XR Solution Administrator

XR Solution Technical Certification Training

Session 1:

Training | Knowledge Check | Lab Exercise

March 2022

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XR SOLUTION ADMINISTRATOR

Session 1

- XR Series Hardware
- AirLink® OS Key Features and Layout
- AirLink® Services Including ALMS
- Knowledge Check (Online Quiz)
- Lab Exercise 1

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XR SOLUTION
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- Differences between XR80 5G and XR80 LTE models
- Differences between XR80 5G Wi-Fi and XR90 5G Wi-Fi
- Antenna requirements for each XR Series router
- Ethernet port capabilities and behavior
- Requirements for Out-of-Band Management to work
- LPWA radio capability and restrictions
- AirLink OS responsiveness compared to ALEOS
- Product label information

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XR SERIES ROUTERS

XR90 | XR80 | XR80 LTE

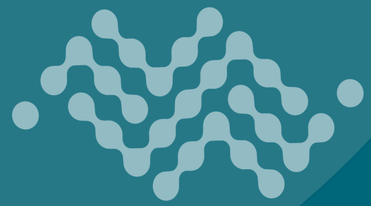
Model Overview

Model Differences

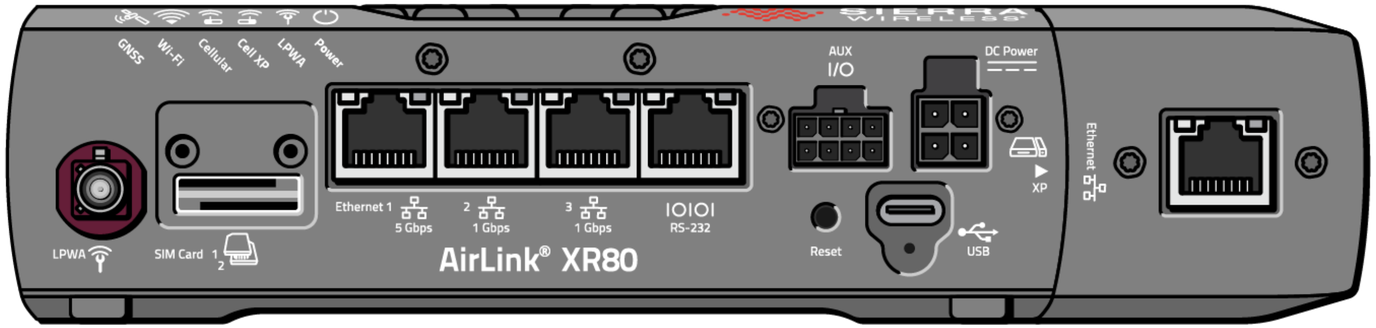
Common Features

Interfaces and Behavior

Antenna Requirements



XR Series Model Overview



Model	NAM	Global
XR90 5G Wi-Fi	•	•
XR80 5G Wi-Fi	•	•
XR80 LTE Wi-Fi	•	•
XR80 5G	•	•
XR80 LTE	•	•

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Model Differences

Model	Internal Cell	Wi-Fi	Precision Time	Bluetooth	Expansion	Max Ethernet
XR90	--	(2) 5GHz 4x4 (1) 2.4GHz 4x4*	--	BT 4.1**	Up to 2 XP	1 x 5 GbE 4 x 1 GbE
XR80 5G	5G Sub-6 (4G Cat20 fallback)	--	1 x Precision Time Protocol IEEE 1588**	--	Up to 1 XP	1 x 5 GbE 3 x 1 GbE
XR80 5G Wi-Fi		(1) 5GHz 4x4 (1) 5GHz 1x1 (1) 2.4GHz 4x4*				
XR80 LTE Wi-Fi	4G Cat20					
XR80 LTE		--				

*2.4GHz Wi-Fi share 5GHz antennas
**Hardware is present, future software support

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Common Features: Building on the Tradition

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Concurrent 2.4/5GHz Wi-Fi 6 Radios
with 4x4 MU-MIMO

FAKRA
Color coded and keyed quick-connect antenna connections

GNSS
with Dead Reckoning and Differential GPS capability

Embedded LPWA Cellular Radio
management traffic only (OOBM)

Serial over RJ45
with dual serial console operation via breakout cable

XP Cartridge Expansion Capability
5G Cellular + Ethernet

Balanced High-Speed Interfaces
Cellular, Ethernet, Wi-Fi, USB-C

Software-Defined Networking (LAN and WAN)
with configurable interfaces

Quad-core CPU with Data Path Acceleration Architecture
for VPN processing offload

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Common Features: Carrying on the Tradition

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7-36V power supply transient protection from -600v to +200v

Two configurable SIM slots

Rugged gasketed design
(IP64 even with XP)

-30°C to +70°C / -22°F to +158°F operating range

Unrestricted critical firmware updates for product life

1-year AirLink Services included in price

Up to 5 years extended warranty with current Services subscription

RoHS2, REACH, WEEE, Class 1 Div 2

E-Mark
(72/245/EEC, 2009/19/EC),
ISO7637- 2, SAE J1455
(Shock & Vibration)

MIL-STD-810G
Shock, Thermal shock, Vibration, Humidity

EN50155
(Rolling Stock)

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Balancing the Speed In and Out

Not just high speed 5G Cellular, but multiple WAN and LAN-capable wired and wireless interfaces

Dual Radio Cellular

Peak 5G DL
up to 4.1 Gbps

UL of 660 Mbps

Peak 4G DL of 2 Gbps,
UL of 210 Mbps

Wired

One 5 Gbps Ethernet
+
One USB-C 3.2 Gen 1

Wireless

4x4 MU-MIMO
Wi-Fi 6
up to 2.4 Gbps

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Interfaces and Behavior: Network

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Interfaces and Behavior: Network

Full IPv4 and IPv6 support with transitional tools

Default IPv4 LAN is set to 192.168.1.0/24

Default Gateway is 192.168.1.1 and DHCP range is 100-200

SDN allows multiple LAN segments assignable to any network interface

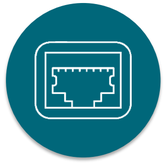
Various options for traffic forwarding

SDN allows dynamic WAN assignment

DHCP Reservation and Named Networks and Hosts

Zone-based firewall; all out, all between, none in by default

Default priority (based on WAN zone)



Ethernet (any) > 5 GHz client > 2.4 GHz client > Cell 1 > Cell 2

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Interfaces and Behavior: Wired Interfaces

Ethernet

All Ethernet ports are configurable for LAN or WAN use

Dynamic WAN Auto-detect is default for all Ethernet ports (base and XP)

All Ethernet ports provide access to Default LAN, out of the box

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The left port is 5 Gbps, all other ports are 1 Gbps

USB-C

USB-C port is on Default LAN and is LAN-configurable

Windows: requires driver install (auto update, optional); OS/X: autodetect

---

Theoretical max throughput is 5 Gbps

Industry-standard screw-lock support

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Interfaces and Behavior: Cellular

SIM Slots

Top slot is for radio 1 (INT/XP1), bottom slot is for radio 2 (XP/XP2)

SIMs read only at boot time

Slot assignments are configurable

Automated SIM failover supported for single-cellular routers (3.0)

APN Modes

Automatic: Look-up based on carrier, uses most common (Default)

Manual: APN specified

Manual: Blank (network assignment if network supports)

Multi: up to 5 per radio; presents each entry as virtual cell

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Interfaces and Behavior: Wi-Fi 6 and Serial

DBDC Wi-Fi 6

Dual-band dual-concurrent radios; all disabled, set to 20MHz channel width

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DFS disabled; enabling gives more 80MHz bands but has delay in AP broadcast

---

Locked to outdoor channels only based on region (changing in 4.0)

Up to 3 SSIDs available per access point

RS232 Serial

RJ45 port providing single or dual RS232

Compatible with standard Cisco-compatible light blue console/rollover cable

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Proprietary cable available for dual-serial (one 4-wire, one 2-wire)

Pinout available in Hardware guide for building customer dual-serial cables as needed

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Interfaces and Behavior: Wi-Fi 6 Details by Model

XR90

5 GHz are two independent 4x4 radios, each configurable for client or AP (not shared)

2.4 GHz: can operate in “repeater” mode (same channel as 2.4GHz STA) or “timeslice” mode (different channels)

2.4 GHz: map each operation (STA/AP) to specific antenna bank

XR80

Dual concurrent 2.4/5 GHz use 4 streams

Both radios support shared operation; channel is based on STA/client (“repeater” mode)

Discrete configuration of one each 2.4 and 5 GHz radio

If you are using 5GHz STA mode, you **must** connect an antenna to Wi-Fi 5 connection

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LPWA Radio: Management Traffic Only

Each XR Series router has an internal LPWA radio with 1x1 antenna

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LPWA Radio: Management Traffic Only

Data is limited to LWM2M management traffic to ALMS

Not configurable for user traffic

Limited to low throughput Cat-M1, NB-IoT

Not capable of supporting AirLink OS updates Over-The-Air

Must receive initial activation from ALMS

Requires registration and active Services status

Uses SW connectivity, regional offering details may differ

Internal SIM (not user accessible)

LPWA antenna included in router box

Provides Out-of-band management in case of total WAN loss

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Antenna Requirements

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Antenna Requirements

Cellular

4x4 MIMO each, 600-6000 MHz per cell

Cables must support high frequencies

Use of adapters not supported (interference + cable spec)

Wi-Fi

XR80: requires 4x4 MIMO 2.4/5 GHz plus 1x1 5GHz (5 total)

XR90: requires two 4x4 MIMO 2.4/5 GHz (8 total)

GNSS

FAKRA Signal Blue C Plug (requires HC 9003 jack on cable)

Cables must be low-loss

Bluetooth

XR90 only: 2.4 GHz element with FAKRA Water Blue Z unkeyed (any FAKRA jack)

Can use any 2.4GHz Wi-Fi antenna

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FAKRA Connector Summary

Antenna	FAKRA Color	Key	Requires jack	XR90	XR80	XP
Cellular	Claret-Violet	D	HA9004 jack	-	4	4
Wi-Fi	Beige	I	HV 1001 jack	8	5	-
GNSS	Signal Blue	C	HC 9003 jack	1	1	-
Bluetooth	Water Blue	Z	RAL 5021 jack	1	-	-

Not including LPWA antenna, which has same connector as other Cellular but is provided with base unit

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When can I get by with less antennas?

My customer wants to use existing antennas, or use less than all the available connections to save money if they don't need all the speed

Cellular	Wi-Fi XR80	Wi-Fi XR90
You can't It's not just about throughput; some channels use 3+4 as primary connections	If never using 5GHz STA (Client) mode, you can skip Wi-Fi 5 If not max throughput requirement	You can't 2.4 and 5GHz are shared, but MIMO order is reversed so even dual-band 2x2 requires all 4

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AIRLINK OS

Key Features

AirLink OS Layout

Key Features of AirLink OS

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Key Features of AirLink OS

Reboots only required for SIM-related changes

Dynamic WAN auto-detect

Software-defined networking (SDN): LAN and WAN

Multi-APN support

Full IPv6 support and typical controls and tools

Enhanced troubleshooting tools and logging

Enhanced reporting behavior to ALMS cloud management

User management and audit log

Improved upgrade behavior and new backout capability

Quarterly feature release schedule

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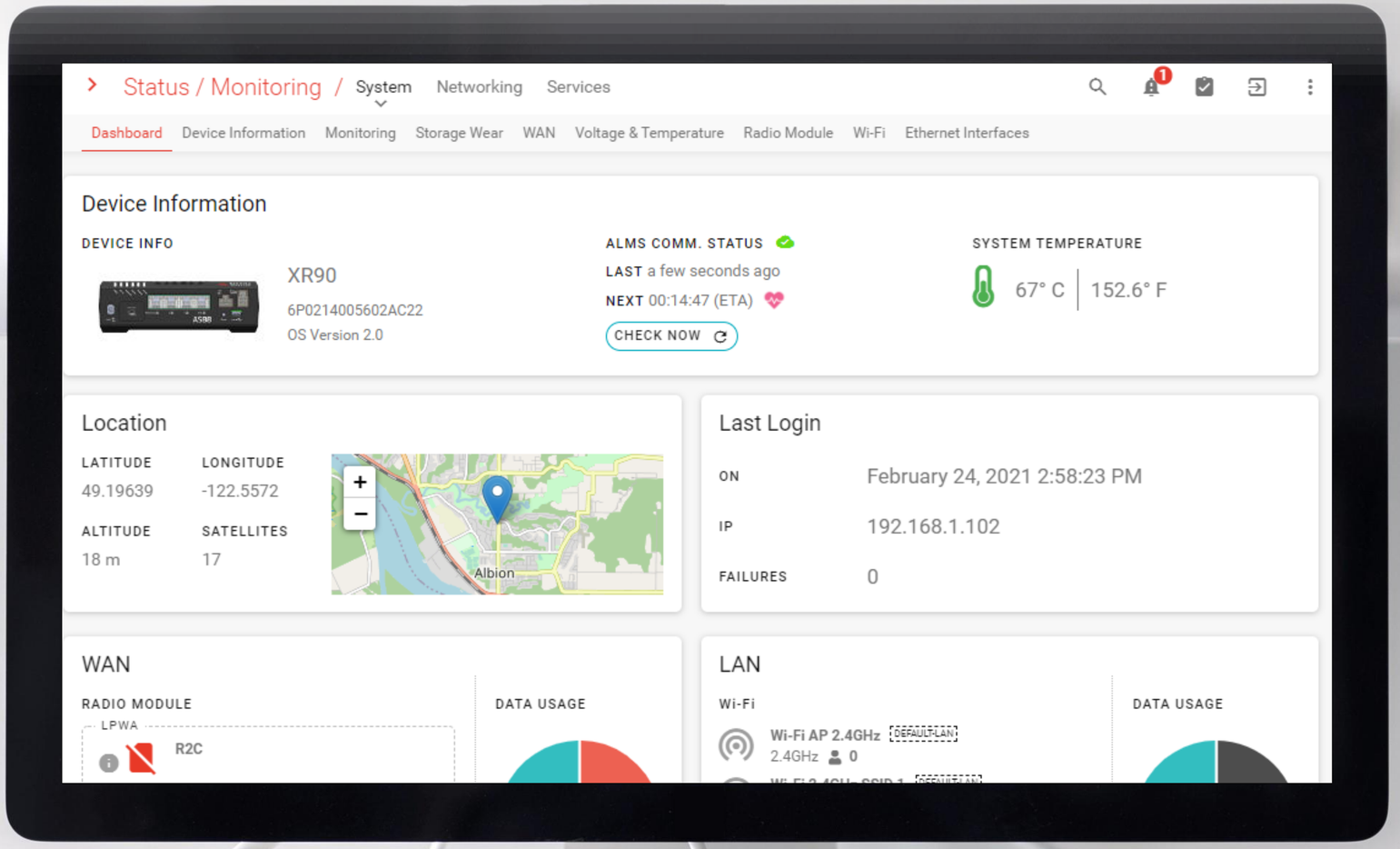
Navigating the User Interface: Better But Different



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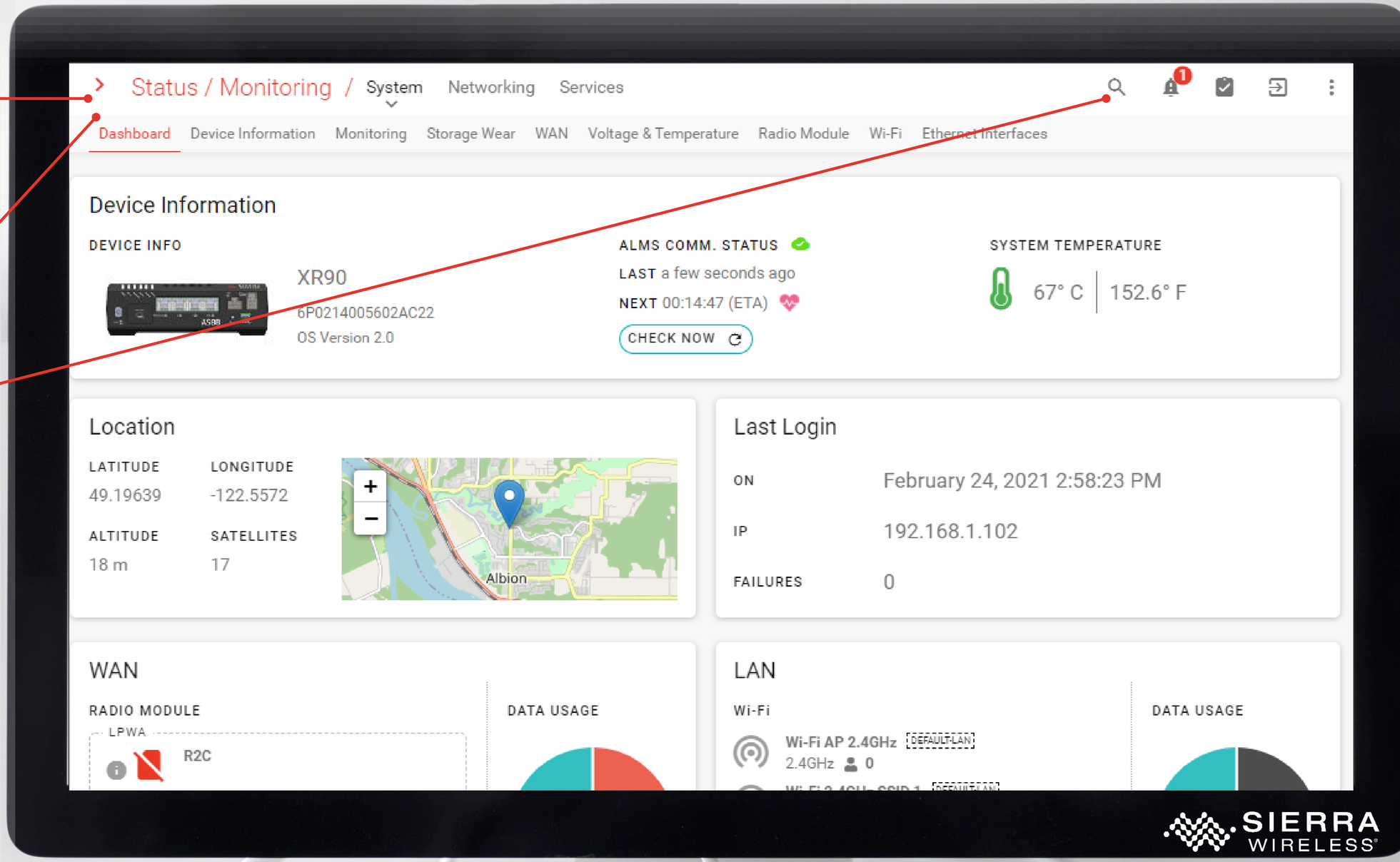
Navigating the User Interface: Navigation Tools

Quickly find settings and values, navigate to sections

Left and top Menu panels

Search function



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Navigating the User Interface: Modern and Elegant

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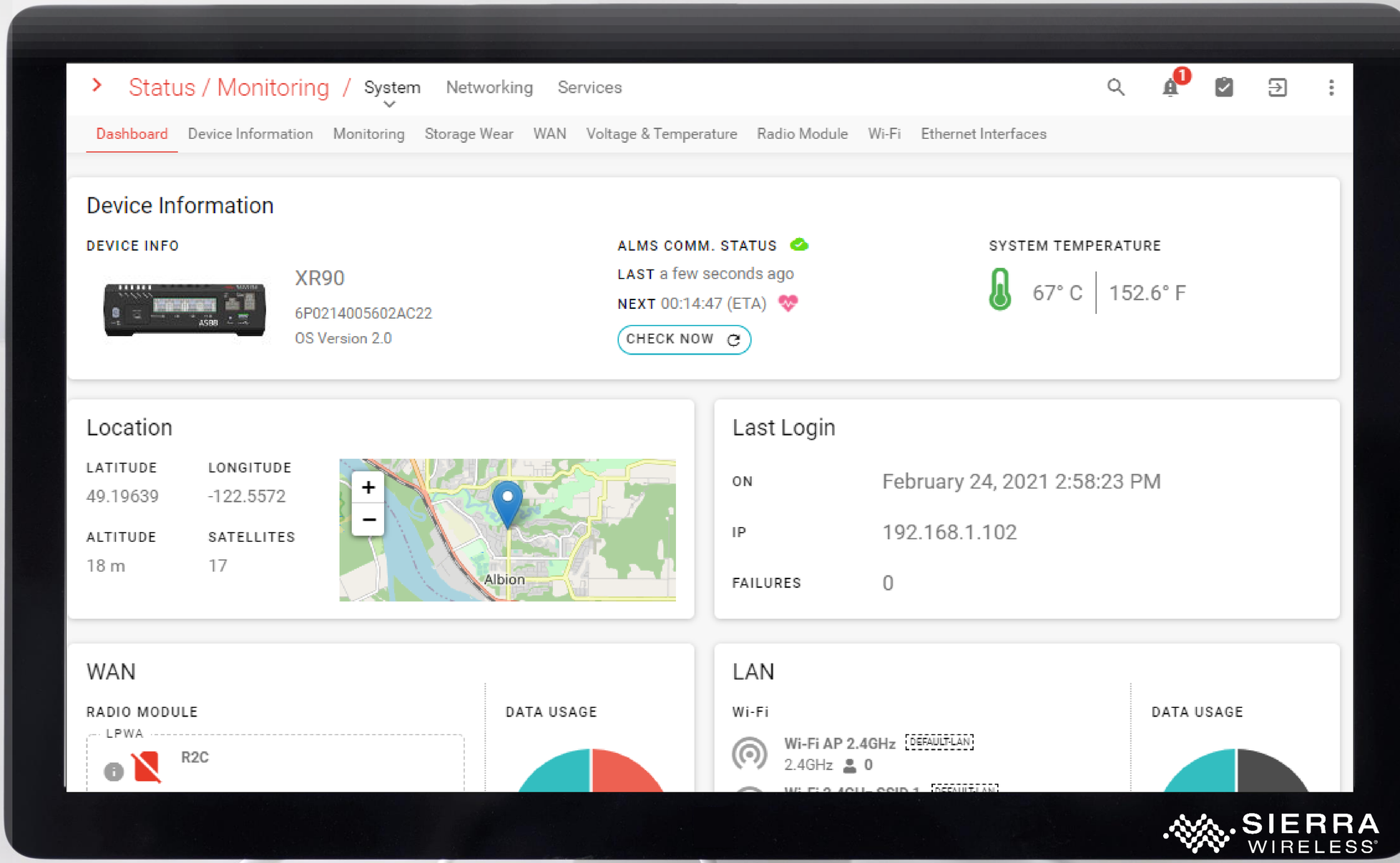
Different layout and operation

It does so much more!



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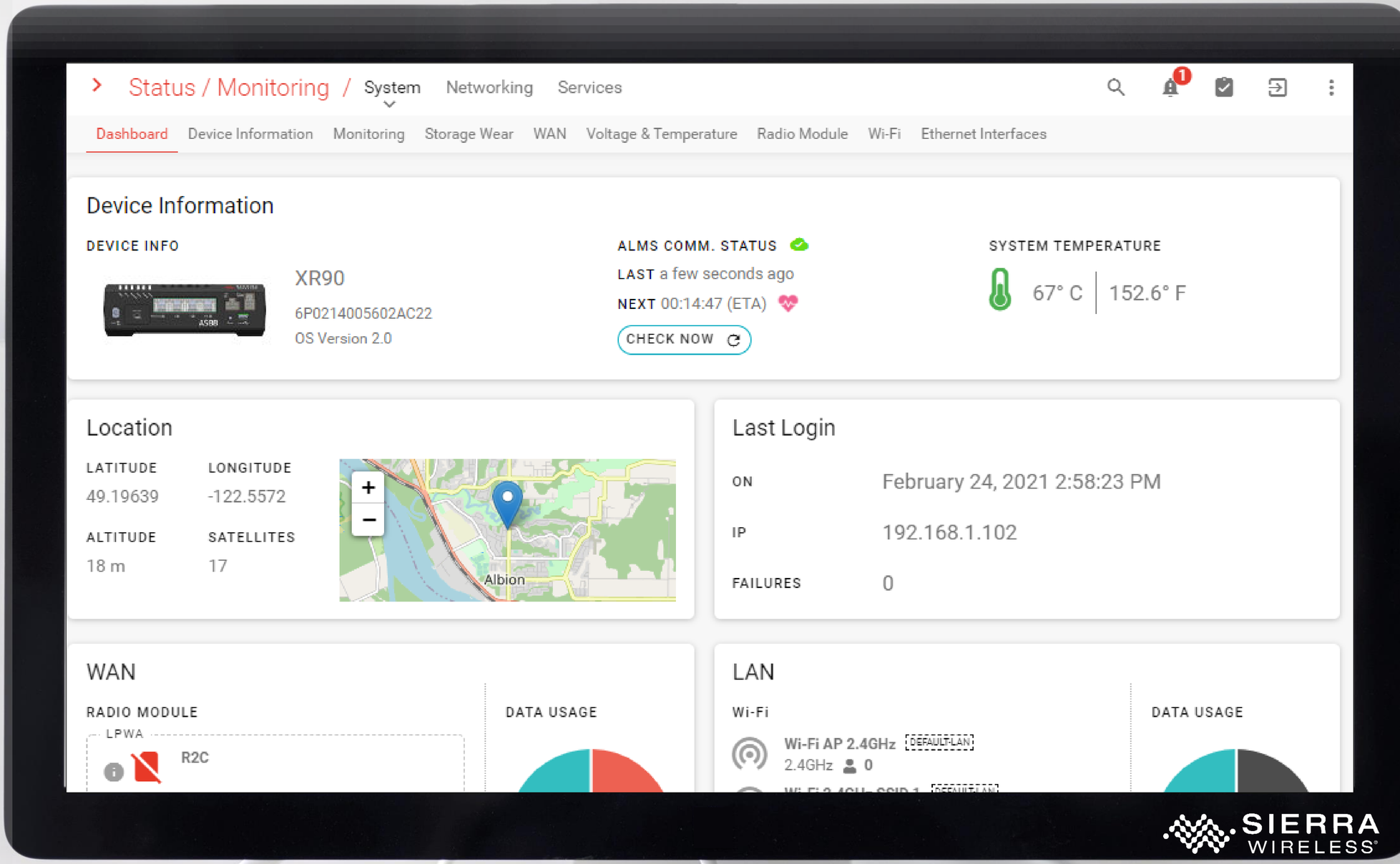
Navigating the User Interface: Intelligently Segmented

XR SOLUTION ADMINISTRATOR

Status and Monitoring first, including the Dashboard



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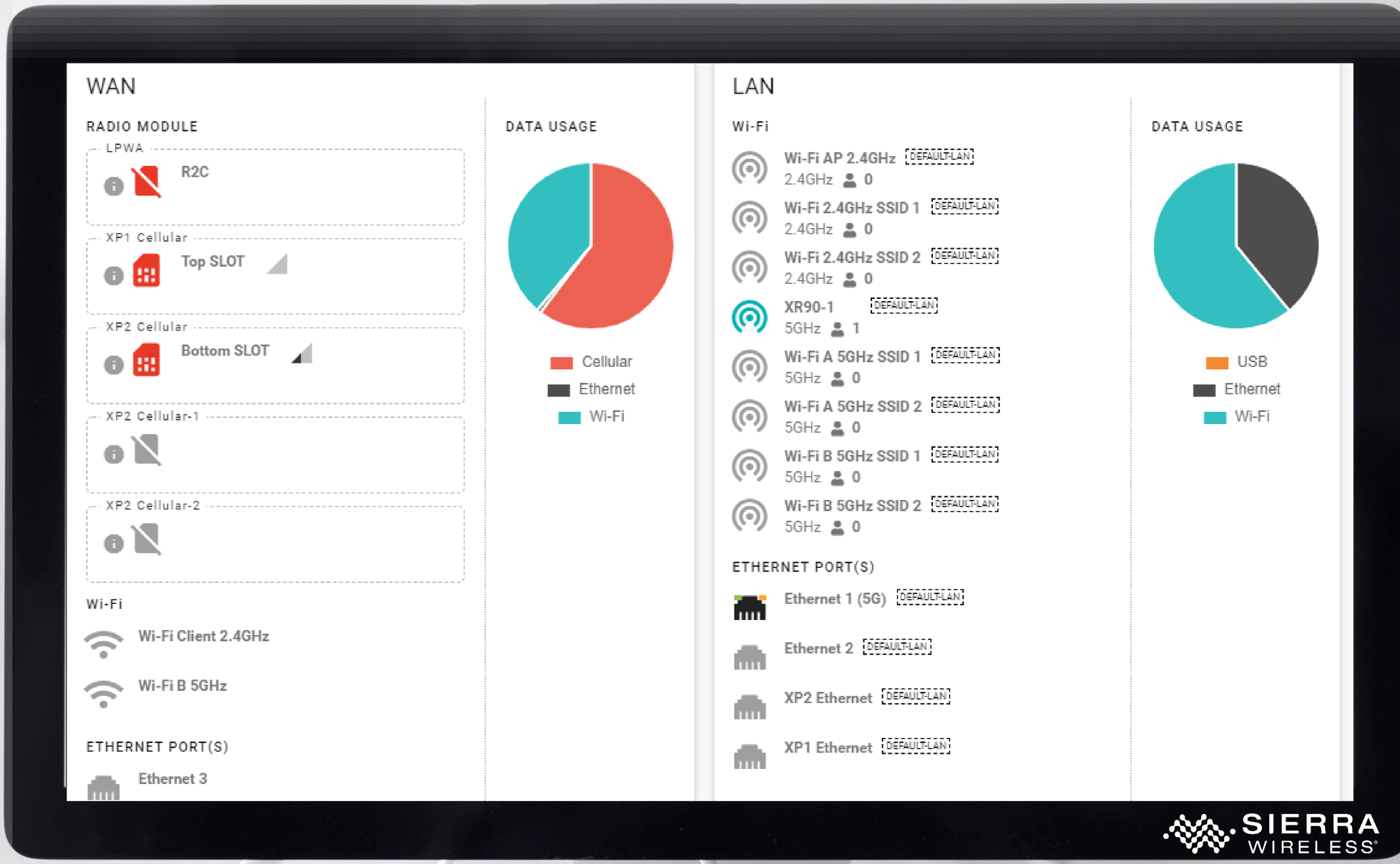
Navigating the User Interface: Intelligently Segmented

Then Communications



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Navigating the User Interface: Intelligently Segmented

And finally, device systems and management

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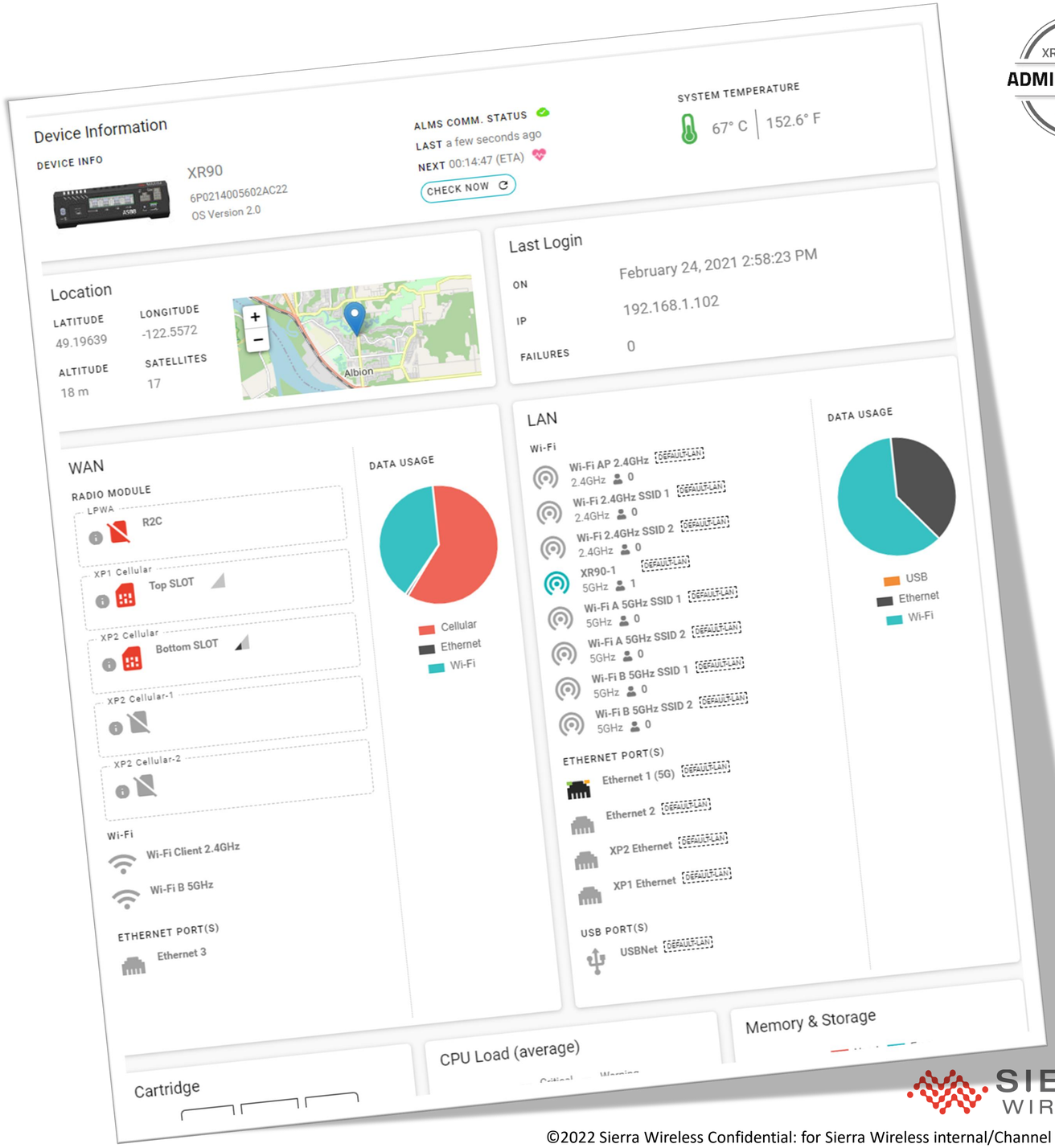
Dashboard and Status

A lot of information, in layers

- WAN Link states
- LAN interfaces and users
- Network states
- Location status
- Management status



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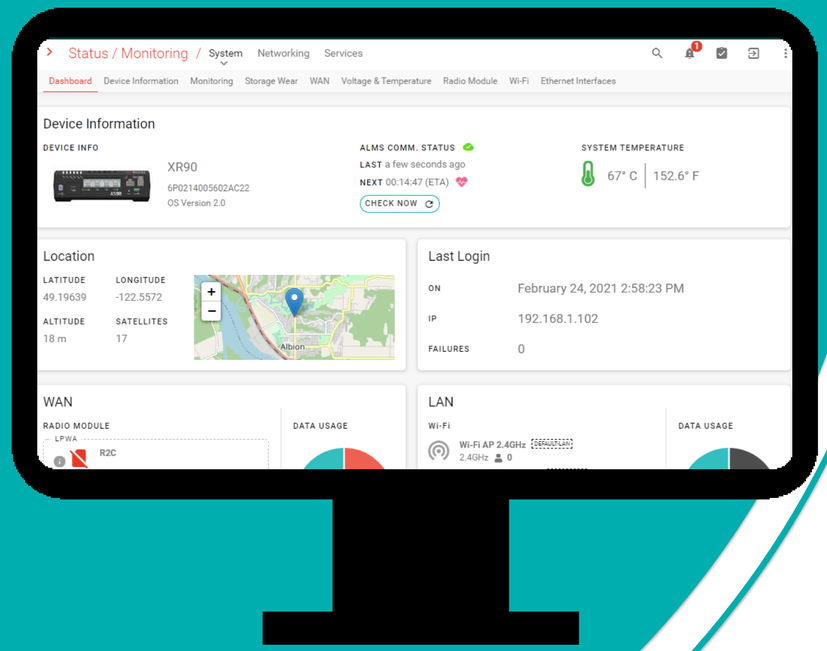
AIRLINK SERVICES AND ALMS

Strengthening the End-to-End Security

Registration Code

Strengthening the End-to-End Solution

Network devices need to be maintained



Subscription-based maintenance model ensures no device is left behind

Product solution includes the first year of AirLink Services

Regulatory landscape and customer dedication to security; carrier pressure

Many organizations and certification authorities mandate devices updates

Secure cloud-based service is the right tool

Sierra Wireless prioritizes security in the cloud and data residency

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AirLink Services Registration Code

The router label information is continuing to evolve

Default Password
FYI: the only place it is printed

NEW

Registration Code
for AirLink Services registration

The Serial Number and Radio IMEIs

XR80, IMEIs for both the LPWA radio and 5G radio

XR90, IMEI for the LPWA radio

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Using the QR code

Scan the image with your smartphone

On bottom label of the router

Unique, even more than before

One way to access Service registration information

Next session will explore more in-depth the best workflow around registering devices for AirLink Services

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Thinking Outside the Label

Router registration information is found on the label, but that requires opening every box and capturing a QR code or multiple bar codes.

Some information is restricted from certain locations for security purposes

Data	Bottom of Router	Outside of Box	ASN File
Default Password	Yes	No	No
Registration Code	Yes	No	Yes
Serial Number	Yes	Yes	Yes

Sierra Wireless sends registration information to distribution partners and is available for Resellers

Request registration information from your distributor to enable a more automated workflow

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WHAT'S NEXT

Knowledge Check

Online quiz

Lab Exercise #1 and Submission

Next Week: AirLink OS

XR SOLUTION ADMINISTRATOR

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Taking the Online Quiz

As part of the certification program, you are required to demonstrate mastery of requirements to work with the XR Series of routers

Complete the online quiz with >80% prior to the start of the next session

You do not need to complete the lab exercise prior to taking the quiz, because it is based on the presentation content

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Introduction to Lab Exercise #1

The lab exercise covers:

- Guided inquiry into confirming device status
- Examining link quality indicators
- Examining link capability indicators
- New and improved troubleshooting tools
- Setting up some basic device parameters

Also:

- Creating an ALMS “Gen 2” account (if not already done)
- Registering your XR Series router for AirLink Premium/Complete for XR80 (including ALMS)

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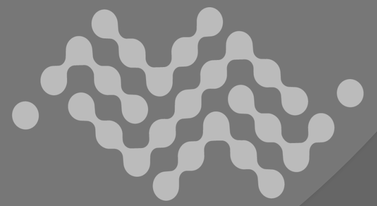
END OF SESSION 1

Thank you!