Cisco ISR and ASR Application Experience Routers

Cisco® Application Experience (AX) routers revolutionize the delivery of application-aware services in the branch office and WAN, with comprehensive solutions for application visibility, control, and optimization to enable customers to successfully deploy, monitor, and troubleshoot their applications from anywhere.

This ordering guide describes the options available for each product to help you take advantage of application experience from Cisco.

The Cisco Application Experience portfolio is available on the following product families:

- Cisco 4000-AX Application Experience Routers
- Cisco 3900-AX Application Experience Routers
- Cisco 2900-AX Application Experience Routers
- Cisco 1900-AX Application Experience Routers
- Cisco 800 Series Integrated Services Routers (ISRs) with an AX Feature Set software licensing option
- Cisco ASR 1000 Series Application Services Routers with AX bundles

Cisco Intelligent WAN with Akamai Connect

Cisco Intelligent WAN (IWAN) with Akamai Connect is a fully integrated solution from Cisco and Akamai that provides the next-generation application and network optimization. It integrates the best-in-class advanced WAN optimization and intelligent caching techniques directly into the Cisco Integrated Services Routers with Application Experience (ISR-AX) at the branch office. It effectively extends the Akamai Intelligent Platform across the last mile from the Internet directly into the branch office with edge caching, thus significantly offloading traffic from the WAN and providing a superior user experience over bandwidth-constrained networks. Akamai Connect provides faster content delivery regardless of device, connectivity, or cloud, including the corporate private cloud and the public Internet cloud, where most business traffic traverses. Each Cisco 2911-AX, 2921-AX, and 2951-AX ISR, Cisco 3900-AX and 4400-AX Series ISR-AX, and Cisco 4351 and 4331-AX router bundle also includes the option to add Akamai Connected Cache licenses.

Cisco ISR 4000-AX Series Integrated Services Routers

The Cisco 4000 Integrated Services Router Family includes the Cisco 4451-X-AX, 4431-AX, 4351-AX, 4331-AX, and 4321-AX routers. Each Cisco 4000-AX bundle includes licenses for IP Base, Security (SEC), Application Experience (AppX), and Right to Use (RTU) for Wide Area Application Services (WAAS). Cisco 4000-AXV bundles also include licenses for Unified Communications (UC) and Cisco Unified Border Element.

Cisco 4451-X-AX Series Integrated Services Routers

The Cisco 4451-X-AX ISR includes IP Base, Security, and AppX licensing with RTU for 2500 ISR WAAS or virtual WAAS (vWAAS) connections. The Cisco 4451-AXV also includes licenses for Cisco Packet Voice DSP Module 4-64 (PVDM4-64, Unified Communications (UC), and CUBE (refer to Table 1).

The Cisco 4451-X-AX platform includes 4-GB DRAM and 8 GB of flash memory by default. It does not include solid-state drives (SSDs) and additional memory that are required for ISR WAAS.

Table 1.   Cisco 4451-X-AX and 4451-X-AXV Platforms

Platform ID	Estimated Router WAN BW w/ Services	Description	WAAS/VWAAS/ISR WAAS Options	WAAS Optimized TCP Connections
ISR4451-X-AX/K9	1 Gbps or 2 Gbps	Cisco ISR 4451 with IP Base, APP and SEC licenses.	• 16GB DRAM, 32GB Flash and 2x200GB SSD drives for ISR-WAAS • UCS-E140/160 single wide or doublewide option for vWAAS	• 2500 with ISR-WAAS • or 2500 with UCS-E for vWAAS • For > 2500 see note below
ISR4451-X-AXV/K9	1 Gbps or 2 Gbps	Cisco ISR 4451 with CUBE, UC, IPBase, SEC and APP licenses, PVDM4-64.	• 16GB DRAM, 32GB Flash and 2x200GB SSD drives for ISR-WAAS • UCS-E140/160 single wide or doublewide option for vWAAS	• 2500 with ISR-WAAS • or 2500 with UCS-E for vWAAS • For > 2500 see note below

Note:

- Additional WAAS licenses are required for connections.
- Multiple WAAS instances are supported up to the max throughput of the router with services enabled.
- If multiple WAAS instances are required at the branch, AppNav is recommended to efficiently distribute traffic between the WAAS nodes. AppNav-XE is a feature of IOS-XE and included as part of the ISR-4000-AX license. It is recommended that all WAAS nodes in an AppNav node group have similar capacity/connection limits.

When ordering, you have two options to enable either ISR WAAS or vWAAS as follows:

Option 1 - ISR WAAS on the Router

For up to 2500 ISR WAAS connections, the DRAM upgrade to 16 GB, flash memory upgrade to 32 GB, SSD network-interface-module (NIM) carrier, and two 200-GB SSDs must be included. With the Cisco 4451-X-AX, customers can purchase a bundled upgrade option that includes the DRAM upgrade, flash-memory upgrade, and SSDs for ISR WAAS. Customers just need to add the bundle shown in Table 2 or add items individually as shown in Table 3.

Table 2.   Bundle Upgrade Option Including DRAM Upgrade, Flash-Memory Upgrade, and SSDs for ISR WAAS

Product ID	Description
ISR4451XWAAS-200G	DRAM upgrade to 16GB, Flash Memory upgrade to 32GB, NIM Carrier and 400GB (200+200) SSD Bundle

Note: Bundle upgrade can only be purchased at the same time router is purchased and cannot be purchased separately.

Table 3. Required DRAM Upgrade, Flash-Memory Upgrade, and SSDs for ISR WAAS on Cisco 4451

Product ID	Description	Qty
MEM-4400-4GU16G	4GB to 16GB DRAM Upgrade for ISR4400	1
MEM-FLASH-8U32G	8GB to 32GB Flash Upgrade for ISR4400	1
SSD-SATA-200G	200GB SATA Solid State Drive (SSD)	2
NIM-SSD Carrier	NIM carrier for SSDs	1

Option 2 - vWAAS on Cisco UCS E-Series Module

For 2500 vWAAS connections a Cisco Unified Computing System™ (Cisco UCS®) E-Series module UCS-E 140/160/180 must be included in the configuration with minimum 16GB of memory and 900GB disk option.

Cisco 4431-AX Series Integrated Services Routers

The Cisco 4431-AX ISR includes IP Base, Security, and AppX licensing with RTU for 1300 ISR WAAS or vWAAS connections, and the Cisco 4431-AXV also includes voice features including PVDM4-64, CUBE, Cisco Unified Communications Manager Express (CME), and UC licenses (refer to Table 4).

The Cisco 4431-AX platform includes 4-GB DRAM and 8 GB of flash memory by default. It does not include SSDs and additional memory that is required for ISR WAAS.

Table 4. Cisco 4431-AX and 4431-AXV Platforms

Platform ID	Estimated Router WAN BW w/ Services	Description	WAAS/VWAAS/ISR WAAS Options	WAAS Optimized TCP Connections
ISR4431-AX/K9	500 Mbps or 1Gbps	Cisco ISR 4431 AX Bundle, with IPBase, APP and SEC licenses	• 16GB DRAM, 16GB Flash and 1x200GB SSD drives for ISR-WAAS	• 1300 with ISR-WAAS
ISR4431-AXV/K9	500 Mbps or 1Gbps	Cisco ISR 4431 AXV Bundle, with PVDM4-64 with CUBE-25, UC, IPBase, APP and SEC licenses.	• 16GB DRAM, 16GB Flash and 1x200GB SSD drives for ISR-WAAS	• 1300 with ISR-WAAS

When ordering, the following hardware items are required to enable ISR WAAS as indicated in Tables 5 and 6.

Table 5. Bundle Upgrade Option Including DRAM Upgrade, Flash-Memory Upgrade, and SSDs for ISR WAAS on Cisco 4431-AX and 4431-AXV

Product ID	Description
ISR4430U-MEM-SSD	DRAM upgrade to 16GB, Flash Memory upgrade to 16GB, NIM Carrier and 200GB SSD Bundle

Note: Bundle upgrade can only be purchased at the same time router is purchased and cannot be purchased separately.

Table 6. Required DRAM Upgrade, Flash-Memory Upgrade, and SSDs for ISR WAAS on Cisco 4431-AX and 4431-AXV

Product ID	Description	Qty
MEM-4400-4GU16G	4GB to 16GB DRAM Upgrade for ISR4400	1
MEM-FLASH-8U16G	8GB to 16GB Flash Upgrade for ISR4400	1
SSD-SATA-200GB	200GB SATA Solid State Drive (SSD)	1
NIM-SSD Carrier	NIM carrier for SSDs	1

Support for vWAAS on Cisco UCS E-Series Servers is not available on the Cisco 4431.

Cisco 4351-AX Series Integrated Services Routers

The Cisco 4351-AX ISR includes IP Base, Security, and AppX licensing with RTU for 1300 ISR WAAS or vWAAS connections, and the Cisco 4351-AXV also includes voice features including CUBE and UC licenses (refer to Table 7).

Each Cisco 4351-AX includes 4-GB DRAM and 4 GB of flash memory by default. It does not include SSDs and additional memory that is required for ISR WAAS.

Table 7.   Cisco 4351-AX and 4351-AXV Platforms

Platform ID	Estimated Router WAN BW w/ Services	Description	WAAS/VWAAS/ISR WAAS Options	WAAS Optimized TCP Connections
ISR4351-AX/K9	200Mb or 400Mb	Cisco ISR 4351 AX Bundle, with IPBase, APP and SEC licenses	• 16GB DRAM, 16GB Flash and 1x200GB SSD drives for ISR-WAAS • UCS-E140/160 single wide or doublewide option for vWAAS	• 750 with ISR-WAAS Or • 1300 with vWAAS • For >1300 see note below
ISR4351-AXV/K9	200Mb or 400Mb	Cisco ISR 4351 AXV Bundle with PVDM4-64, with CUBE-25, IPBase, APP, SEC and UC licenses.	• 16GB DRAM, 16GB Flash and 1x200GB SSD drives for ISR-WAAS • UCS-E140/160 single wide or doublewide option for vWAAS	• 750 with ISR-WAAS Or • 1300 with vWAAS • For >1300 see note below

Note:

- Additional WAAS licenses are required for connections.
- Multiple WAAS instances are supported up to the max throughput of the router with services enabled.
- If multiple WAAS instances are required at the branch, AppNav is recommended to efficiently distribute traffic between the WAAS nodes. AppNav-XE is a feature of IOS-XE and included as part of the ISR-4000-AX license. It is recommended that all WAAS nodes in an AppNav node group have similar capacity/connection limits.

When ordering, you have two options to enable either ISR WAAS or vWAAS as follows:

Option 1 - ISR WAAS on the Router

For 750 ISR WAAS connections, DRAM upgrade to 16 GB, flash-memory upgrade to 16 GB, and SSD is required. When ordering, you have a choice of either one mSATA 200-GB SSD drive or one SSD NIM carrier and 200-GB SSD that must be included in the configuration as indicated in Tables 8 and 9.

Table 8.   Bundle Upgrade Option Including DRAM Upgrade, Flash-Memory Upgrade, and mSATA SSDs for ISR WAAS on Cisco 4351-AX and 4351-AXV

Product ID	Description
ISR4350U-MEM-MSATA	DRAM upgrade to 16GB, Flash Memory upgrade to 16GB and 200GB mSATA SSD Bundle

Note: Bundle upgrade can only be purchased at the same time router is purchased and cannot be purchased separately.

Table 9. Required DRAM Upgrade, Flash-Memory Upgrade and SSDs for ISR WAAS on Cisco 4351-AX and 4351-AXV

Product ID	Description	Qty
MEM-4300-4GU16G	4GB to 16GB DRAM upgrade for ISR4300 series	1
MEM-FLSH-4U16G	4GB to 16GB Flash upgrade for ISR4300 series	1
SSD-SATA-200GB	200GB SATA Solid State Drive (SSD)	1
NIM-SSD Carrier	NIM carrier for SSDs	1
Or		
SSD-MSATA-200GB	200GB mSATA Solid State Drive (SSD)	1

DRAM and flash-memory upgrade plus SSD storage are required for ISR WAAS. Onboard mSATA SSD or NIM carrier plus SSD are options. Using the onboard mSATA will free up the NIM carrier for other uses.

Option 2 - vWAAS on Cisco UCS E-Series Module

For 1300 vWAAS connections a Cisco Unified Computing System™ (Cisco UCS®) E-Series module UCS-E 140/160/180 must be included in the configuration with minimum 12GB of memory and 700GB disk.

Cisco 4331-AX Series Integrated Services Routers

The Cisco 4331-AX ISR includes; IP Base, Security, and AppX licensing with RTU for 750 ISR WAAS or 1300 vWAAS connections, and the Cisco 4331-AXV also includes voice features including CUBE and UC licenses (refer to Table 10).

Each Cisco 4331-AX includes 4-GB DRAM and 4 GB of flash memory by default. It does not include SSDs and additional memory that is required for ISR WAAS.

Table 10. Cisco 4331-AX and 4431-AXV Platforms

Platform ID	Estimated Router WAN BW w/ Services	Description	WAAS/VWAAS/ISR WAAS Options	WAAS Optimized TCP Connections
ISR4331-AX/K9	100 Mbps or 300 Mbps	Cisco ISR 4331 AX Bundle, with IPBase, APP and SEC licenses	• 16GB DRAM, 16GB Flash and 1x200GB SSD drives for ISR-WAAS • UCS-E140S single wide option for vWAAS	• 750 with ISR-WAAS Or • 1300 with vWAAS • For > 1300 see note below
ISR4331-AXV/K9	100 Mbps or 300 Mbps	Cisco ISR 4331 AXV Bundle with PVDM4-32, CUBE-10, IPBase, APP, SEC and UC licenses.	• 16GB DRAM, 16GB Flash and 1x200GB SSD drives for ISR-WAAS • UCS-E140S single wide option for vWAAS	• 750 with ISR-WAAS Or • 1300 with vWAAS • For >1300 see note below

Note:

- Additional WAAS licenses are required for connections.
- Multiple WAAS instances are supported up to the max throughput of the router with services enabled.
- If multiple WAAS instances are required at the branch, AppNav is recommended to efficiently distribute traffic between the WAAS nodes. AppNav-XE is a feature of IOS-XE and included as part of the ISR-4000-AX license. It is recommended that all WAAS nodes in an AppNav node group have similar capacity/connection limits.

When ordering, you have two options to enable either ISR WAAS or vWAAS as follows:

Option 1 - ISR WAAS on the Router

For 750 ISR WAAS connections, DRAM upgrade to 16 GB, flash-memory upgrade to 16 GB, and SSD is required. When ordering, you have a choice of either one mSATA 200-GB SSD drive or one SSD NIM carrier and 200-GB SSD that must be included in the configuration as indicated in Tables 11 and 12.

Table 11. Bundle Upgrade Option Including DRAM Upgrade, Flash-Memory Upgrade, and mSATA SSDs for ISR WAAS on Cisco 4331-AX and 4331-AXV

Product ID	Description
ISR4330U-MEM-MSATA	DRAM upgrade to 16GB, Flash Memory upgrade to 16GB and 200GB mSATA SSD Bundle

Note: Bundle upgrade can only be purchased at the same time router is purchased and cannot be purchased separately.

Table 12. Required DRAM Upgrade, Flash-Memory Upgrade, and SSDs for ISR WAAS on Cisco 4331-AX and 4331-AXV

Product ID	Description	Qty
MEM-4300-4GU16G	4GB to 16GB DRAM upgrade for ISR4300 series	1
MEM-FLSH-4U16G	4GB to 16GB Flash upgrade for ISR4300 series	1
SSD-SATA-200G	200GB SATA Solid State Drive (SSD)	1
NIM-SSD Carrier	NIM carrier for SSDs	1
Or		
SSD-MSATA-200G	200GB mSATA Solid State Drive (SSD)	1

DRAM and flash-memory upgrade plus SSD storage are required for ISR WAAS. Onboard mSATA SSD or NIM carrier plus SSD are options. Using the onboard mSATA will free up the NIM carrier for other uses.

Option 2 - vWAAS on Cisco UCS E-Series Module

For 1300 vWAAS connections a Cisco Unified Computing System™ (Cisco UCS®) E-Series module UCS-E 140/160/180 must be included in the configuration with minimum 12GB of memory and 700GB disk.

Cisco 4321-AX Series Integrated Services Routers

The Cisco 4321-AX ISR includes IP Base, Security, and AppX licensing with RTU for 200 ISR WAAS or vWAAS connections, and the Cisco 4321-AXV also includes voice features including CUBE and UC licenses (refer to Table 13).

Each Cisco 4321-AX includes 4-GB DRAM and 4 GB of flash memory by default. It does not include SSDs and additional memory that is required for ISR WAAS.

Table 13. Cisco 4321-AX and 4321-AXV Platforms

Platform ID	Estimated Router WAN BW w/ Services	Description	WAAS/VWAAS/ISR WAAS Options	WAAS Optimized TCP Connections
ISR4321-AX/K9	50 Mbps or 100 Mbps	Cisco ISR 4321 AX Bundle, with IPBase, APP and SEC licenses.	• 8GB DRAM, 8GB Flash and 1x200GB SSD drives for ISR-WAAS	• 200 with ISR-WAAS
ISR4321-AXV/K9	50 Mb or 100 Mbps	Cisco ISR 4321 AXV Bundle, with CUBE-10, IPBase, APP, SEC and UC licenses.	• 8GB DRAM, 8GB Flash and 1x200GB SSD drives for ISR-WAAS	• 200 with ISR-WAAS

When ordering, the following hardware items are required to enable ISR WAAS as indicated in Tables 14 and 15.

Table 14. Bundle Upgrade Option Including DRAM Upgrade, Flash-Memory Upgrade, and mSATA SSDs for ISR WAAS on Cisco 4321-AX and 4321-AXV

Product ID	Description
ISR4320U-MEM-MSATA	DRAM upgrade to 8GB, Flash Memory upgrade to 8GB and 200GB mSATA SSD Bundle

Note: Bundle upgrade can only be purchased at the same time router is purchased and cannot be purchased separately.

Table 15. Required DRAM Upgrade, Flash-Memory Upgrade, and SSDs for ISR WAAS on Cisco 4321-AX and 4321-AXV

Product ID	Description	Qty
MEM-4300-4GU8G	4GB to 8GB DRAM upgrade for ISR4300 series	1
MEM-FLSH-4U8G	4GB to 8GB Flash upgrade for ISR4300 series	1
SSD-SATA-200G	200GB SATA Solid State Drive (SSD)	1
NIM-SSD Carrier	NIM carrier for SSDs	1
Or		
SSD-MSATA-200G	200GB mSATA Solid State Drive (SSD)	1

DRAM and flash-memory upgrade plus SSD storage are required for ISR WAAS. Onboard mSATA SSD or NIM carrier plus SSD are options. Using the onboard mSATA will free up the NIM carrier for other uses.

Support for vWAAS on Cisco UCS E-Series Servers is not available on the Cisco 4321.

Cisco 3900-AX, 2900-AX, and 1900-AX Series Integrated Services Routers

The Cisco 3900-AX ISR includes licenses for Data, Security, and WAAS Express (WAASX), and a RTU for 2500 WAAS or vWAAS connections. The Cisco 2911-AX includes a 1300 WAAS or vWAAS RTU license. You can use this RTU on any combination or multiples of modules for WAAS and/or vWAAS connections on the Cisco 2900-AX or 3900-AX Series Routers, respectively. The Cisco 1900-AX Series includes licenses for Data, Security, and WAASX.

Options when ordering follow (refer to Table 16):

- The Cisco Services-Ready Engine (SRE): Enabling WAAS requires a Cisco SRE 710 or SRE 910.
- The Cisco UCS E-Series module: Enabling vWAAS requires a Cisco UCS E-Series module.

  The SRE or Cisco UCS E-Series module is not included by default with Cisco ISR-AX Routers when ordering, but is optional when ordering; not including by default gives you flexibility in choosing modules when ordering and enabling either WAAS or vWAAS. The RTU can be spread across multiple SRE and/or Cisco UCS E-Series modules in a single router.

The ISR-AX bundles include the option for purchase of SRE or Cisco UCS E-Series modules at a promotional price; when the SRE or Cisco UCS E-Series module is purchased separately it is not at the promotional price. Customers who will initially deploy WAAS Express but who plan to deploy full WAAS or vWAAS later are encouraged to buy the ISR-AX bundle with a SRE or Cisco UCS E-Series module to take advantage of the promotional pricing.

The Cisco 2900 and 3900-AX Series bundles also offer UC voice-enabled AXV bundles (refer to Table 17).

Table 16. Cisco 1900-AX, 2900-AX, and 3900-AX Application Experience (AX) Routers Overview and Ordering Information

Platform ID	Estimated Router WAN BW w/ Services	Description	WAAS/VWAAS/ISR WAAS Options	WAAS Optimized TCP Connections
C1921-AX/K9	15 Mbps	CISCO 1921 Modular Router, 2 GE, 2 EHWIC slots, 256F/512D, with IPBase, SEC and APP licenses.	-	50 (WAAS-Express)
C1941-AX/K9	25 Mbps	Cisco ISR 1941 Router w/ 2 GE, 2 EHWIC slots, 256MB CF, 2.5GB DRAM, with IPBase, SEC and APP licenses.	-	150 (WAAS-Express)
C2901-AX/K9	25 Mbps	Cisco ISR 2901 w/ 2 GE, 4 EHWIC, 2 DSP, 256MB CF, 2.5GB DRAM, with IPBase, APP and SEC licenses.	-	150 (WAAS-Express)
C2911-AX/K9	35 Mbps	Cisco ISR 2911 w/ 3 GE, 4 EHWIC, 2 DSP, 1 SM, 256MB CF, 2.5GB DRAM, with IPBase, SEC and APP licenses - WAAS/vWAAS with 1300 connection RTU.	• SRE-710 option for WAAS • SRE-910 option for WAAS • UCS-E140/160 single wide option for vWAAS	• 250 (WAAS-Express) • 500 (SR E-710) • 1000 (SRE-910) • >1001 and up to 1300 add UCS-E (vWAAS) • For >1300 See notes 6-8 below
C2921-AX/K9	50 Mbps	Cisco ISR 2921 w/ 3 GE, 4 EHWIC, 3 DSP, 1 SM, 256MB CF, 2.5GB DRAM with IPBase, SEC and APP licenses- WAAS/vWAAS with 1300 connection RTU.	• SRE-710 option for WAAS • SRE-910 option for WAAS • UCS-E140/160 single wide option for vWAAS	• 250 (WAAS-Express) • 500 (SRE-710) • 1000 (SRE-910) • >1001 and up to 1300 add UCS-E (vWAAS) • For >1300 See notes 6-8 below
C2951-AX/K9	75 Mbps	Cisco ISR 2951 w/ 3 GE, 4 EHWIC, 3 DSP, 2 SM, 256MB CF, 4 GB DRAM with IPBase, SEC and APP licenses - WAAS/vWAAS with 1300 connection RTU.	• SRE-710 option for WAAS • SRE-910 option for WAAS • UCS-E140/160 single wide option for vWAAS	• 400(WAAS-Express) • 500 (SRE-710) • 1000 (SRE-910) • For >1000 and up to 1300 add 2nd SRE for WAAS or UCS-E for vWAAS up to 1300 connections • For >1300 See notes 6-8 below
C3925-AX/K9	100 Mbps	Cisco ISR 3925 w/ SPE100 (3GE, 4EHWIC, 4DSP, 2SM, 256MBCF, 4GBDRAM with IPBase, SEC and APP licenses- WAAS/vWAAS with 2500 connection RTU.	• SRE-710 option for WAAS • SRE-910 option for WAAS • UCS-E140/160 single wide option for vWAAS	• 400 (WAAS-Express) • 500 (SRE-710) • 1000 (SRE-910) • For >1000 and up to 2000 add 2nd SRE for WAAS or UCS-E for vWAAS up to 2500 connections • For >2500 See notes 6-8 below
C3925E-AX/K9	250 Mbps	Cisco ISR 3925 w/ SPE200, 4GE, 3EHWIC, 3DSP, 2SM, 256MBCF, 2GB DRAM, with IPBase, SEC and APP licenses - WAAS/vWAAS with 2500 connection RTU.	• SRE-710 option for WAAS • SRE-910 option for WAAS • UCS-E140/160 single wide option for vWAAS	• 500 (SRE-710) • 1000 (SRE-910) • For >1000 and up to 2000 add 2nd SRE for WAAS or UCS-E for vWAAS up to 2500 connections • For >2500 See notes 6-8 below

Platform ID	Estimated Router WAN BW w/ Services	Description	WAAS/VWAAS/ISR WAAS Options	WAAS Optimized TCP Connections
C3945-AX/K9	150 Mbps	Cisco ISR 3945 w/ SPE150, 3GE, 4EHWIC, 4DSP, 4SM, 256MBCF, 4GBDRAM with IPBase, SEC and APP licenses - WAAS/vWAAS with 2500 connection RTU.	• SRE-710 option for WAAS • SRE-910 option for WAAS • UCS-E140/160 single wide option for vWAAS	• 400 (WAAS-Express) • 500 (SRE-710 • 1000 (SRE-910) • For >1000 and up to 2000 add 2nd SRE for WAAS or UCS-E for vWAAS up to 2500 connections • For >2500 See notes 6-8 below
C3945E-AX/K9	350 Mbps	Cisco ISR 3945E w/ SPE250, 4GE, 3EHWIC, 3DSP, 4SM, 256MBCF, 2GBDRAM with IPBase, SEC and APP licenses - WAAS/vWAAS with 2500 connection RTU.	• SRE-710 option for WAAS • SRE-910 option for WAAS • UCS-E140/160 single wide option for vWAAS	• 500 (SRE-710) • 1000 (SRE-910) • For >1000 and up to 2000 add 2nd SRE for WAAS or UCS-E for vWAAS up to 2500 connections • For >2500 See notes 6-8 below

Table 17.   Unified Communications Voice-Enabled Cisco 2900 and 3900 Series AXV Bundles

Platform ID	Estimated Router WAN BW w/ Services	Description	WAAS/VWAAS/ISR WAAS Options	WAAS Optimized TCP Connections
C2911-AXV/K9	35 Mbps	Cisco ISR 2911 w/ 3 GE, 4 EHWIC, 2 DSP, 1 SM, 256MB CF, 2.5GB DRAM, with IPBase, SEC, UC, CUBE and APP licenses - WAAS/vWAAS with 1300 connection RTU, PVDM3-16.	• SRE-710 option for WAAS • SRE-910 option for WAAS • UCS-E140/160 single wide option for vWAAS	• 250 (WAAS-Express) • 500 (SRE-710) • 1000 (SRE-910) • >1001 and up to 1300 add UCS-E (vWAAS) • For >1300 See notes 6-8 below
C2921-AXV/K9	50 Mbps	Cisco ISR 2921 w/ 3 GE, 4 EHWIC, 3 DSP, 1 SM, 256MB CF, 2.5GB DRAM with IPBase, SEC, UC, CUBE and APP licenses - WAAS/vWAAS with 1300 connection RTU\, PVDM3-32.	• SRE-710 option for WAAS • SRE-910 option for WAAS • UCS-E140/160 single wide option for vWAAS	• 250 (WAAS-Express) • 500 (SRE-710) • 1000 (SRE-910) • >1001 and up to 1300 add UCS-E (vWAAS) • For >1300 See notes 6-8 below
C2951-AXV/K9	75 Mbps	Cisco ISR 2951 w/ 3 GE, 4 EHWIC, 3 DSP, 2 SM, 256MB CF, 4 GB DRAM with IPBase, SEC, UC, CUBE and APP licenses- WAAS/vWAAS with 1300 connection RTU, PVDM3-32.	• SRE-710 option for WAAS • SRE-910 option for WAAS • UCS-E140/160 single wide option for vWAAS	• 400(WAAS-Express) • 500 (SRE-710) • 1000 (SRE-910) • For >1000 and up to 1300 add 2nd SRE for WAAS or UCS-E for vWAAS up to 1300 connections • For >1300 See notes 6-8 below
C3925-AXV/K9	100 Mbps	Cisco ISR 3925 w/ SPE100 (3GE, 4EHWIC, 4DSP, 2SM, 256MBCF, 4GBDRAM with IPBase, SEC, UC, CUBE and APP licenses- WAAS/vWAAS with 2500 connection RTU, PVDM3-64.	• SRE-710 option for WAAS • SRE-910 option for WAAS • UCS-E140/160 single wide option for vWAAS	• 400 (WAAS-Express) • 500 (SRE-710) • 1000 (SRE-910) • For >1000 and up to 2000 add 2nd SRE for WAAS or UCS-E for vWAAS up to 2500 connections • For >2500 See notes 6-8 below

Platform ID	Estimated Router WAN BW w/ Services	Description	WAAS/VWAAS/ISR WAAS Options	WAAS Optimized TCP Connections
C3945-AXV/K9	150 Mbps	Cisco ISR 3945 w/ SPE150, 3GE, 4EHWIC, 4DSP, 4SM, 256MBCF, 4GBDRAM with IPBase, SEC, UC, CUBE and APP licenses - WAAS/vWAAS with 2500 connection RTU), PVDM3-64.	• SRE-710 option for WAAS • SRE-910 option for WAAS • UCS-E140/160 single wide option for vWAAS	• 400 (WAAS-Express) • 500 (SRE-710 • 1000 (SRE-910) • For >1000 and up to 2000 add 2nd SRE for WAAS or UCS-E for vWAAS up to 2500 connections • For >2500 See notes 6-8 below

Notes:

1 TCP connection requirements vary by application; some applications consume multiple TCP connection resources for WAAS optimization.

2 Target WAN bandwidth is not limited in software or by any other system limit, but is rather provided as guidance for deployment sizing purposes.

3 Cisco 1905 and 1921 routers have fixed non-expandable memory. DRE is disabled on these platforms.

4 Typical WAN interfaces for maximum benefit with Cisco WAAS Express include T1/E1, 3G, and multi-T1, and smaller interfaces such as 256 or 384Kbps interfaces.

5 2.5GB DRAM included for WAAS-Express on Cisco 1941/2901/2911/2921-AX and for 2951-AX and 3925/3945-AX series routers 4GB DRAM is included for WAAS Express, the 1921-AX has 512MB DRAM only. 3925E/3945E-AX have 2GB DRAM by default and do not support WAAS Express.

6 Additional WAAS licenses are required for connections above the RTU limit.

7 Please verify the vWAAS target bandwidth rating is not greater than the router's rating with services enabled. Some ISR routers will not support the full vWAAS 1300, 2500 or 6000 capacity.

8 For multiple WAAS instances WCCP for 2900/3900 series is needed to manage multiple node groups using UCS-E or SRE. It is recommended that all WAAS nodes in a WCCP node group have similar capacity/connection limits. So for example with 3900 series which includes 2500 TCP Connections, add one or two UCS-E modules each with vWAAS 2500 for up to 7500 total TCP connections on the router or a single 6k vWAAS instance per UCS-E module up to 8500 total TCP connections. Additional WAAS RTU license is required Multiple vWAAS instances on UCS-E modules is supported up to the max throughput of the router with services enabled.

AX Licensing for the Cisco 800 Series Integrated Services Routers

The AX licensing for the Cisco 800 Series combines Cisco WAAS Express and Cisco Application Visibility and Control (AVC) in a way that is simple to order, configure, and deploy for optimized branch-office routing.

The AX licensing for the Cisco 800 Series consists of a combination of RTU software licenses and necessary DRAM memory that will get applied to the Cisco 800 Series Integrated Services Router:

- Advanced IP License
- WAAS Express RTU license
- AVC RTU license
- DRAM maximum memory upgrade

The AX Feature Set for the Cisco 800 Series is a selectable option that can be added when configuring a Cisco 880 or 890 Series ISR. Spare separate licenses may also be purchased and added to existing Cisco 880 or 890 Series Routers for these features.

Cisco Intelligent WAN with Akamai Connect

Each Cisco 2911, 2921, 2951-AX, 3900-AX Series and Cisco 4400-AX, 4351, and 4331-AX Series Router bundle also includes the option to add Akamai Connect licenses. Spare licenses may also be added to existing Cisco 2911, 2921, 2951-AX, 3900 Series, Cisco 4400-AX, 4351, and 4331-AX Routers with a WAAS or APP license that may be purchased separately (refer to Table 18).

Table 18.   Akamai Connect Licenses

Ordering SKU	Description
SL-200-AKC	Akamai Connect License for 200 WAAS/vWAAS connections
SL-750-AKC	Akamai Connect License for up to 750 WAAS/vWAAS connections
SL-1300-AKC	Akamai Connect License for up to 1300 WAAS/vWAAS connections
SL-2500-AKC	Akamai Connect License for up to 2500 WAAS/vWAAS connections
SL-6K-AKC	Akamai Connect License for up to 6000 WAAS/vWAAS connections
SL-200-AKC=	Akamai Connect License for 200 WAAS/vWAAS connections (Spare)
SL-750-AKC=	Akamai Connect License for up to 750 WAAS/vWAAS connections (Spare)
SL-1300-AKC=	Akamai Connect License for up to 1300 WAAS/vWAAS connections (Spare)
SL-2500-AKC=	Akamai Connect License for up to 2500 WAAS/vWAAS connections (Spare)
SL-6K-AKC=	Akamai Connect License for up to 6000 WAAS/vWAAS connections (Spare)

Note: Akamai Connect licences are not supported on Cisco 1900 Series, 2901 ISRs.

APP License Product IDs for Cisco 1900, 2900, 3900, and 4400 Series Integrated Services Routers

You can also purchase APP licenses and add them to Cisco 1905, 1921, 1941, 2900, 3900, or 4000 Series ISRs by purchasing the APP license as a separate line item. Each APP license includes the key IWAN components with no additional hardware needed for features, including DATA license features, Dynamic Multipoint VPN (DMVPN), Cisco Performance Routing Version 3 (PfRv3), AVC, Network Based Application Recognition 2 (NBAR2), quality of service (QoS), etc.

Customers may add a SRE module, Cisco UCS E-Series module, or onboard SSD + Memory module if they want to run WAAS, vWAAS, or some other hosted application. Or for WAAS Express a DRAM upgrade is required. All WAAS licensing is included with the APP license, so inclusion of the required hardware is all that is necessary. Note: The APP license does not include a SEC license. Table 19 gives the product IDs for ordering APP licenses.

Table 19.   Ordering APP Licenses

Ordering SKU	Description
SL-19-APP-K9	Application Experience License ISR 1905, 1921 or 1941 - includes licenses for: AppX, DATA and WAASX
SL-19-APP-K9=	Application Experience License ISR 1905, 1921 or 1941 - includes licenses for: AppX, DATA and WAASX, Spare Paper RTU
L-SL-19-APP-K9=	Application Experience License ISR 1905, 1921 or 1941 - includes licenses for: AppX, DATA and WAASX, eDelivery RTU
SL-29-APP-K9	Application Experience License for ISR 2900 series - includes licenses for: AppX, DATA, WAASX and WAAS/vWAAS 1300 connections RTU
SL-29-APP-K9=	Application Experience License for ISR 2900 series - includes licenses for: AppX, DATA, WAASX and WAAS/vWAAS 1300 connections, Spare Paper RTU
L-SL-29-APP-K9=	Application Experience License for ISR 2900 series - includes licenses for: AppX, DATA, WAASX and WAAS/vWAAS 1300 connections, eDelivery RTU

Ordering SKU	Description
SL-39-APP-K9	Application Experience License for ISR 3900 series - includes licenses for: AppX, DATA, WAASX and WAAS/vWAAS 2500 connections RTU
SL-39-APP-K9=	Application Experience License for ISR 3900 series - includes licenses for: AppX, DATA, WAASX and WAAS/vWAAS 2500 connections, Spare Paper RTU
L-SL-39-APP-K9=	Application Experience License for ISR 3900 series - includes licenses for: AppX, DATA, WAASX and WAAS/vWAAS 2500 connections, eDelivery RTU
SL-4350-APP-K9	Application Experience License for ISR 4350 series - includes licenses for: AppX, ISRWAAS/vWAAS 750 connections RTU
SL-4350-APP-K9=	Application Experience License for ISR 4350 series - includes licenses for: AppX, ISRWAAS/vWAAS 750 connections RTU, Spare Paper RTU
L-SL-4350-APP-K9=	Application Experience License for ISR 4350 series - includes licenses for: AppX, ISRWAAS/vWAAS 750 connections RTU, eDelivery RTU
SL-4330-APP-K9	Application Experience License for ISR 4330 series - includes licenses for: AppX, ISRWAAS/vWAAS 750 connections RTU
SL-4330-APP-K9=	Application Experience License for ISR 4330 series - includes licenses for: AppX, ISRWAAS/vWAAS 750 connections RTU, Spare Paper RTU
L-SL-4330-APP-K9=	Application Experience License for ISR 4330 series - includes licenses for: AppX, ISRWAAS/vWAAS 750 connections RTU, eDelivery RTU
SL-4320-APP-K9	Application Experience License for ISR 4330 series - includes licenses for: AppX, ISRWAAS 200 connections RTU
SL-4320-APP-K9=	Application Experience License for ISR 4330 series - includes licenses for: AppX, ISRWAAS 200 connections, Spare Paper RTU
L-SL-4320-APP-K9=	Application Experience License for ISR 4330 series - includes licenses for: AppX, ISRWAAS 200 connections, eDelivery RTU
SL-44-APP-K9	Application Experience License for ISR 4400 series - includes licenses for: ISRWAAS/vWAAS 2500 connections RTU for ISR4451 and 1300 connections for ISR4431 RTU
SL-44-APP-K9=	Application Experience License for ISR 4400 series - includes licenses for: ISRWAAS/vWAAS 2500 connections RTU for ISR4451 and 1300 connections for ISR4431, Spare Paper RTU
L-SL-44-APP-K9=	Application Experience License for ISR 4400 series - includes licenses for: ISRWAAS/vWAAS 2500 connections RTU for ISR4451 and 1300 connections for ISR4431, eDelivery RTU

Please note that the APP license does not include a Security license.

AppX License for Cisco 800 Series Integrated Services Routers

The AppX License may be a separate line item for select Cisco 800 Series Routers. Table 20 gives the product IDs for ordering the AppX Feature Set for the Cisco 800 Series.

Table 20. Ordering AppX Licenses for Cisco 800 Series Routers

Ordering SKU	Description
FL-C800-APP	AVC/Advanced IP with upgrade up to 1GB DRAM for Cisco 800 Series Routers
FL-C800-APP=	AVC/Advanced IP with upgrade up to 1GB DRAM for Cisco 800 Series Routers (spare)
L-FL-C800-APP=	AVC/Advanced IP with upgrade up to 1GB DRAM for Cisco 800 Series Routers (spare, e-delivery)

Supported Cisco 800 Series Integrated Services Routers

The AppX License may be added to any of the Cisco 800 Series Routers listed in Table 21.

Table 21. Supported Cisco 800 Series Routers

Supported Platform	Description
C892FSP-K9	Cisco 892 FSP Router
C896VA-K9	Cisco 896 VA router
C897VA-K9	Cisco 897 VA router
C897VAW-A-K9	Cisco 897 AW A router

Supported Platform	Description
C897VA-M-K9	Cisco 897 Annex M over POTs and 1GE/SFP Sec Router
C897VAW-E-K9	Cisco 897 VDSL2/ADSL2+ over POTs, 1GE/SFP, 802.11n ETSI Comp
C897VAM-W-E-K9	Cisco 897 Annex M over POTs & 1GE/SFP, 802.11n ETSI
C898EA-K9	Cisco 898 G.SHDSL ATM/EFM Multi-mode & 1GE/SFP Sec Router

The AppX Feature Set on the Cisco 880 and 890 Series ISRs with 1-GB DRAM can support a target WAN capacity of 11 Mbps and up to 125 concurrent TCP connections.

Cisco ASR 1000 Application Experience

The Cisco ASR 1000 Application Experience (AX) bundles consist of the following items:

- AVC license with NBAR2 DPI, Flexible NetFlow (FNF), and Performance Monitoring
- AppNav for WAN optimization
- Option to purchase heavily discounted vWAAS licenses, to be run on a standalone server

Table 22 lists the Cisco ASR-AX Router bundles.

Table 22.   Cisco ASR-AX Router Bundles

Part Number	Product Description
ASR1002X-AIS-AX	ASR1002X AX, AVC, AIS, vWAAS Bundle
ASR1002X-AES-AX	ASR1002X AX, AVC, AES, vWAAS Bundle
ASR1001-5G-AIS-AX	ASR1001 AX, AVC, AIS, 5G, vWAAS, Bundle
ASR1001-5G-AES-AX	ASR1001 AX, AVC, AES, 5G, vWAAS, Bundle
ASR1001X-AIS-AX	ASR1001X AX, AVC, AIS, vWAAS Bundle
ASR1001X-AES-AX	ASR1001X AX, AVC, AES, vWAAS Bundle

Virtual WAAS Ordering Option with Cisco ASR-AX Bundles

With each of the ASR bundles listed in Table 22, Cisco is providing the option to purchase a discounted vWAAS license; these licenses may then be deployed on a standalone server. Product IDs are listed in Table 23.

Table 23.   vWAAS Product IDs for Specific Cisco ASR-AX Configurations Only

Part Number	Product Description
FLASR1-AX-VWAAS12K	License for Virtual WAAS 12000 Connections
FLASR1-AX-VWAAS50K	License for Virtual WAAS 50000 Connections

AppNav on Cisco ASR Ordering Information

AppNav is integrated into Cisco IOS® XE Software for the Cisco ASR platforms, and licensing for AppNav features is included with Advanced IP Services (AIS) or Advanced Enterprise Services (AES) licensing. To enable AppNav, the AIS or AES license is required, as indicated in Table 24.

Table 24.   AppNav Product IDs for Cisco ASR Routers

Part Number	Product Description
FLASR1-IPB-AESK9	Cisco ASR 1000 Series IP BASE to ADV ENT SERVICES Upgrade
FLASR1-IPB-AISK9	Cisco ASR 1000 Series IP BASE to ADV INT SERVICES Upgrade
FLASR1-IPB-AESK9=	Cisco ASR 1000 Series IP BASE to ADV ENT SERVICES Upgrade (Spare)
FLASR1-IPB-AISK9=	Cisco ASR 1000 Series IP BASE to ADV INT SERVICES Upgrade (Spare)

Application Visibility and Control on ASR Platforms Ordering Information

AVC is integrated into Cisco IOS XE Software for the Cisco ASR platforms. Licensing for AVC is included with Advanced Internet Services (AIS) or Advanced Enterprise Services (AES) licensing plus an AVC-specific license. To enable AVC, either the AIS or AES license from Table 24 and an AVC license from Table 25 are required.

Table 25.   AVC Licenses for Cisco ASR Routers

Part Number	Product Description
FLSASR1-AVC	Appl. Visibility and Control License for ASR1000 Series
FLSASR1-AVC=	Appl. Visibility and Control License for ASR1000 Series (Spare)
L-FLSASR1-AVC=	Appl. Visibility and Control License for ASR1000 Series (eDelivery)

Additional Information

To obtain current information about prices for products in the Cisco Integrated Services Routers Generation 2 (ISR G2) portfolio, please refer to the Cisco price list.

- Cisco Commerce Workspace:
  https://www.cisco.com/web/partners/events/commerce_workspace.html.
- Cisco WAAS Software data sheets:
  https://www.cisco.com/en/US/products/ps6870/products_data_sheets_list.html.
- Cisco WAAS Modules for Cisco ISRs data sheets:
  https://www.cisco.com/en/US/products/ps9750/index.html.
- Cisco Wide Area Application Services Appliances:
  https://www.cisco.com/c/en/us/products/routers/wide-area-application-services-waas-appliances/index.html.
- Cisco 4000-X Integrated Services Routers ordering guide:
  https://www.cisco.com/c/en/us/products/collateral/routers/4400-series-integrated-services-routers-isr/guide_c07-728759.html.
- Cisco Integrated Services Routers Generation 2 ordering guide:
  https://www.cisco.com/c/en/us/products/collateral/routers/1900-series-integrated-services-routers-isr/ordering_guide_c07_557736.html.
- Cisco ASR1000 Series ordering guide:
  https://www.cisco.com/c/en/us/products/collateral/routers/asr-1000-series-aggregation-services-routers/guide-c07-731639.html.
- Cisco Technical Services:
  https://www.cisco.com/go/ts.