



## DEPLOYMENT GUIDE

# DEPLOYING THE WANJET DEVICE WITH EMC SYMMETRIX SRDF

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One of the data replication applications that WANJet is able to provide acceleration benefits to is the EMC Symmetrix Remote Data Facility® (SRDF) family of remote storage replication solutions. SRDF is the most widely deployed suite of remote storage replication solutions on the market, and is installed in tens of thousands of demanding environments worldwide.

The WANJet is a powerful, appliance-based solution that delivers fast, steady, predictable performance for all users on a WAN. WANJet overcomes the limitations of wide area networks, helping with file transfers and data replication between data centers and branch offices.

For more information on EMC SRDF, see  
<http://www.emc.com/products/networking/srdf.jsp>

For more information on the WANJet device, see  
<http://www.f5.com/products/wanjet/>

## Prerequisites

The following are prerequisites for this deployment

- ◆ The WANJet 500 must be running version 4.2.16.
- ◆ EMC Symmetrix DMX2, DMX3 or DMX4 Storage Systems.
- ◆ EMC Symmetrix Remote Data Facility (SRDF).
- ◆ Carefully review the pre-deployment tasks in the following section.

## Pre-deployment tasks

In order to have a successful deployment, the replication system must already be functioning correctly, and meeting certain performance targets. Without this, The WANJet devices will be unable to add value. Therefore we strongly recommend that the following checks be made prior to deployment. Experience has shown that while these are often assumed to be in place, they are not necessarily so and must be double checked.

## Network Traffic

It is critical to know what SRDF modes will be transmitted through the WANJet devices, and what non-SRDF traffic will be transmitted. This will help in the process of setting bandwidth allocations for SRDF within the WANJet. It will also help determine the number of simultaneous TCP connections at any given time, which can impact the WANJet **Congestion Control** setting.

Take note of the following application traffic characteristics:

- Maximum output load available to the WANJet from the Symmetrix device on the source side (in Mbps). This should *always* be greater than the allocated WAN bandwidth available to the WANJet for SRDF traffic, otherwise the WANJet cannot and will not provide any acceleration benefits.
- Listing of all applications sending traffic over the WAN Link and the protocol used (e.g. CIFS, TCP, UDP, etc.)
- Average and peak number of TCP connections for each of the applications sending traffic over the WAN link.

◆ **Important**

*One area of caution is that SRDF Adaptive Copy mode can often limit the output of traffic from the Symmetrix if it is running in either Disk Pending or Write Pending modes. This is because the Symmetrix assigns it very low priority against any front-end host traffic. If the output is lower than the available WAN bandwidth, then WANJet will not add any value in terms of accelerating the traffic.*

## Network Configuration

Although WANJet is transparent to networking devices (such as routers and switches), these devices can impede the performance of the WANJet device if not configured correctly (for example, if a device is encrypting or compressing the traffic before it gets to WANJet, it will result in lower compression and data reduction performance of WANJet).

Document the following network components that sit between the Symmetrix ports and the WAN routers on both the source and target sides.

- Routers
- Switches
- Hubs
- Encryption devices
- Compression devices

## WAN Link

For optimal functionality, the WANJet device must know the actual available bandwidth, latency and packet loss averages over the WAN. Users often assume their WAN link meets certain parameters, when it may not. It is crucial to test all of these parameters under heavy traffic load and with the correct network priorities so that the measurements reflect the circuit that actual SRDF traffic will traverse. WAN links that seem to have certain characteristics under light load, may have very different characteristics under heavy load. Because the purpose of the WANJet is to accelerate traffic, it will utilize all available bandwidth, therefore testing under load is critical.

Take note of the following network parameters while under maximum (or very heavy) load:

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- Observed average and peak throughput in Megabits per second (Mbps).
  - Observed average and peak latency via roundtrip time in milliseconds (RTT ms).
  - Observed average and peak packet loss percentages.
  - If possible, observed and average delay jitter is also a useful metric.

Note that in the event that SRDF/Synchronous is being used in cases of low latency, low packet loss, and/or low congestion links, WANJet may add some latency to the link. Latency is an important consideration for synchronous SRDF deployments.

The EMC Solutions Validation Center-Business Continuance (SVC BC) is the group within EMC that is responsible for evaluating deployment plans where SRDF traffic traverses IP networks. Most new SRDF implementations by EMC also involve a Network Assessment. The Network Assessment can be provided by an EMC Network Assessment engagement or through the successful completion of the SVC BC External Network Assessment Form. For further information on Solution Qualifiers or Network Assessments, please contact your local EMC sales representative.

## Configuring the WANJet

Use the following procedures to configure the WANJet device for deployment with EMC Symmetrix Remote Data Facility.

### Enabling Delayed Connection Acceptance for SRDF

Delayed connection acceptance is a setting which prevents the WANJet from accepting a new inbound connection until it can open the outbound connection to the target machine. SRDF uses new connections as a type of heartbeat between Symmetrix storage systems, and this setting ensures the WANJet proxy behaves correctly by not accepting new connections until they are successfully accepted on the destination host.

This is typically done for port 1748 for SRDF, but you must confirm this with the SRDF administrator.

#### **To enable delayed connection acceptance for SRDF**

1. Log on to the WANJet configuration utility.
2. In the navigation pane, expand **Configuration**, and then click **Local WANJet**.  
The Local WANJet screen opens.
3. In the VLAN Settings row, click **Settings for Delayed Connection Acceptance**.

4. In the **Ports** box, type the SRDF port (typically **1748**). Each port must be separated by a colon, with no spaces.
5. Click the **Save** button.

The screenshot shows a web-based configuration interface for WANJet. At the top right, there are links for 'User Manual', 'About', and 'Logout roadmin'. A yellow warning icon with an exclamation mark is present, accompanied by the text: 'You have made configuration changes to 'Local WANJet'. To confirm these, please click the 'Save' button.' Below this, the breadcrumb 'ation » Local WANJet' is visible. The main section is titled 'WANJet Settings for Delayed Connection Acceptance'. It contains two rows: 'Enable:' with a checked checkbox, and 'Ports:' with a text input field containing '139:445:1748'. Above the input field, a note reads: 'Each port must be separated by a : (colon) with no space in between.' Below the input field, a note states: 'Note: Click "Save" to apply the changes. Changes will not be reflected until the operation is completed.' At the bottom right, there are two buttons: 'Save' and 'Cancel'.

*Figure 1 Adding the SRDF port to the WANJet configuration*

## Configuring the Optimization Policy

The next step is to configure the Optimization Policy for SRDF.

### To modify the Optimization Policy

1. In the navigation pane, expand **Optimization**, and then click **Optimization Policy**. The Optimization Policy screen opens.
2. Leave **Optimize All Subnets** unchecked, the default setting. Unless you have application traffic from multiple subnets to optimize, this should remain off.
3. Leave **Include WANJet Subnet** checked, the default setting. This should remain checked in most deployments. This option means that the traffic to be optimized is on the same subnet as the WANjet. WANJet performance will be improved with this setting, rather than the general **Optimize All Subnets**.
4. In the **Protocol Optimization Policies** section, click the **Add** button. The Add Port/Service Name popup screen opens.
5. In the **From Port** row, type the SRDF port (usually **1748**) in the boxes (see Figure 2).
6. Check the **TDR-1** and **TDR-2** boxes. We recommend using both TDR-1 and TDR-2 for the highest level of optimization.

7. Check the **Connection Intercept** box. Connection Intercept resets connections that are currently in passthrough mode, but should be moved to optimized mode when a change is made to the optimization policy. It does not affect currently optimized sessions.
8. Click **OK**. The Edit Port/Service Name screen closes, and you see the WANJet Optimization Policy screen.
9. Click the **Save** button.

Add Port/Service Name	
Protocol:	TCP <input checked="" type="radio"/> UDP <input type="radio"/>
Service Name:	Select <input type="button" value="v"/>
From Port:	1748 to 1748
Processing Mode:	ACM5 <input type="button" value="v"/>
TOS Priority:	Preserve <input type="button" value="v"/>
TDR-1:	<input checked="" type="checkbox"/>
TDR-2:	<input checked="" type="checkbox"/>
Encryption:	<input type="checkbox"/>
Connection Intercept:	<input checked="" type="checkbox"/>

*Figure 2 Adding a Protocol Optimization Policy*

## Modifying the Application QoS settings

The next step is to modify the Application QoS (Quality of Service) options. Application QoS bandwidth must be set to the actual bandwidth available to the WANJet devices, whether that is the entire link or only the Permanent Virtual Circuit (PVC) portion available. There is no need to reduce this setting to account for any overhead in the TCP protocol.

### To modify the Application QoS settings

1. In the navigation pane, expand **Optimization**, and then click **Application QoS**. The Application QoS screen opens.
2. From the Application QoS table, click the IP address of the remote WANJet appliance to which you want to apply an Application QoS policy. The **Manage the Application QoS Settings of a Remote WANJet** box opens.
3. In the **Link Bandwidth** box, type the bandwidth size of the link between the local WANJet and the remote WANJet. From the **Link Bandwidth** list, select **Kb/s** or **Mb/s**. In our example, we are using an OC3 link, so we type **155** and choose **Mb/s** (see Figure 3).

**Note:** If you have other application traffic sharing the same WAN link with SRDF, it is possible to prioritize the SRDF traffic over the other traffic. An example would be prioritizing critical SRDF replication traffic over less critical remote tape backup traffic. Refer to the WANJet User Guide for details on how to do this.

4. Click the **OK** button. The **Manage the Application QoS Settings of a Remote WANJet** box closes.
5. Click the **Save** button on the main Application QoS page.

**Manage the Application QoS Settings of a Remote WANJet**

Node Type:	Single		
WANJet IP:	10.10.50.50		
WANJet Alias:	WANJet Server		
Link Bandwidth:	155	mb/s	Enter 0 or blank to deallocate bandwidth.

Supported Subnet	Netmask	Alias	Status
10.10.50.0	255.255.255.0		Enabled
10.10.0.0	255.255.0.0		Enabled

Protocol	Service Name	Processing Mode	TDR-1	TDR-2	Encryption	Connection Intercept
TCP	All ports	Optimized	Y	Y	N	Y

Application QoS Policy	Bandwidth	Maximum
Default	100%	100%

**Figure 3** Adding the Link Bandwidth to the Application QoS settings

## Modifying the Tuning settings

The next step is to modify the WANJet Tuning options. In this procedure, we specify Bandwidth, RTT and Queue Size. Setting these parameters correctly is critical to the performance of the WANJet. Typically, the queue size calculated by the Configuration utility is appropriate and does not need to be changed, but it is good to understand how changes can effect performance in an SRDF environment. It is possible to manually adjust this value to optimize performance. When queues are not building up within the WANJet device, the WANJet is essentially being starved for traffic. A healthy queue length provides the WANJet enough data to accelerate properly. However, too large a queue size can simply increase the connection latency by adding to the queuing delay and so this can begin to cause the Symmetrix flow control mechanism to reduce its send rate.

As mentioned previously, it is very important to measure the actual round trip time (RTT) under load, with the same priority as the actual SRDF traffic. This is the only way to determine true RTT. Because of the difficulty in measuring true RTT, it is helpful to get a close estimate, and then use trial

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and error to reach optimal tuning; although we recognize this is not always possible if the Symmetrix storage systems are in production. Slightly over-tuning the RTT can sometimes improve performance of the WANJet devices, but if done in excess it can result in too much packet loss.

### To modify the Tuning settings

1. In the navigation pane, expand **Optimization**, and then click **Tuning**.  
The Tuning screen opens.
2. In the **Bandwidth** box, type the amount of WAN bandwidth.
3. In the **RTT** box, type the true RTT, as explained above.
4. Uncheck the **Congestion Control** box, if checked.  
*Note:* If the WANJet congestion control is left checked (on), it interferes with the internal flow control mechanism used within SRDF. Typically this would be left On in situations where many simultaneous TCP connections were running through the WANJet (e.g. over 1,000) which you might see in a branch office scenario. Since this is uncommon with data replication scenarios, and due to conflicts with the SRDF flow control mechanism in the Symmetrix, we strongly recommend Congestion Control is Off.
5. In the **Queue Size** box, type a number of packets. We recommend you leave this at the default setting.
6. Click the **Save** button.

## Additional Recommendations

The following sections contain additional considerations for deploying WANJet with SRDF.

### Changes in the WAN environment

Anytime the WAN circuit available to the WANJets changes, such as the bandwidth or latency, all settings under the **Application QoS** and **Optimization Policy** must be adjusted correspondingly. Please note that latency input must correspond to the latency of the network under load. This means measuring latency while SRDF traffic is flowing and tuning the WANJet accordingly.

### Performance Charts

Leaving the real time performance charts portion of the WANJet GUI visible during while WANJet is actively operating can slightly reduce the overall performance of WANJet. For maximum performance, do not leave this tab open and in view for long periods of time.

## EMC Symmetrix Compression

Compression must be turned off on the Symmetrix so that the WANJet has raw data to work with and optimize. While the Symmetrix does have a data compression feature, the WANJet has access to a wide variety of codecs which it can apply depending on varying network conditions, and therefore results in better overall compression.

## Other considerations

Often overlooked in network environments when deploying WANJet are devices which may be between the EMC Symmetrix devices and the WANJet appliances. It is important to consider any such devices and ensure that they do not perform their own compression or encryption to ensure optimal WANJet performance.