aws

Architecture Diagrams

Active/Active and Active/Passive Configurations in AWS Direct Connect

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Service Level Agreement (SLA)

Amazon Web Services offers customers the ability to achieve highly-resilient network connections between Amazon Virtual Private Cloud (Amazon VPC) and their on-premises infrastructure. The AWS Direct Connect Resiliency Toolkit provides a connection wizard with multiple resiliency models. These models help you to determine and then place an order for the number of dedicated connections to achieve your SLA objective.

This reference architecture focuses on the Maximum Resiliency model, which provides you with a way to order dedicated connections to achieve an SLA of 99.99%. You can find the requirements in the Direct Connect Service Level Agreement.

Link aggregation groups (LAGs) and Equal Cost Multi Path (ECMP)

For Active/Active mode, you can leverage LAGs for dedicated Direct Connect connections, terminating on the same Direct Connect endpoint. This will load balance traffic across all connections in the LAG on layer 2. This will not protect against failure on the Direct Connect endpoint or the whole Direct Connect location.

With ECMP, you can load balance traffic across multiple connections and Direct Connect locations on layer 3. You can influence path behaviour by longest prefix match and Border Gateway Protocol (BGP) attributes. This allows for setting up Active/Active or Active/Passive configurations.

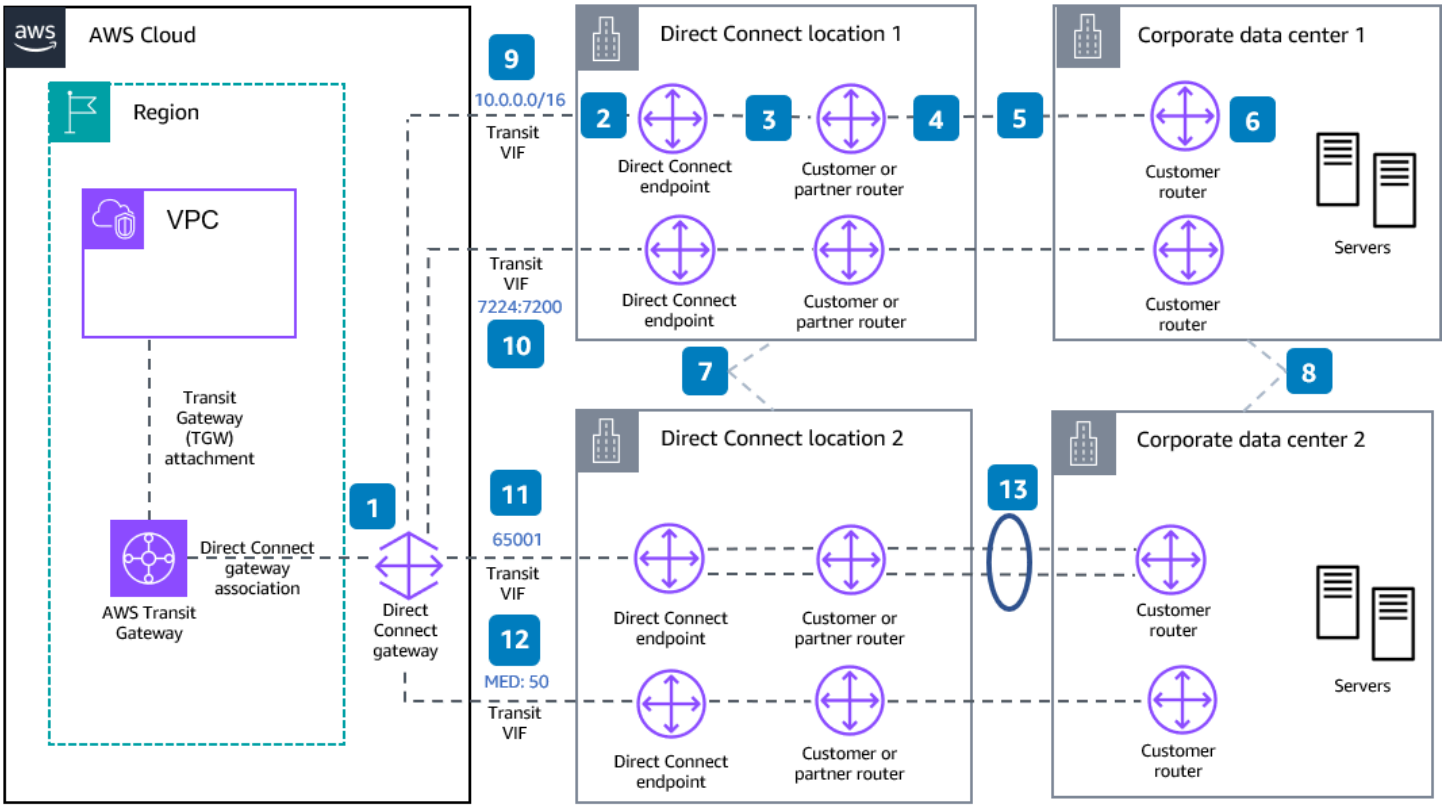
Active/Active with Private/Transit VIF Diagram

Build Active/Active configuration with Transit/Private Virtual Interface (VIF) for max resiliency. Have redundant Direct Connect connections inside each Direct Connect location as well as across locations, customer data centers, and devices. This configuration offers customers max resilience to failure. Such a topology ensures resilience to connectivity failure due to a fiber cut or a device failure as well as a complete location failure.

- **Transit/Private VIF**: You can create Active/Active by ensuring advertised prefixes, local preference, autonomous system (AS) path, and Multi-Exit Discriminator (MED) values are the

same. With that you influence incoming traffic from AWS. These options are not mutually exclusive and can be used together.

- **Active/Active**: Traffic is load-shared between interfaces based on flow via ECMP. If one connection becomes unavailable, then all traffic is routed through the other connections.



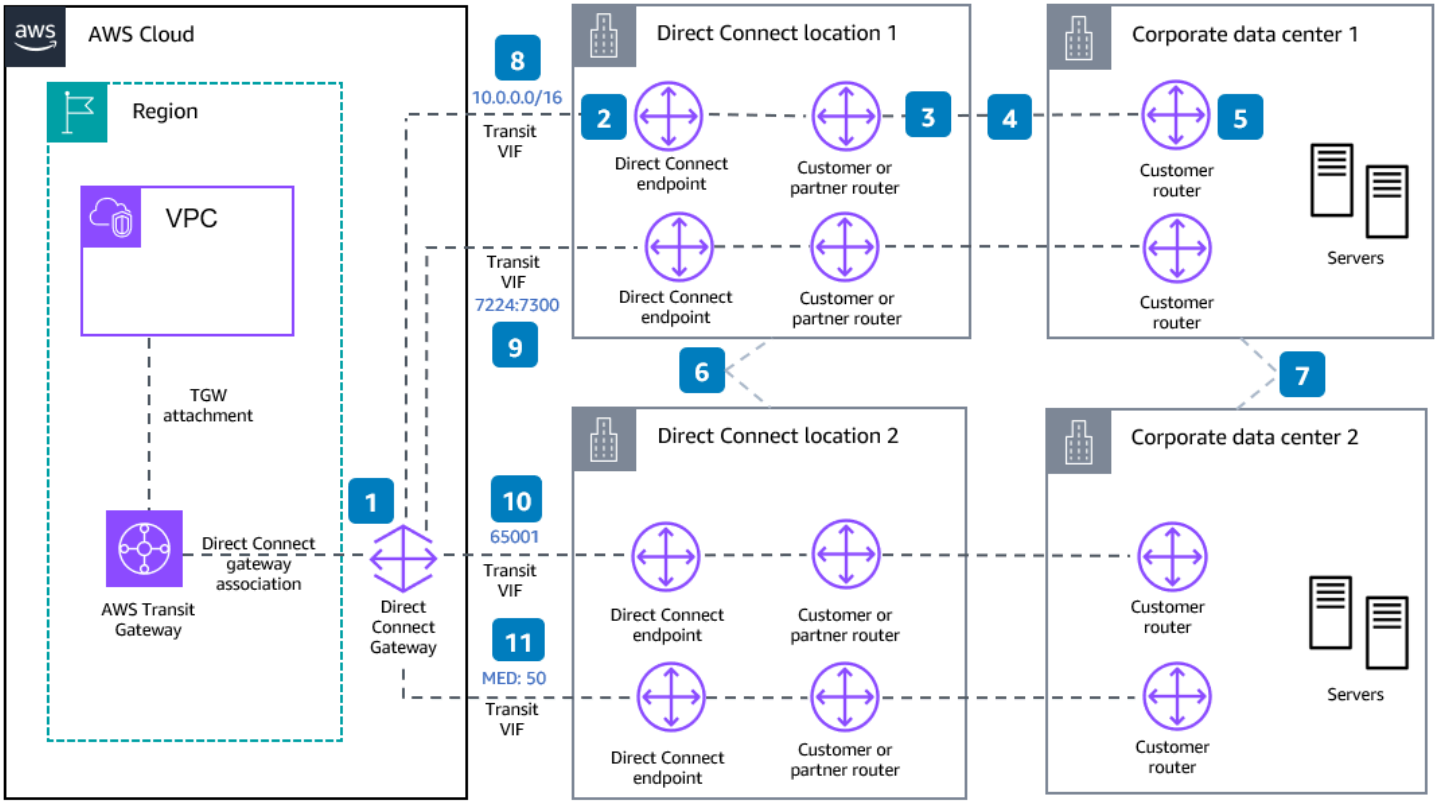
1. **AWS Direct Connect** gateway is a global construct and AWS takes care of its availability.
2. When you request multiple ports at the same **Direct Connect** location, they will be provisioned on redundant AWS equipment.
3. **Direct Connect** supports multipathing to multiple virtual interfaces within the same location, and traffic is load-shared between interfaces based on flow. If one connection becomes unavailable, all traffic is routed through the other connection.
4. Have the redundant **Direct Connect** connections terminate on different customer/partner routers inside the **Direct Connect** location.
5. **Direct Connect** connections have to be brought down for regular scheduled maintenance. Therefore, use multiple connections.
6. Have the redundant **Direct Connect** connections terminate on different routers inside your data center.

7. Use multiple **Direct Connect** connections across multiple **Direct Connect** locations.
8. Use multiple **Direct Connect** connections across multiple customer sites.
9. Advertise the same prefixes across all **Direct Connect** connections for Active/Active setup.
10. If prefixes are the same, a higher local preference is preferred. By using BGP communities you can set the local preference from 7224:7100/7200/7300 where 7100 is low, 7200 is medium, and 7300 is high preference. Use the same local preference across all **Direct Connect** connections for an Active/Active setup.
11. If local preference is the same, shortest AS paths are preferred across **Direct Connect** connections associated with the same AWS Region. Use the same AS path length across all **Direct Connect** connections for an Active/Active setup.
12. If AS path lengths are the same, a lower MED value will be preferred. For an Active/Active setup, use the same MED value for all **Direct Connect** connections.
13. You can create LAGs for dedicated connections terminating at the same **Direct Connect** endpoint. All connections in a LAG operate in Active/Active mode.

Active/Passive with Private/Transit VIF Diagram

Build Active/Passive configuration with Transit/Private VIF for max resiliency. Have redundant Direct Connect connections inside each Direct Connect location as well as across locations, customer data centers and devices. This configuration offers customers max resilience to failure. Such a topology ensures resilience to connectivity failure due to a fiber cut or a device failure as well as a complete location failure.

- **Transit/Private VIF**: You can create Active/Passive setups in multiple ways by controlling advertised prefixes, local preference, AS path and MED value. With that you influence incoming traffic from AWS. These options are not mutually exclusive and can be used together.
- **Active/Passive**: One connection handles traffic, and the others are on standby. If the active connection becomes unavailable, then all traffic is routed through the passive connections.



1. **Direct Connect** gateway is a global construct and AWS takes care of its availability.
2. When you request multiple ports at the same **Direct Connect** location, they will be provisioned on redundant AWS equipment.
3. Have the redundant **Direct Connect** connections terminate on different customer/partner routers inside the **Direct Connect** location.
4. **Direct Connect** connections have to be brought down for regular scheduled maintenance. Therefore, use multiple connections.
5. Have the redundant **Direct Connect** connections terminate on different routers inside your data center.
6. Leverage multiple **Direct Connect** connections across multiple **Direct Connect** locations.
7. Leverage multiple **Direct Connect** connections across multiple customer sites.
8. By advertising more specific prefixes you can prefer one **Direct Connect** connection over the others.
9. If prefixes are the same, a higher local preference is preferred. By using BGP communities you can set a local preference from 7224:7100/7200/7300 where 7100 is low, 7200 is medium, and 7300 is high preference. Use a higher local preference to prefer a specific **Direct Connect** connection over others.

10 If local preference is the same, shortest AS paths are preferred. You can use AS path prepending for **Direct Connect** connections associated with the same AWS Region. AWS will prefer the shorter AS path for multiple virtual interfaces in a Region.

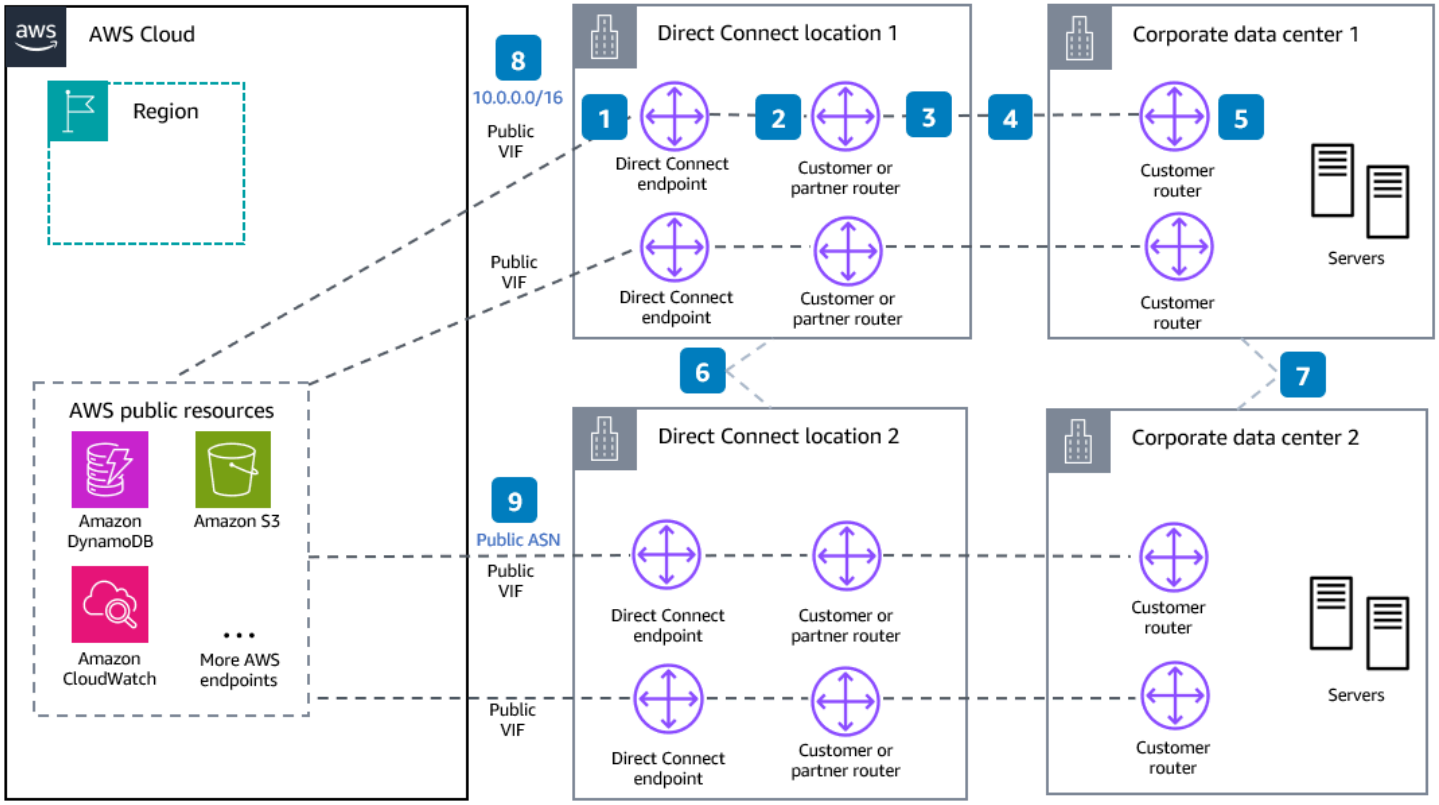
11 Use a lower MED value to prefer a specific **Direct Connect** connection.

Active/Active with Public VIF Diagram

Build Active/Active configuration with Public VIF for max resiliency. Have redundant Direct Connect connections inside each Direct Connect location as well as across locations, customer data centers, and devices. This configuration offers customers max resilience to failure. Such a topology ensures resilience to connectivity failure due to a fiber cut or a device failure as well as a complete location failure.

- **Public VIF**: You can create Active/Active with a public Autonomous System Number (ASN) by ensuring advertised prefixes, Local Preference and AS path values are the same. These options are not mutually exclusive and can be used together.
- **Active/Active**: Traffic is load-shared between interfaces based on flow via ECMP. If one connection becomes unavailable, then all traffic is routed through the other connection(s).

  If you're using a private ASN, load balancing on a public virtual interface is not supported.

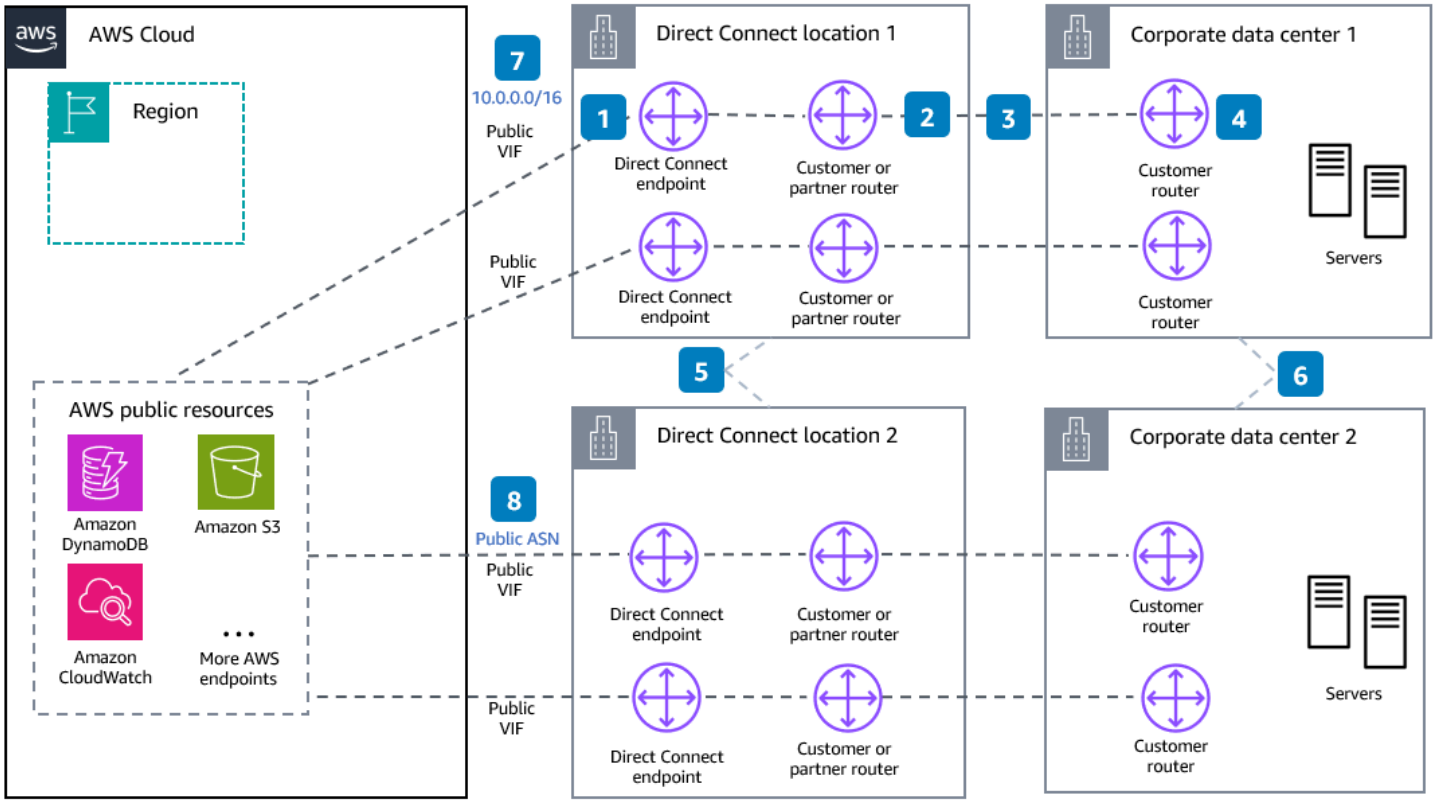


1. When you request multiple ports at the same **Direct Connect** location, they will be provisioned on redundant AWS equipment.
2. **Direct Connect** supports multipathing to multiple virtual interfaces within the same location, and traffic is load-shared between interfaces based on flow. If one connection becomes unavailable, all traffic is routed through the other connection.
3. Have the redundant **Direct Connect** connections terminate on different customer/partner routers inside the **Direct Connect** location.
4. **Direct Connect** connections have to be brought down for regular scheduled maintenance. Therefore, use multiple connections.
5. Have the redundant **Direct Connect** connections terminate on different routers inside your data center.
6. Leverage multiple **Direct Connect** connections across multiple **Direct Connect** locations.
7. Leverage multiple **Direct Connect** connections across multiple customer sites.
8. Advertise the same prefixes across all **Direct Connect** connections for Active/Active setup.
9. If prefixes are the same, shortest AS paths are preferred. Use the same AS path length across all **Direct Connect** connections for an Active/Active setup.

Active/Passive with Public VIF Diagram

Build Active/Passive configuration with Public VIF for max resiliency. Have redundant Direct Connect connections inside each Direct Connect location as well as across locations, customer data centers and devices. This configuration offers customers max resilience to failure. Such a topology ensures resilience to connectivity failure due to a fiber cut or a device failure as well as a complete location failure.

- **Public VIF**: You can create Active/Passive with a *public* ASN by controlling advertised prefixes and AS path. You can create Active/Passive with a *private* ASN by controlling advertised prefixes.
- **Active/Passive**: One connection handles traffic, and the others are on standby. If the active connection becomes unavailable, then all traffic is routed through the passive connections.



1. When you request multiple ports at the same **Direct Connect** location, they will be provisioned on redundant AWS equipment.
2. Have the redundant **Direct Connect** connections terminate on different customer/partner routers inside the **Direct Connect** location.

3. **Direct Connect** connections have to be brought down for regular scheduled maintenance. Therefore, use multiple connections.
4. Have the redundant **Direct Connect** connections terminate on different routers inside your data center.
5. Leverage multiple **Direct Connect** connections across multiple **Direct Connect** locations.
6. Leverage multiple **Direct Connect** connections across multiple customer sites.
7. By advertising more specific prefixes, you can prefer one **Direct Connect** connection over the others.
8. For public ASNs, if prefixes are the same, shortest AS paths are preferred. Use shorter AS path length to prefer a specific **Direct Connect** connection over the others.

Download editable diagram

To customize this reference architecture diagram based on your business needs, download the ZIP file which contains an editable PowerPoint.

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Further reading

For additional information, refer to

- AWS Architecture Icons
- AWS Architecture Center
- AWS Well-Architected

Contributors

Contributors to this reference architecture diagram include:

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Diagram history

To be notified about updates to this reference architecture diagram, subscribe to the RSS feed.

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