

ExpressCluster X WAN for Windows

Network Requirements

Checklist

ExpressCluster X WAN has the following basic network requirements for each cluster of 2 (i.e. primary and standby) servers that in general must be met to enable full disaster recovery (DR) functionality:

Requirement 1: A logical IP protocol network that spans 2 (i.e. primary and standby) sites must be available to be used as the **Public Network** to enable transparent migration of virtual server identity between the primary and standby systems.

Requirement 2: Proper IP protocol network routing between the client systems and the **Public Network** must be configured to enable network communication between client and server systems.

Requirement 3: Proper IP protocol network routing between the server systems and the **Interconnect Network** must be configured to enable cluster specific network communication between the primary and standby servers.

Requirement 4: For synchronous data mirroring, **Interconnect Network** round trip time (RTT) for 1500-byte PING packets must be 70ms or less to ensure proper operation of **ExpressCluster X WAN** and the target application. For asynchronous data mirroring, **Interconnect Network** round trip time (RTT) for 1500-byte PING packets should be low enough to meet sustained target application transaction performance requirements to minimize risk of excessive data loss in case of system failure.

Requirement 5: For synchronous data mirroring, **Interconnect Network** bandwidth must be 1.5Mbps or greater to meet sustained target application transaction performance requirements. For asynchronous data mirroring, **Interconnect Network** bandwidth must be high enough to meet sustained target application transaction performance requirements to minimize risk of excessive data loss in case of system failure.

The above network requirements must be met to ensure proper operation of **ExpressCluster X WAN**.

Implications and Recommendations

In general, if customer network infrastructure do not meet the network requirements then professional network consulting services would be required to analyze existing network

infrastructure, design necessary network infrastructure changes, and implement designed network changes using specific network equipment.

The following sections discuss some of the implications and recommended ways to meet the network requirements in a generic context that may or may not be appropriate for a specific deployment.

Requirement 1

Figure 1 shows a basic example LAN configuration within the same data center that meets this requirement while Figure 2 shows a basic example WAN configuration to meet this requirement. In typical WAN environment, this requirement usually means a dedicated virtual network (e.g. VLAN or VPN) has to be in place between the primary and standby sites. Generally, dedicated routers or switches are required to implement the virtual network using layer 2 or layer 3 network protocols. Example commercial routers that could be used to implement the virtual network include Cisco routers running Cisco IOS v12.0 and later (e.g. Cisco 1711) which can support layer 3 VPN (e.g. IPSec) or layer 2 VPN (e.g. L2TPv3). A more advanced example configuration using VPN routers is shown in Figure 3.

In general, customer organizations may have multiple groups managing the IT infrastructure so approval to implement virtual networks using specific network equipment and protocols may require explicit authorization from multiple groups besides the group purchasing **ExpressCluster X WAN**. So, understanding and coordination of customer organization groups and processes is critical to successful deployment.

Requirement 2

This requirement is meant to ensure proper network communication can occur between client systems residing on separate logical networks from the logical networks of the servers. This requirement is general and fundamental to all IP network communication and is a technically simple objective to accomplish. However, depending on the customer organization, approval from multiple groups may be required to implement changes to customer network routers to enable the necessary network communication.

If for some reason, the necessary routing is not obtainable then a possible workaround is to connect all relevant client systems directly to the same logical network as the servers and assign the addresses to the client systems from the same logical network as the servers. An example is shown in Figure 4.

Requirement 3

This requirement is meant to ensure proper network communication can occur between the primary and standby servers for cluster health check and data mirroring. This requirement is general and fundamental to all IP network communication and is general a technically simple objective to accomplish. However, depending on the customer organization, approval from multiple groups may be required to implement changes to customer network routers to enable the necessary network communication.

Requirement 4

For synchronous data mirroring usage, **ExpressCluster X WAN** requires the **Interconnect Network** round trip latency (RTT) to be 70ms or less for reliable operation. Furthermore, lower RTT may be required in order to meet target application transaction performance requirement.

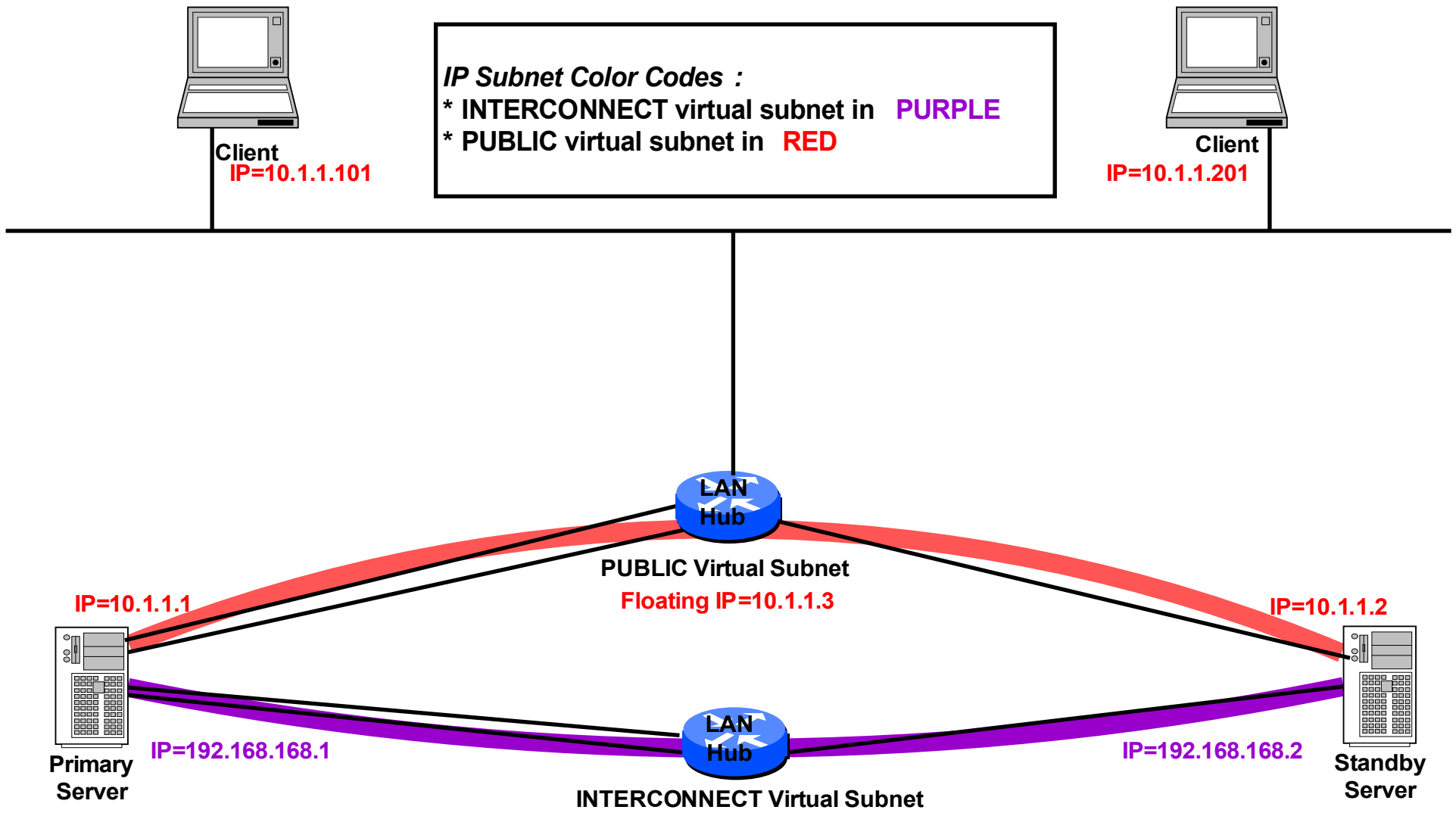
For asynchronous data mirroring usage, **ExpressCluster X WAN** does not have a strict **Interconnect Network** RTT requirement but significant data loss risk will increase if the RTT becomes much larger than the typical target application transaction time as more data will be queued on the local server.

Requirement 5

For synchronous mirroring usage, **ExpressCluster X WAN** requires available **Interconnect Network** network bandwidth to be 1.5Mbps or greater. Furthermore, higher available network bandwidth may be required to meet the target application transaction performance requirement.

For asynchronous data mirroring usage, **ExpressCluster X WAN** does not have a strict **Interconnect Network** available network bandwidth requirement but significant data loss risk will increase if the available network bandwidth becomes much lower than the typical target application transaction data rate as more data will be queued on the local server.

A general rule of thumb for available network bandwidth is that the raw available network bandwidth should be at least 3x the required average application data rates. Example, if target application expects to process 10 2KByte transactions per second then the required network bandwidth would be 40KBytes(=2*10*2KBytes) per second which in turn means (assuming a 10x conversion from raw data bytes to network packet bits) 400KBits per second of available network bandwidth would be required.



Same Data Center

Figure 1: Example ExpressCluster X WAN network configuration within same data center.

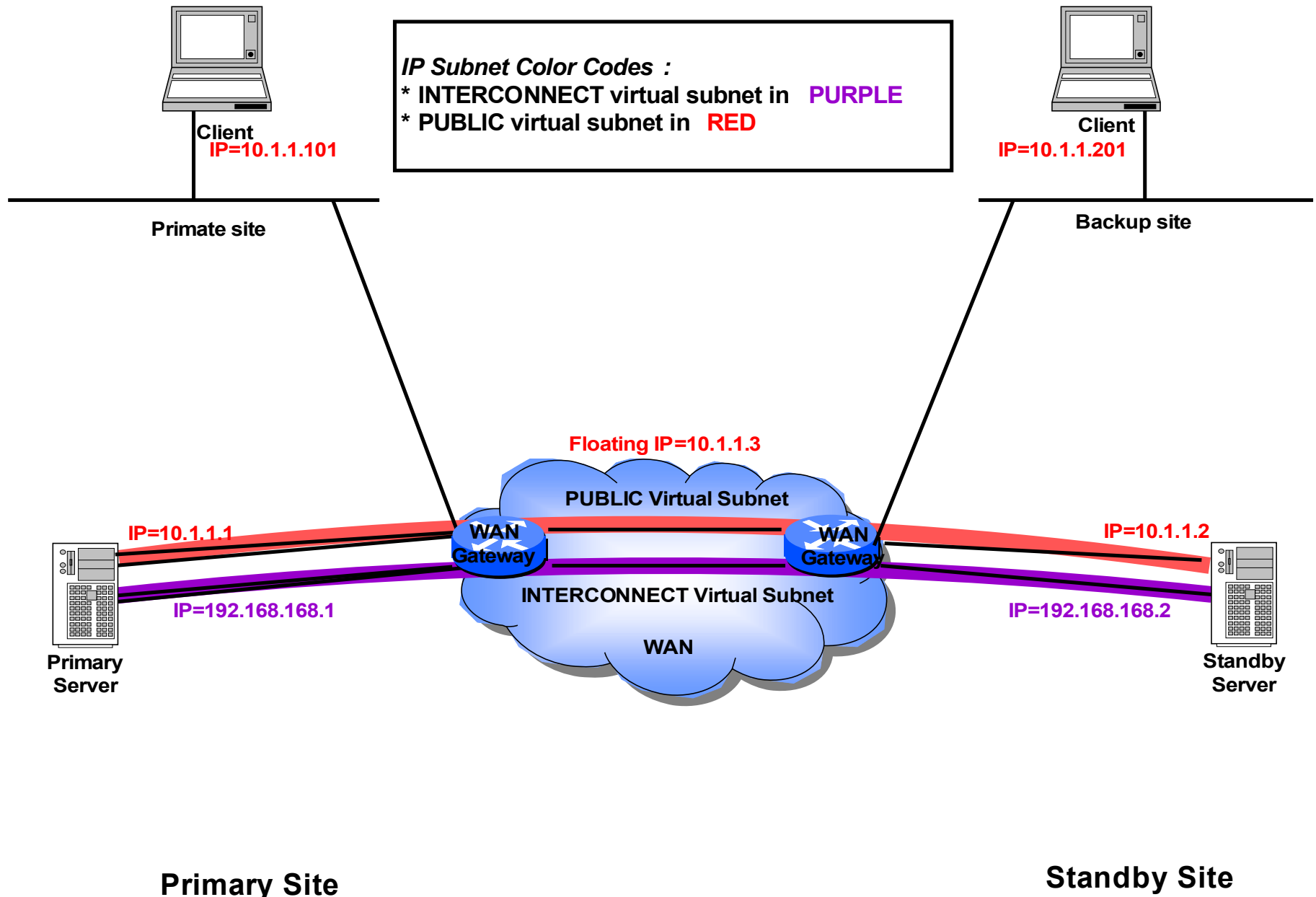


Figure 2: Example ExpressCluster X WAN network configuration for sites sharing common subnets.

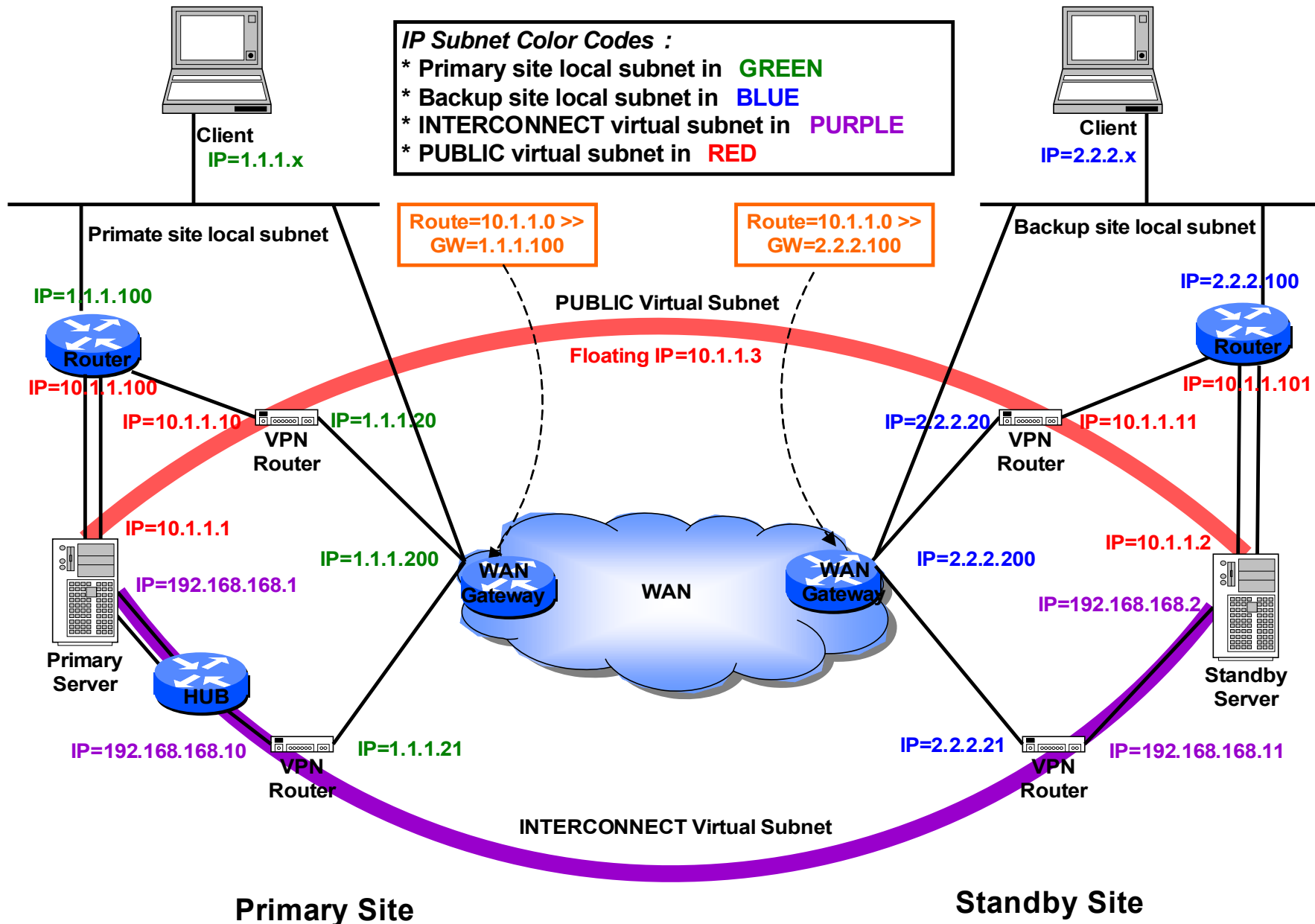


Figure 3 Example RECOMMENDED ExpressCluster X WAN network configuration for sites with separate local subnets.

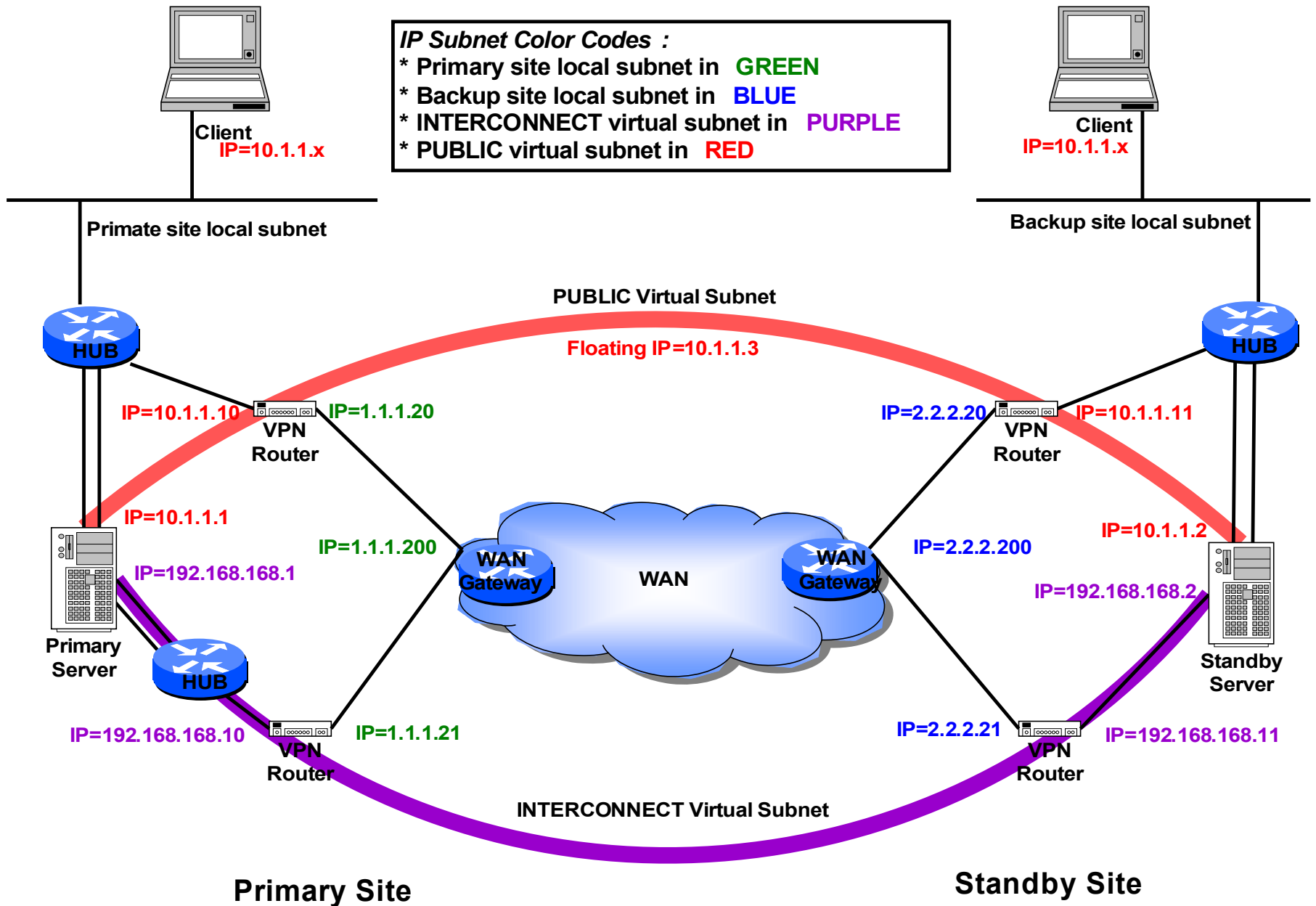


Figure 4 Example WORKAROUND ExpressCluster X WAN network configuration for sites with separate local subnets.