR with access control, LDAP, and with TLS (/docs/operations/configure/cross-datacenter/xdr_security.html) .
<code>namespace</code> (/docs/reference/configuration)	None	Specifies the name of the namespace data to ship to the remote datacenters. The <code>dc</code> stanza can include multiple <code>namespace</code> declarations.

Dynamic configuration with asinfo

With the `asinfo set-config` command, you can configure datacenters dynamically while the system.

The example parameters shown below can all be entered on a single `asinfo set-config` command line but are shown separately for clarity.

- First, use `asinfo set-config` to define the `dc` and its corresponding `name-address-port` parameters, as shown with the parameters and the `action=add` clause below.

```
asinfo -v "set-config:context=xdr;dc=DC1;node-address-port=10.0.0.2:3000;action=add"
ok
```

- Then, add the desired `namespace` to that defined `dc` , as shown with the parameter and the `action=add` clause below:

```
asinfo -h localhost -v "set-config:context=xdr;dc=DC1;namespace=someNameSpaceName;action=add"
```

- For good measure, you should also add this same configuration to your configuration file.

Rewind or restart shipment

With the `asinfo set-config` command, you can rewind a namespace's shipment of records a specific number of seconds or restart shipment completely.

When you are rewinding, the namespace to rewind must already have been configured either via the configuration file or via the commands discussed in [Configuring dynamically with asinfo \(/docs/operations/configure/configuring-dynamically-with-asinfo\)](/docs/operations/configure/configuring-dynamically-with-asinfo). That is, you cannot use a single command to add a namespace and rewind it at the same time.

In the example below, for datacenter `DC1` and namespace `biggy` , the `action=add;rewind=600` clause rewinds shipment to 10 minutes before the current time:

```
asinfo -h localhost -v "set-config:context=xdr;dc=DC1;namespace=biggy;action=add;rewind=600"
```

For small datasets, you can restart the shipment entirely from the beginning with `action=add;rewind=all` . For large datasets, be careful with starting a complete rewind, which can increase server loads. The example below completely restarts shipment for datacenter `teenytiny` and namespace `itsybitsy` :

```
asinfo -h localhost -v "set-config:context=xdr;dc=teenytiny;namespace=itsybitsy;action=add;rewind=all"
```

Example configuration parameters for XDR topologies

(</docs/operations/configure/cross-datacenter/index.html#example-configuration-parameters-for-xdr-topologies>).

This section presents configuration file parameters that correspond to different supported topologies described in [XDR Architecture \(/docs/architecture/xdr.html\)](/docs/architecture/xdr.html).

- Active-passive.
- Linear chain, also known as "linear daisy chain".

- Star.
- Mesh.

Only the [basic XDR stanzas](#) ([//docs/operations/configure/cross-datacenter/index.html#basic-xdr-stanza-xdr-dc-node-address-port-and-namespace](#)) are shown, with no optional parameters.

Active-passive

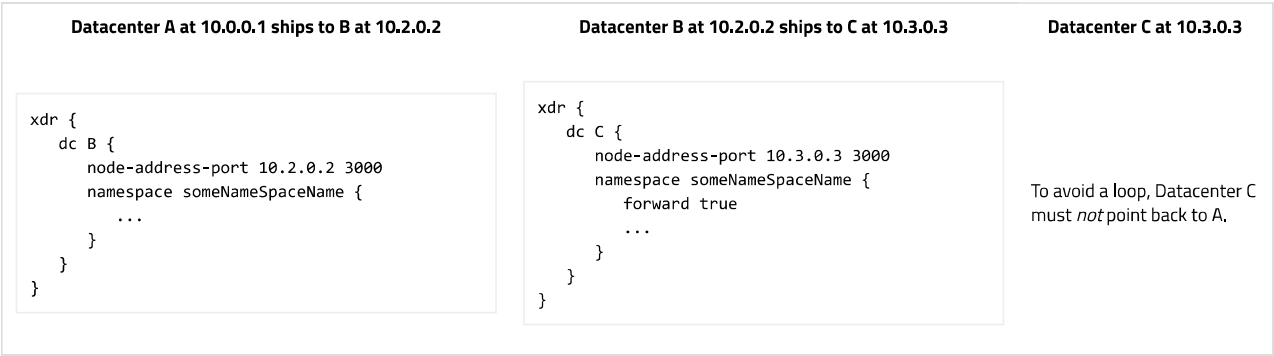
In active-passive topology, data are written to only a single node and then shipped to other datacenters.



Linear chain

In linear chain topology, data are shipped in a straight line from one datacenter to another and another and so on.

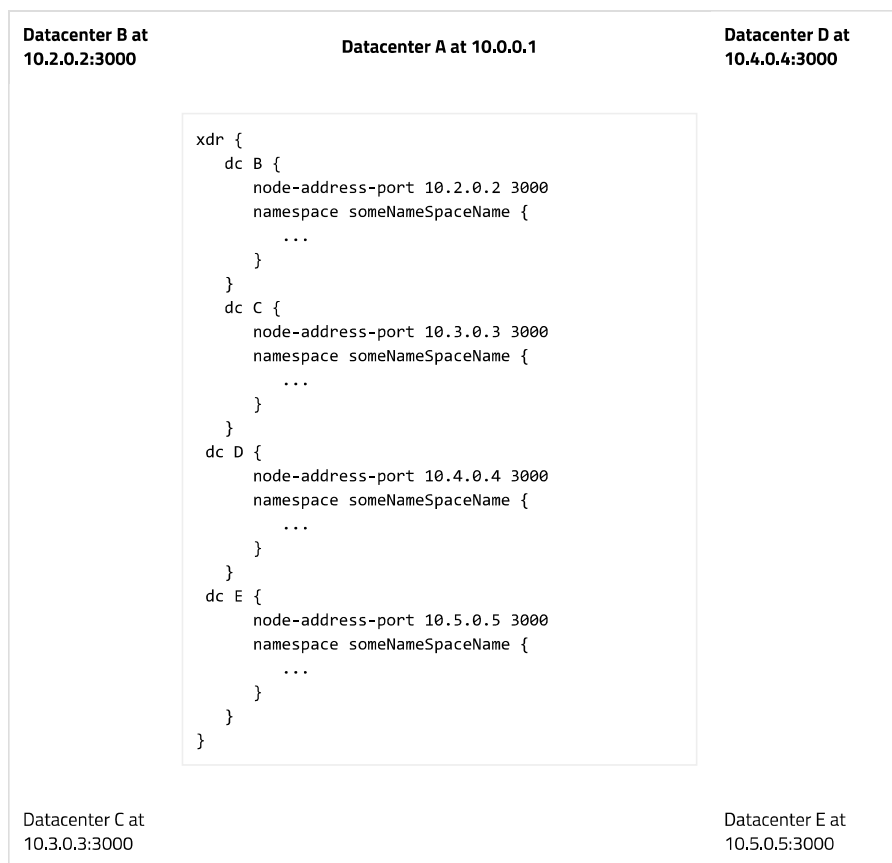
In the example below, in datacenter B, `forward true` is needed to ship records from Datacenter B to Datacenter C.



Star

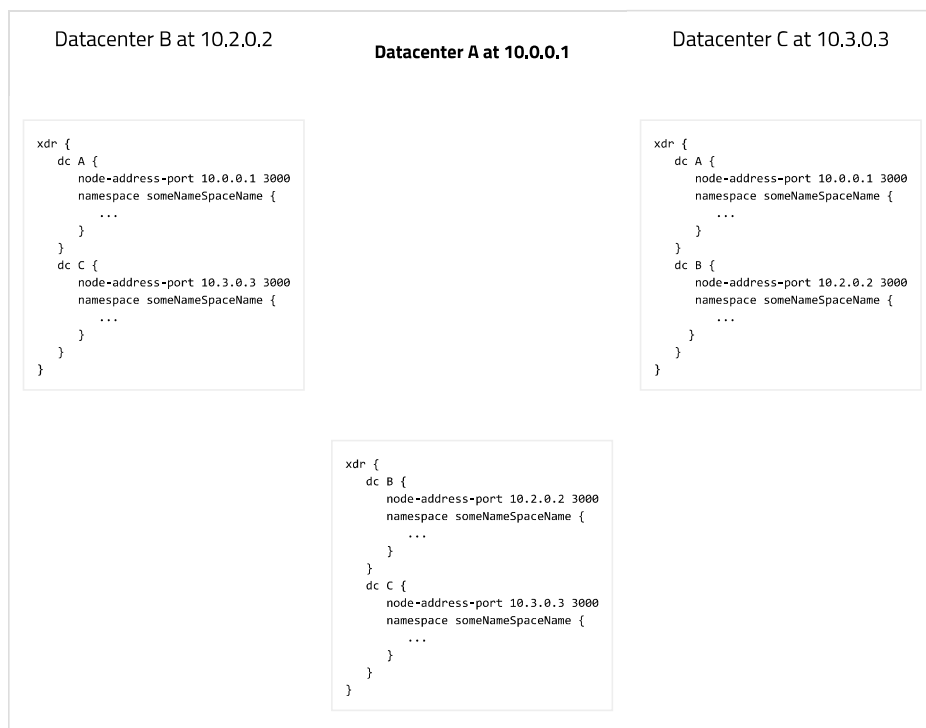
In this example, Datacenter A ships to all other datacenters, with no shipment among those other datacenters.





Mesh

In this example, each datacenter ships to all the others but not to itself.



Other XDR information

Including or excluding specific sets and bins

See [Including or excluding specific sets and bins \(/docs/operations/configure/cross-datacenter/sets_and_bins.html\)](/docs/operations/configure/cross-datacenter/sets_and_bins.html).

Controlling write behavior of incoming records

See [Controlling write behavior of incoming records \(/docs/operations/configure/cross-datacenter/write-policy.html\)](/docs/operations/configure/cross-datacenter/write-policy.html)

Lifecycle of XDR record shipment with metrics

See [Lifecycle of XDR record shipment with metrics \(/docs/operations/configure/cross-datacenter/lifecycle.html\)](/docs/operations/configure/cross-datacenter/lifecycle.html).

Compression, record forwarding, and deleted records

See [Compression, record forwarding, and deleted records \(/docs/operations/configure/cross-datacenter/compression_forwarding_deletes.html\)](/docs/operations/configure/cross-datacenter/compression_forwarding_deletes.html).

Securing with access control, LDAP, and TLS

See [Securing with access control, LDAP, and TLS \(/docs/operations/configure/cross-datacenter/xdr_security.html\)](/docs/operations/configure/cross-datacenter/xdr_security.html).

Reference XDR parameters and metrics

See [Reference XDR parameters and metrics \(/docs/operations/configure/cross-datacenter/parameters_and_metrics.html\)](/docs/operations/configure/cross-datacenter/parameters_and_metrics.html).

Where to Next?

- Learn [XDR Management \(/docs/operations/manage/xdr\)](/docs/operations/manage/xdr).
- Return to [Configure Page \(/docs/operations/configure\)](/docs/operations/configure).