Progress®
Kemp® LoadMaster®

Feature Description Bonding VLAN and VXLAN

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Introduction

LoadMaster bonding/Virtual LAN (VLAN) tagging can be easily set up and configured using the LoadMaster Web User Interface (WUI). Successful deployment requires that the pre-requisites have been satisfied.

The LoadMaster also supports Virtual Extensible LAN (VXLAN) and VXLAN Tunnel Endpoint (VTEP) capabilities. LoadMasters have the ability to proxy across VXLAN to non-VXLAN networks.

VXLAN is an overlay technology that encapsulates MAC frames at Layer 2 into a UDP header providing a way for multi-tenant “cloud” networks to span large networks. It is an overlay network in that it allows the creation of Layer 2 networks on top of Layer 3 networks. Communication is established between two or multiple tunnel end points called VTEPs which encapsulate Virtual Machine traffic in a VXLAN header as well as stripping the encapsulation off to present it to the destination Virtual Machine with the original Layer 2 packet. This allows Virtual Machine communication across subnets without the use of a Layer 3 router to bridge the segments via tunnelling.

This guide is designed to introduce interface bonding, VLAN and VXLAN configuration on the LoadMaster. Bonding support is available with all network modules.

Contents

- Prerequisites

Prerequisites

The switch being used must be compatible with:

- VLAN tagging

    - IEEE 802.1Q
- Bonding/teaming (802.3ad/Active-Backup)
    - IEEE 802.1AX/IEEE 802.3ad/LACP

Note: It is not possible to bond interfaces on Azure or Amazon Web Services (AWS) LoadMasters.

Switch Configuration

Enabling the Active-Backup mode generally does not require switch intervention and can be configured directly on the LoadMaster. Using the 802.3ad bonding mode will require configuring a link aggregation group on the switch in conjunction with the LoadMaster. Please read your switch documentation to establish the corresponding team/bond. Common terms for link aggregation include "Ethernet trunk", "NIC teaming", "port channel", "port teaming", "port trunking", "link bundling", "EtherChannel", "Multi-Link Trunking (MLT)", "NIC bonding", "Network Fault Tolerance (NFT)" and “LAG”.

When enabling VLAN trunking on the switch port, make sure to configure the port to support the appropriate mode; General; Access or Trunking. Descriptions are as follows, but please check your switch documentation for specifics:

- General — The port belongs to VLANs, and each VLAN is user-defined as tagged or untagged (full 802.1Q mode)
- Access — The port belongs to a single untagged VLAN
- Trunk — The port belongs to VLANs in which all ports are tagged

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Bonding/Teaming (802.3ad/Active-Backup)

There are a few key points to keep in mind when creating bonds/teams:

- You can only bond interfaces higher than the parent. For example, if you start with port 10 you can only add ports 11 and greater.
- When using a Virtual LoadMaster (VLM), all NICs must be added prior to configuring bonding or adding VLANs. If a new NIC is needed you must remove the bond and/or remove the VLANs.
- If VLAN tagging is required, bond the links first and then add VLANs after the bond has been configured
- Bonding interfaces 0 and 1 is not permitted
- You should never bond all interfaces
- In order to add a link to a bonded interface, any IP addressing must first be removed from the link to be added. The NIC to be added to the initial interface must not have an IP address.
- Enabling the Active-Backup mode generally does not require switch intervention
- The **802.3ad** mode is an active-active setup
- Ensure that all bonded interfaces are configured for the same link speed, both on the switch and the LoadMaster
- If you want to bond port 0, you should strongly consider moving the web administrative interface and/or the remote SSH access to a different port temporarily until that bonding has been completely configured

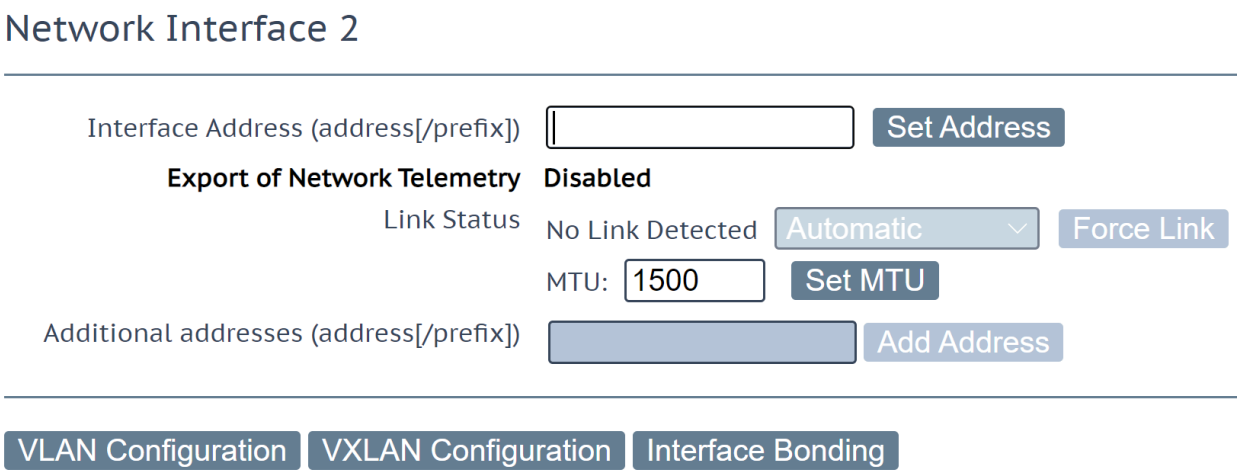
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- Creating a Bond/Team
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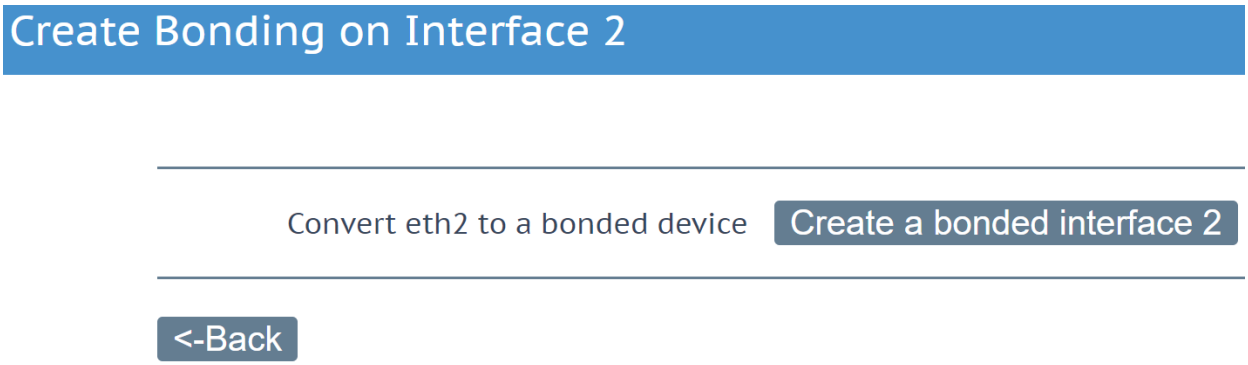
Creating a Bond/Team

To create a bond/team, follow the steps below:

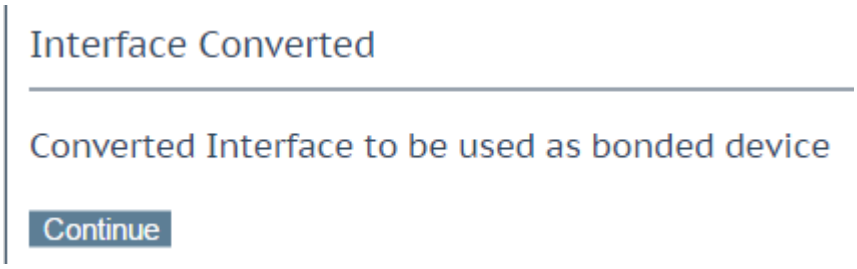
1. In the main menu of the WUI, navigate to **System Configuration > Network Setup > Interfaces**.
2. Click the link for the relevant interface.



3. Click **Interface Bonding**.

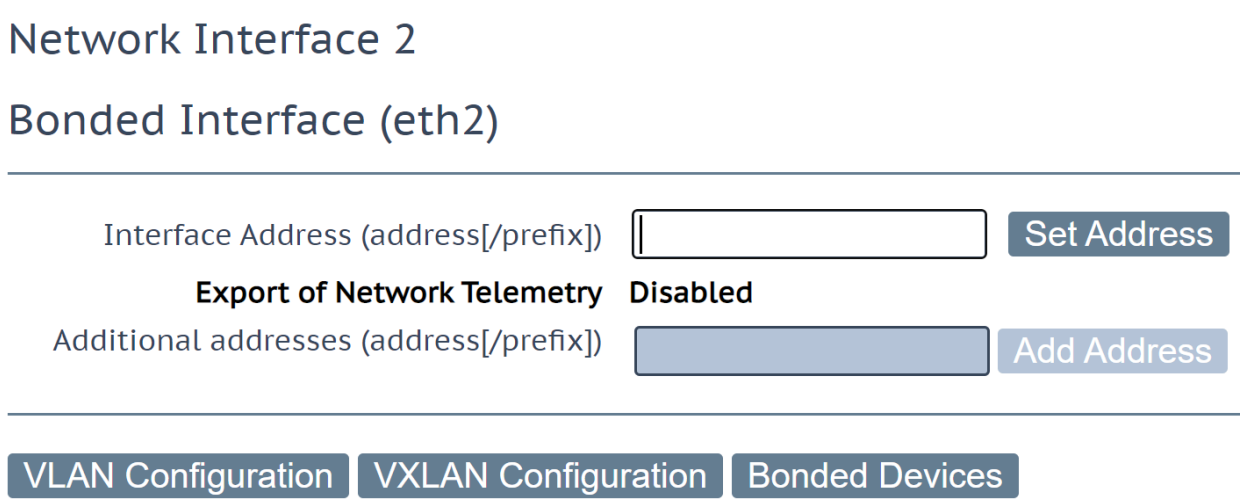


4. Click **Create a bonded interface**.
5. Click **OK**.
6. Click **OK** again.

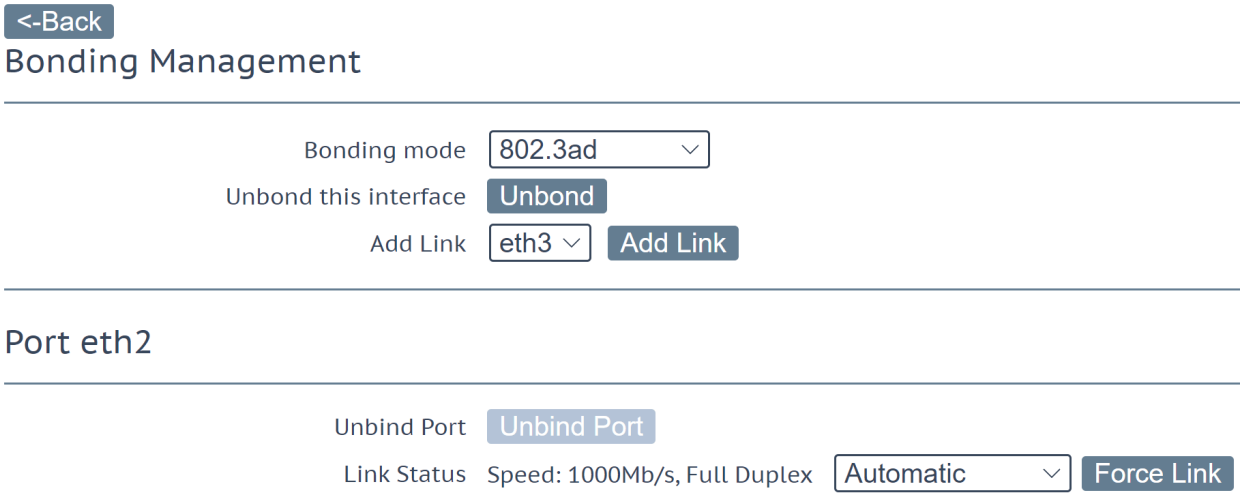


7. Click **Continue**.

8. In the main menu, select **System Configuration > Network Setup > Interfaces** and click the bnd link.



9. Click **Bonded Devices**.

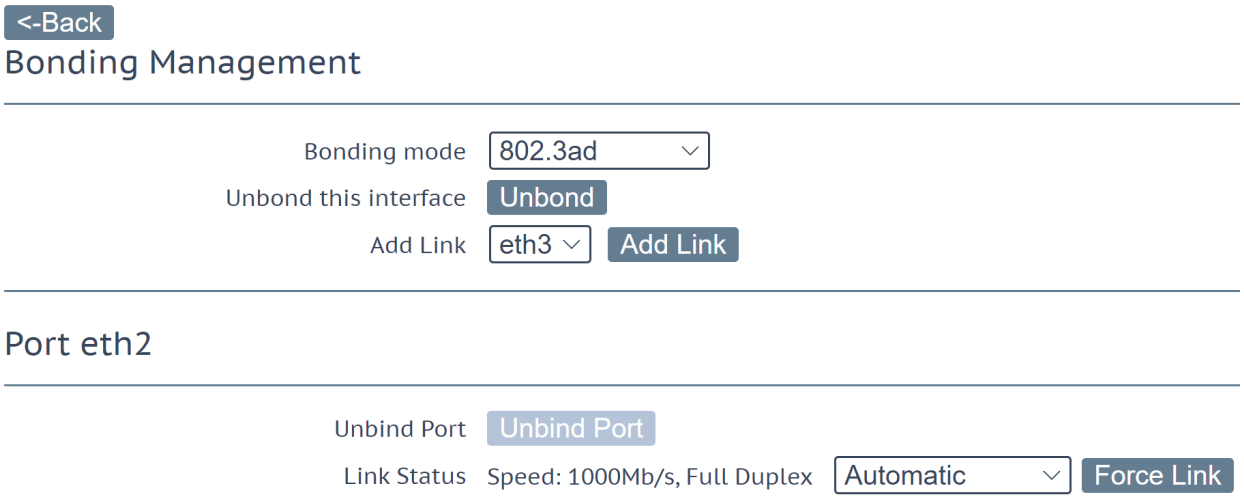


10. Select the relevant interface and click **Add Link**.

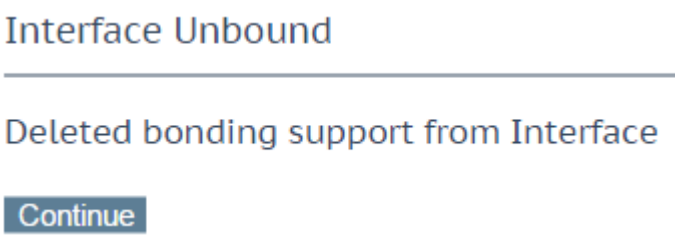
Removing a Bond/Team

To remove a bond/team, follow the steps below:

1. In the main menu of the LoadMaster WUI, go to **System Configuration > Network Setup > Interfaces**.
2. Select the bond to be removed.



3. Click **Bonded Devices**.
4. Un-bind each port by clicking the **Unbind Port** button. Repeat this until all ports are removed from the bond.
5. Once all of the child ports have been un-bonded, the parent port can be unbonded by clicking **Unbond**.



6. Click **Continue**.

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VLAN Tagging

Things to keep in mind:

- Configure VLAN tagging on the switch first, if required
- Start by deciding if you need bonding. If you do, first establish the bonded configuration. Then, proceed by adding the VLAN tagging information.
- VLANs can be added to physical interfaces or bonded interfaces
- The VLAN interface IP address cannot be in the same subnet as the VXLAN interface

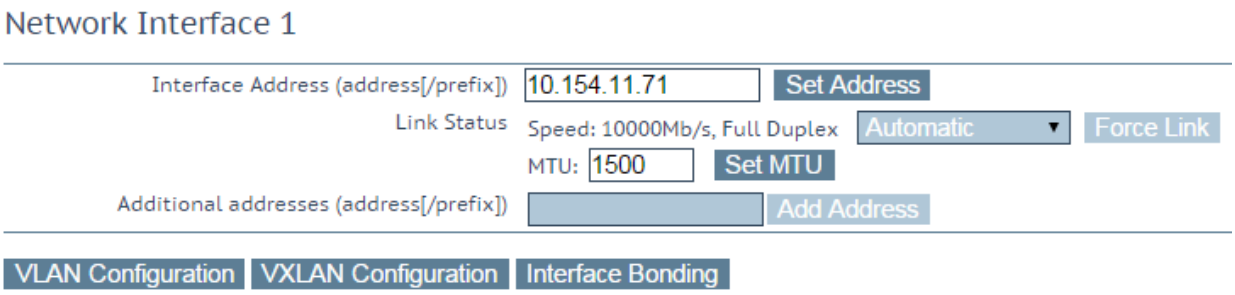
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- Add a VLAN
- Remove a VLAN

Add a VLAN

To add a VLAN, follow the steps below:

1. In the main menu of the WUI, go to **System Configuration > Network Setup > Interfaces**.
2. Click the relevant interface.



3. Click **VLAN Configuration**.
4. Enter the **VLAN Id** and click **Add New VLAN**.
5. Click **Continue**.
6. Repeat as needed.

To view the VLANs, in the main menu of the WUI, select **System Configuration > Network Setup > Interfaces** and expand the drop-down list.

Remove a VLAN

Note: Before removing a VLAN, please ensure that the interface is not being used for other purposes, for example as a multicast interface, WUI interface, SSH interface or a GEO interface.

To remove a VLAN select the **System Configuration > Network Setup > Interfaces** menu option and select the appropriate VLAN ID from the drop-down list.

Once selected, delete the IP and then click **Set Address**. Once the IP has been removed you will have the option to delete the VLAN, by clicking the **Delete this VLAN** button.

Repeat as needed. To view the VLANs select the **System Configuration > Network Setup > Interfaces** menu option and select the appropriate VLAN ID from the drop-down list.

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VXLAN

There are a few key points to keep in mind when creating a VXLAN:

- VXLANs can be added to physical interfaces as well as bonded interfaces
- It is possible to create a VLAN on top of a VXLAN
- IPv6 is not supported for VXLAN
- VXLAN is not supported when LoadMaster clustering is configured
- VXLANs use UDP destination port **8472**
- The VXLAN interface IP address cannot be in the same subnet as the VLAN interface.

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The Role of the VNI in VXLANs

The **VNI** (VXLAN Network Identifier) is a 24-bit identifier used in VXLAN to distinguish different virtual Layer 2 segments, similar to how VLAN IDs work in traditional networks.

VXLAN encapsulates Ethernet frames inside UDP packets for transport over an IP network. Each VXLAN segment is identified by a VNI, which tells the VXLAN Tunnel Endpoint (VTEP) which overlay network the packet belongs to.

The VNI range is from 1 to 16,777,215 (24 bits). This large range is a key advantage of VXLAN compared to VLAN (which only supports up to 4096).

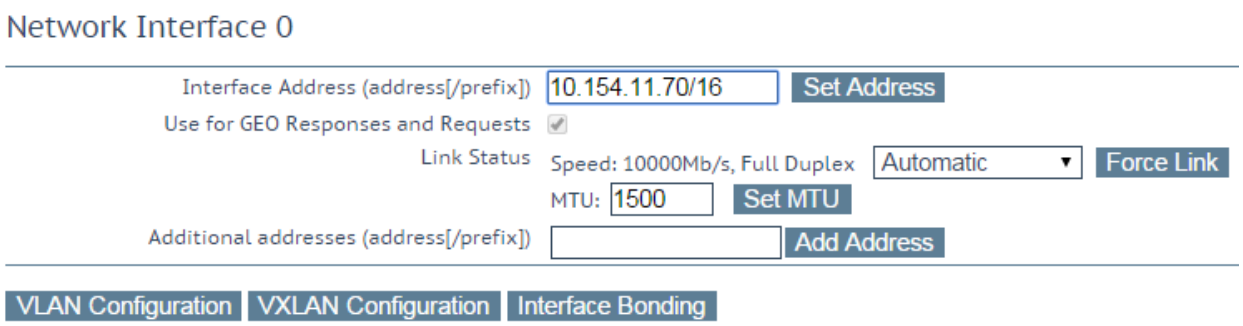
VNI is mandatory for VXLAN operation because:

- VXLAN is designed to create multiple isolated Layer 2 networks over a shared Layer 3 underlay.
- Without VNI, the VTEP cannot determine which virtual network the traffic belongs to.
- VNI serves the same purpose in VXLAN as VLAN tagging does in traditional networks.
- Normal hosts connected to a VXLAN-backed network do not need to know VNI. They just see a regular Ethernet segment. VTEPs (switches, routers, or devices that encapsulate VXLAN) need VNI to encapsulate and decapsulate traffic correctly.

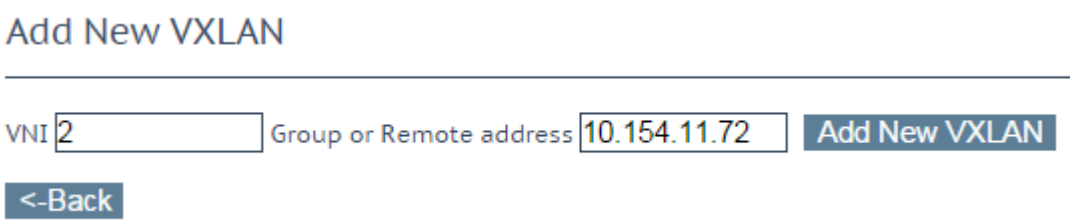
Add a VXLAN

To add a VXLAN to an interface in the LoadMaster, follow the steps below:

1. In the main menu of the LoadMaster WUI, go to **System Configuration > Network Setup** and click the relevant interface link.



2. Click the VXLAN Configuration button.



3. Enter a new VXLAN Network Identifier (**VNI**).
4. Enter the multicast group IP address or remote end-point (VTEP) IP address (in the case of a unicast point-to-point VXLAN).
5. Click **Add New VXLAN**.
6. To configure the VXLAN, go to **System Configuration > Network Setup** and select the relevant VXLAN from the drop-down list.



7. Enter the address of the interface and click **Set Address**.

Note: If configuring a VXLAN in a High Availability (HA) setup, you will also have to specify the **HA Shared IP address**, the **HA Partner IP address** and specify whether or not to use the interface for HA checks.

If required, a VLAN can be created on top of the VXLAN by clicking the **VLAN Configuration** button.

Remove a VXLAN

A VXLAN can only be deleted if there are no VLANs created on top of it and if there are no IP addresses assigned to the VXLAN. If a VLAN has been created on top of a VXLAN, first delete the VLAN and then you can delete the VXLAN.

To delete a VXLAN, follow the steps below:

1. In the main menu of the LoadMaster, go to **System Configuration > Network Setup** and select the relevant VXLAN from the drop-down list provided.
2. Click **Delete this VXLAN**, as shown in the screenshot above.

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References

For further details on the WUI fields, refer to the following document: Web User Interface (WUI) Configuration Guide.