1. EXECUTIVE SUMMARY

Gaming consoles like the Sony PlayStation 3, Nintendo Wii, and Microsoft Xbox 360 are being increasingly used in wireless mode in enterprise environments like university dormitories. Testing in Meru’s Interoperability Lab has shown that there are unique issues in connectivity with gaming system as compared to other mainstream Wi-Fi™ enabled devices. University IT personnel have to address how they will handle game console interoperability. This document shows the detailed configurations needed in Meru System Director 4.0 and 4.1 releases to support interoperability between Meru Networks controllers and APs with Sony PlayStation 3, Nintendo Wii, and Microsoft Xbox 360.

1.1 SONY PLAYSTATION 3

BACKGROUND

Sony Playstation 3 gaming console (like many common console systems) has both a wired Ethernet port and 802.11bg wireless network connectivity for online community access. While both of these interfaces have a MAC address, Sony utilizes one of them. During the process of associating to a wireless network the PS3 uses one MAC to probe for wireless APs and the other for the authentication portion of the association process.

INTEROPERABILITY DETAILS

Virtual Cell and Virtual Port features are enabled by default in 3.6.1 and newer versions of Meru System Director as well as on AP300 family access points. This allows for optimization of client association and seamless roaming. The Virtual Port feature uses the client MAC Address to create a Virtual Wireless Network (BSSID) specific to that client. A Virtual Port is assigned to the first MAC address. When the PS3 changes its MAC address during the association process, the second MAC address assignment is denied access.

PS3 can be connected by disabling the Virtual Cell and Virtual Port features in the ESS Profiles and in the AP300 radio settings. This would affect ALL ESS profiles on those APs and be suboptimal for all clients. With System Director 4.1, support for the AP1000 was added. The AP1000 can support Virtual Port and non-Virtual Port ESSes concurrently.

In Meru System Director 4.1, a feature called VCell Overflow was introduced. This enables the creation of a non-Virtual ESS Profile alongside existing ESS Profiles that are running Virtual Cell/Virtual Port on an AP300 radio in VCell Mode. The Sony PS3 has been successfully field tested in VCell Overflow on 4.1-39 and 4.1-55 versions of System Director.

CONFIGURATION OVERVIEW

To configure VCell Overflow ESSID for PS3, TWO ESS Profiles are required. In the example below, we will be presenting an ESSID to the community with an SSID of “GamingDevices.”

For VCell Overflow to work there is a ‘Parent’ ESS Profile with VCell enabled from which the clients can overflow from. To keep non-PS3 clients from trying to associate to this VCell ESS Profile, we will set the “New APs join ESS” option to “NO.” IF this is an existing ESS Profile, you need to set this to NO AND remove all ESS-AP entries. NOTE: This ESS will NOT be available to users.

VCell and VPort remain enabled
New APs Join ESS is set to OFF
SSID = GamingDevices
Profile Name = GamingDevices VC
Next we are going to create the "Child" ESS Profile.
VCell and VPort are set to OFF
New APs Join ESS is set to ON*
Overflow FROM = GamingDevices_VC
SSID = GamingDevices
Profile Name = GamingDevices_Overflow

* If you do not want the "GamingDevices" ESS Profile on ALL APs you can set "New APs Join ESS" to "OFF" and use the ESS-AP table to manage the radio list on which this ESS is broadcast. Make sure you ONLY use the OVERFLOW profile when doing this.

These ESS Profiles were created as a new profile. That ensures that all data rates are using the 4.1 DEFAULT settings. PS3 requires a minimum 11Mbps 11b data rate be available as a base AND transmit rate. The defaults are acceptable.

All Testing was done with Clear, WEP64 (ASCII & Hex), WEP128 (ASCII & Hex), WPA TKIP, and WPA2-PSK (AES) security.

1.2 NINTENDO WII

BACKGROUND
Nintendo Wii is a gaming console which provides by default ONLY an 802.11bg wireless network interface for online access. There is a USB-Wired Ethernet adapter available.

The Wii does not work with the DEFAULT ESS Configuration created in current versions of Meru System Director. Modifications to the base transmit speeds must be made as outlined below.

INTEROPERABILITY DETAILS
Nintendo Wii is compatible with Clear, WEP64 (ASCII & Hex), WEP128 (ASCII & Hex), WPA-PSK (TKIP) or WPA2-PSK (AES) security profiles.

It is recommended on AP300 to use Clear OR WPA2-PSK security.

Nintendo Wii also REQUIRES that 802.11b or 802.11b+g data rates are available.

CONFIGURATION OVERVIEW
It is recommended that more data rates be made available for the Nintendo Wii gaming console by modifying the default ESS profile configuration.

If you have created a special ESS Profile for the PS3 using the System Director 4.1 VCell Overflow feature, that same OVERFLOW ESS Profile can be used for the Wii. Note that the Wii is fully compatible with Virtual Cell and Virtual Port and does not REQUIRE System Director 4.1 or VCell overflow.

In the Example below we will create and modify an ESS Profile Called "WiiConsole"

Profile Name = WiiConsole
SSID = WiiConsole
VCell and VPort remain On

Changes from default in the BGN Transmit Base Rates matrix are required if your BGN data rates assuming your 2.4 GHz Radios are in "bgn" mode. If your AP radio is in "bg" mode then make the modifications in the BG data rates.
The change made from the default is in the BGN Transmit Base Rates matrix where 1 Mbps, 2 Mbps, 5.5 Mbps and 11Mbps data rates are checked. In the default configuration, only 11Mbps is checked.

1.3 XBOX 360

BACKGROUND

The Microsoft Xbox 360 has a built-in 802.11bgn wireless adapter. The Xbox 360 can run in Virtual Port mode or non-Virtual Port mode.

INTEROPERABILITY DETAILS

Microsoft Xbox 360 is compatible with Clear, WEP64 (hex or ASCII characters), WEP128 (hex or ASCII characters), WPA-PSK (TKIP), and WPA2-PSK (AES) security profiles.

CONFIGURATION OVERVIEW

Except for RADIUS authenticated ESSIDs, the Xbox 360 can associate to any network ESSID configuration in Virtual Port mode or non Virtual Port mode.
2. CONFIGURATION

SUPPORT ALL 3 GAMING CONSOLES IN SYSTEM DIRECTOR 4.0

Summary of steps to configure a security profile and ESSID to support all 3 gaming consoles in System Director 4.0

1. Create a security profile or select an existing security profile.
2. Create an ESS profile or select an existing profile.
3. Optionally, create a VLAN.
4. Disable Virtual Port and Virtual Cell on the ESS profile.
5. Disable Virtual Cell on the AP300.

Detailed configuration

1. Connect to the controller using an internet browser. The address is ‘http://<IP address of controller>’.
   Log in with your controller username and password.
2. Click on the ‘Configuration’ tab on the upper left hand corner of the screen.
3. Scroll down to the ‘Security’ section and click on the ‘Profile’ button. The screen above will now be shown.
4. Click on the ‘Add’ button to add a security profile and the screen above will be shown.
5. Add the security profile name.
6. Select the allowed L2 mode.
7. Select the relevant data encryption mode.
8. Enter the WEP key or preshared key depending upon the L2 mode selected.
9. Click OK to locally save the security profile.

10. Depending upon the design of the network, this step may be optional. If so, skip to step 19. Otherwise, scroll down to the Wired section and click on the VLAN button to create a VLAN. The screen above should appear.
11. Click on the Add button to add a VLAN. The screen above should appear.
12. Input the VLAN name.
13. Input the VLAN tag number.
14. Input the IP address of the VLAN.
15. Input the subnet mask.
16. Input the default gateway.
17. Depending upon the DHCP server configuration, input the IP address of DHCP server if it is on a different subnet.
18. Click OK to locally save the VLAN configuration.

19. Scroll down to the Wireless section and click on the ESS tab to create an ESS profile. The screen above should appear.
20. Click on the Add button and the screen above should appear.
21. Input the ESS profile name.
22. Input the SSID.
23. Input the security profile that was created earlier.
24. If a VLAN is to be used in this profile, change the Tunnel Interface Type to configured VLAN only.
25. At the VLAN pull-down menu, select the VLAN name that was previously created.

26. Scroll down the screen until the Virtual Cell selection menu appears on the top of the screen.
27. Turn off Virtual Port.
28. Turn off Virtual Cell.
29. The default mode of operation of the Meru APs in the 2.4 Ghz spectrum is 802.11bgn mode. The other possible modes are: 802.11b, 802.11g, or 802.11bg. By default, the base transmit rates are only set to 11mb for 802.11b, 802.11bg, and 802.11bgn. In order to support the Nintendo Wii, the base transmit rates must be changed to include 1mb, 2mb, and 5.5mb. This is done by checking the respective boxes in the respective mode sections.

30. Click the OK button to save the ESS profile locally.

31. If the wireless network has AP300s and/or AP300is, then click on the Radio button to make changes to the APs that are in the ESS-AP table for the ESS profile that will support gaming consoles. Otherwise, skip to step 37.
32. Check each radio that is in the ESS profile for which the gaming consoles will utilize.

33. Click on the Bulk Update button.

34. Check the Virtual Cell menu and pull down the menu to set Virtual Cell to off.

35. Click OK. Now the APs will be rebooted and come up in non Virtual Cell mode.

36. When the APs are back up and running, go back into the ESS profile that will support the gaming consoles and check the ESS-AP table to ensure the AP radios are assigned to this ESS profile. If not, then add those radios back to the ESS profile.

37. Click on the save button to save the configuration to the flash drive of the controller.

38. You are now ready to configure and test the gaming consoles. Refer to the screens and documentation of each gaming console to configure the SSID and wireless encryption modes.
SUPPORT ALL 3 GAMING CONSOLES IN SYSTEM DIRECTOR 4.1

Summary of steps to configure a security profile and ESSID to support all 3 gaming consoles in System Director 4.1

1. Create a security profile or select an existing security profile.
2. Optionally, create a VLAN.
3. Create an ESS profile or select an existing profile.
4. Create an overflow ESS profile or select an existing profile.

Detailed configuration settings

1. Connect to the controller using an internet browser. The address is ‘http://<IP address of controller>‘. Log in with your controller username and password.
2. Click on the ‘Configuration’ tab on the upper left hand corner of the screen.
3. Scroll down to the ‘Security’ section and click on the ‘Profile’ button. The screen above will now be shown.
4. Click on the ‘Add’ button to add a security profile and the screen above will be shown.
5. Add the security profile name.
6. Select the allowed L2 mode.
7. Select the relevant data encryption mode.
8. Enter the WEP key or preshared key depending upon the chosen L2 mode.
9. Click OK to locally save the security profile.

10. Depending upon the design of the network, this step may be optional. If so, then skip to step 19. Otherwise, scroll down to the Wired section and click on the VLAN button to create a VLAN.
11. Click on the Add button to add a VLAN. The screen above should appear.
12. Input the VLAN name.
13. Input the VLAN tag number.
14. Input the IP address of the VLAN.
15. Input the subnet mask.
16. Input the default gateway.
17. Depending upon the DHCP server configuration, input the IP address of DHCP server if it is on a different subnet.
18. Click OK to locally save the VLAN configuration.
19. Scroll down to the Wireless section and click on the ESS tab to create an ESS profile. A similar screen above should appear.
20. Click on the Add button and the screen above should appear.
21. Input the ESS profile name.
22. Input the SSID.
23. Input the security profile that was created earlier.
24. Turn off ‘New APs Join ESS’.
25. If a VLAN is to be used in this profile, change the Tunnel Interface Type to configured VLAN only.
26. Select the VLAN name from the VLAN name pull down menu.

27. Scroll down the page until the screen looks like the above screen shot.
28. The default mode of operation of the Meru APs in the 2.4 Ghz spectrum is 802.11bgn mode. The other possible modes are: 802.11b, 802.11g, or 802.11bg. By default, the base transmit rates are only set to 11mb for 802.11b, 802.11bg, and 802.11bgn. In order to support the Nintendo Wii, the base transmit rates must be changed to include 1mb, 2mb, and 5.5mb.
29. Click the OK button to save the ESS profile locally.
30. Click on the save button to save the configuration to the flash drive of the controller.
31. Complete the following steps to create the Virtual Cell overflow ESS profile. Go to the Wireless section and click on the ESS button.
32. Click on the Add button and the screen above should appear.
33. Input the ESS profile name. This profile name must be different from the name entered in step 21.
34. Input the same SSID that was entered in step 22.
35. Input the security profile that was created earlier.
36. If a VLAN is to be used in this profile, change the Tunnel Interface Type to configured VLAN only.

37. Scroll down the page until the screen looks like the above screen shot.
38. Click on the ‘Overflow from’ pull-down menu and select the ESS profile that was created in step 21.
39. Click on the OK button to save the ESS profile locally.
40. Click on the ESS button on the left side.
41. Select the Virtual Cell overflow ESS profile by clicking on the adjacent red arrow box.
42. Click on the ESS-AP Table tab to add the APs to this ESS profile if the APs are not in the ESS-AP table.
The screen above should appear.
43. Click on the save button to save the configuration to the flash drive of the controller.
44. You are now ready to configure and test the gaming consoles. Refer to the screens and documentation of each gaming console to configure the SSID and wireless encryption modes.

3. **SUMMARY**

This deployment document outlined the configuration steps required to support gaming consoles on Meru Networks controllers and access points. To support the Sony Playstation 3, ESS profiles must have Virtual Port and Virtual Cell disabled due to its unique MAC address change during the AP association phase. To support the Nintendo Wii, transmit data rates must be added. To support both of the Nintendo Wii and Xbox 360, Virtual Port can be enabled or disabled.