The Borderless Network
The Integrated Services Routers Generation 2
Transforming your Branch Experience

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CISCO Access Routing Technology Group
Agenda

- Borderless Network Overview
- Integrated Services Router Generation 2 Overview
- Collaboration, Services Virtualization, Security
- Operational Efficiency
- Software Delivery Model
The Transformation: The World Is Our New Workspace

Any Resource

Any Device

Any Location

The BORDERLESS NETWORK

A Next Generation Architecture to Deliver the New Workspace Experience
Borderless Networks

New Business Architecture Approach

- Accelerate growth by integrating innovations into the business process—bringing interactions faster to the customer.

- Harness Video as the agent of change to realize closer customer contact, enhance customer experience and customer loyalty.

- Transform the workspace experience and increase productivity. Automate business processes to drive down costs.

Connect More Closely with Your Customer, Partner, Workforce
Borderless Networks

New Technical Architecture Approach

- Redefine the Control Plane
  - Decoupling the software from the hardware so that you can quickly / flexibly turn on services and protect the investment
  - Converge systems and services so you have the consistent platform to build on
  - Policy as the way to implement, automate and unify services
Borderless Branch
17% Growth Projected by 2010

Workspace Experience

- Drastic increase in video adoption. 75% organizations strive for increased productivity via video

Operational Efficiency

- Centralized Data and Distributed Interactions are driving operational simplicity, cost savings and ROI

Branches Are the Windows to Customer Experience

- Bank
- Retail Store
- Clinic
- Classroom

Source: Nemertes Research
Borderless Branch with ISR G2

**Video-Ready**
- Rich-media applications
- High performance
- Application optimization

**Service Virtualization**
- Services “On-Demand”
- Customized Applications
- Cloud extension

**Operational Excellence**
- Greener technology
- Operational Simplicity
- Rapid ROI with Investment Protection

**Customer Experience**

**Business Innovation**

**Lowest TCO**
Integrated Services Routers
Generation 2 Overview
Introducing: Cisco Integrated Services Router Generation 2

Enhancing the Customer Experience

- Virtual Office
- Secure Mobility
- Customizable Applications
- Secure Collaboration
- Scalable Rich-Media Services

Performance, Scalability, Availability

- 860, 880, 890
- 1941, 1941W
- 2901, 2911, 2921, 2951
- 3925, 3945
Next Generation Integrated Services Routers

Under the Covers

Services Performance Engine (3900)
- Upgradeable with newer engines in the future

Multi-core Network Processor
- Up to 5x performance increase

Multi Gigabit Fabric
- Module to module communications
- Packet prioritization and shaping

NG DSP Modules
- Video ready DSP modules
- 4x increase in audio conferencing and transcoding
- Configurable power savings modes

EHWIC
- 2x performance increase
- HWIC/WIC/VWIC/VIC support natively
- EPoE capable

GE Ports
- Plus GE ports (3 on 2911+)
- SFP slots on 2921 and above

Service Modules
- 3x-7x increase in service module performance
- Existing NM support through adapter
- EPoE capable

Internal Services Module
- 3x increase in service module performance
- Configurable power savings mode
- 802.11n Option on 19xx

USB
- Console over USB
- Convenience storage
- Security credentials
## Cisco 1900 Series
Integrated Services Routers

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<tr>
<td>Form Factor</td>
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### Secure Mobility Platform
- 25Mbps WAN Access with Services
- Factory selectable Integrated wireless 802.11n option
- Desktop form factor with Double Wide HWIC Support
## Cisco 2900 Series

### Integrated Services Routers

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<tr>
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<td>3</td>
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<td>2</td>
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<tr>
<td>Onboard WAN Ports</td>
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</table>

### Secure Collaboration Platform

- Up to 75Mbps WAN Access with Services
- Video-ready DSP support
- Increased service density with Second Services module Slot
- 12 Inch Depth on 2911
Cisco 3900 Series
Integrated Services Routers

<table>
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<tr>
<th>Feature</th>
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<tr>
<td>ISM Slots</td>
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<td>EHWIC Slots</td>
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<tr>
<td>Onboard DSP Slots</td>
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<tr>
<td>Field Upgradeable Motherboards</td>
<td>SPE-150</td>
<td>SPE-100</td>
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<td>Integrated Redundant PS</td>
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<td>256MB</td>
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<tr>
<td>Default DRAM</td>
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<tr>
<td>Form Factor</td>
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</table>

Scalable Rich-media Services Platform

- Up To 150Mbps WAN Access With Services
- Upgradeable services performance engine (SPE) for future expansion
- Configurable dual Integrated Redundant Power supplies
- 2x Default Memory
Introducing The Multi Gigabit Fabric (MGF)

- Superior scalability by providing direct high-performance connectivity between services and modules
  - Provides connectivity between EHWICs, PVDM3s, SMs and ISMs through the backplane

- Offload the CPU when providing connectivity to internal modules or between services
  - There will be no CPU involvement when providing the service integration and traffic redirection as mentioned above

- Legacy interface modules do not benefit from the MGF and connect directly to the system CPU

Note: Not all possible modules are shown
USB Console

- Any Mini USB cable is supported
- As an environmental measure, Cisco no longer ship console cables by default. *

New Type B mini USB Console Port

- Enables use of a Mini USB cable for console access in addition to the Cisco console cable
- Mini USBs are commonly used for cell phones and digital cameras and offers a more flexible console access by not being limited to the Cisco console cable
- Only one console can be active at a time; USB cable always takes precedence

* Console cables in shipment of new router are an option that need to be configured at time of ordering
ISR G2 Performance Positioning

WAN Access and Collaboration

WAN Access Speed With Services

- Line Rate FE +
  - 150 Mb
  - 100 Mb
- VDSL2+/Su b-rate FE
  - 75 Mb
  - 50 Mb
- T1/E1 EFM
  - 35 Mb
  - 25 Mb

Concurrent Rich-media Collaboration Sessions

- 150 Mb
- 100 Mb
- 75 Mb
- 50 Mb
- 35 Mb
- 25 Mb
Service Modules and Interface Cards

Interface Cards (WAN or LAN)

Internal Module for Running Services That Don’t Require Interface Ports, Dedicated CPU and Memory

Independent CPU and Memory for Hosting Services or High Density Interface Ports.
Examples: Wireless LAN Controller, WAN Optimization, Etherswitch Module

High Density Rich-Media Voice and Video DSP Modules

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**EHWIC**
Enhanced High Speed WAN Interface Card

**ISM**
Internal Service Module

**SM**
Service Module

**PVDM3**
Packet Voice/Data Module
Adapters

- Maximize investment protection, while allowing for platform evolution
- Provide maximum interface coverage at platform FCS

NM to SM Adapter

PVDM2 to PVDM3 Adapter
Collaboration, Services Virtualization, Security,
Video-Ready

Rich-media Services with Medianet
- Video-Ready Media Engine (PVDM3)
- Scalable audio-conferencing
- Increased Video Storage (Up to 1TB per module)
- Multi-Gigabit Fabric for hi-performance connectivity
- WAN Optimization and Application Acceleration

Superior Customer Experience
with up to 150 Concurrent Rich-Media Collaboration Sessions

- Telepresence to Mid-Size Branch Offices
- Secure IP Video Surveillance
- High-scale Webex and desktop video collaboration
- Streaming video / Digital Signage
PVDM3 DSPs

- All PVDM3 SKUs supported on all Cisco 2900 and 3900 series platforms
- Up to 4X voice channel density per slot
  - GE backplane interface with for increased IP throughput
- Enhanced multi-core DSP architecture optimized for rich-media UC applications
- Feature parity with the PVDM2s
- Video feature ready
- Migration enabled by support for the co-existence of PVDM2, PVDM2-DM and PVDM3 on the Cisco 2900 and 3900 series platforms

<table>
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<th>PVDM3 SKUs</th>
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<td>PVDM3-16</td>
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</table>
Unified Communications
Max User Counts

- 300 CME, 1200 SRST
- 200 CME, 730 SRST
- 150 CME, 250 SRST
- 100 CME, 100 SRST
- 50 CME, 50 SRST
- 35 CME, 35 SRST

3945
3925
2951
2921
2911
2901
Service Virtualization

Cisco Services Ready Engine
- Service modules with integrated compute & storage in small, router integrated footprint
- Range of virtualized services and applications to meet branch needs
- Centralized deployment and management of services with flexibility to change without truck rolls

Any Service, Any Branch, Any Where

Network and Collaboration Services
- Optimized Branch Experience

Custom Applications for any Deployment
- Network-aware Lean Applications

Industry Standard Server Virtualization
- Server Consolidation

Cloud / Data Center Survivability
- Business Continuity
Virtual Service Delivery Model

Virtualized Services
Software can be deployed and managed remotely without truck-rolls

Cisco Network & Collaboration Services
WAN Optimization
Voice Mail
Video Surveillance
Network Analysis
WLAN Control
Etc.

Compute Services & Third Party Applications
Application Extension Platform (AXP)
General Purpose Server with Virtualization
Windows Services
Vertical applications
Etc.

Integrated Compute and Storage Hardware

Management
Central Management for Remote Provisioning

Third Party* Server Management Tools
Server Lifecycle Management
Application Management
CiscoWorks Tools
Deployment and Provisioning of virtualized services
Domain specific management

Services Ready Engines—ISM or SM

* Roadmap
ISR Generation 2
Services Ready Engines (SRE)

Internal Service Module (ISM)
- Single Core x86
- 512MB RAM, 4GB Flash
- Available on 1941 & above—Selected Services

Service Module (SM)
- Dual Core High Performance x86
- 2–4GB RAM, 500GB-1TB HDD
- Available on 2911 and above—Full Range of Services

- Up to 7x Performance Improvement Compared to Previous Generation
- Support for EnergyWise®—Reduces Power Consumption,
- High Capacity Storage, RAID Capable and FRU Disks—Enable HA Deployments
- Integrated Management, Troubleshooting, on-board HW Diagnostics Tool

Flexible “Service Ready” Deployment Model
- Deploy HW with router—SW can be deployed remotely saving truck roll costs
- Available Services: Application eXtension Platform, Cisco Unity Express
Secure Cloud Computing Architecture
Secure Unified Mobile Architecture
Secure Connectivity with Cisco TrustSec
Advanced Security Services

Secure collaboration with video integration
- Integrated IPsec acceleration
- One touch PSIRT update
- Advanced Management and Instrumentation
- Hardened Foundational security, Compliance
- Up to 5X performance increase over the ISRs
Secure Mobility

High-performance mobility and wireless solutions

- Integrated 802.11n Unified Wireless Network Architecture
- Enterprise Class 3G Wireless WAN Solution
- Secure, Scalable, Centralized Mgmt. & Monitoring of Wireless LAN and Wireless WAN
- Wireless WAN Optimization and Application Acceleration

Converged wired and wireless networks for Borderless Mobility

User Mobility & Guest Access

Broadest range of wireless devices

Reduce OPEX with Remote Management

Seamless Redundant Connectivity = Business Uptime
Operational Excellence
Operational Excellence

Operational Efficiency through Innovation
- Remote deployment, management and monitoring
- Gigabit Ethernet Switching Modules with Enhanced POE
- EnergyWise Support with configurable slot controls
- Field upgradeable motherboard for performance growth
- Increased redundancy across portfolio
- Single Universal IOS Image with Cisco IOS 15.0(1)M

New Business Innovations Drive Lowest TCO

Operational Simplicity—No Truck Rolls!
Energy Efficiency and Savings
Hardware Re-usability with Investment Protection
Business Uptime
New Enhanced EtherSwitch Service Modules (ESM)

- 16, 24, and 48 ports of GE or FE LAN
- Feature parity with Catalyst 3560-E and 2960
- Local Line-rate Layer 2/3 switching
- Supports Cisco EnergyWise for green IT
- Integration with MGF for LAN traffic performance optimization between modules, with no impact on CPU/WAN performance

- Integrates the latest enterprise switch features into the router, with the same features and configurations that are in the headquarters
- Industry Leading Power Over Ethernet
  - Enhanced POE (ePOE) Up to 20 watts per port
  - Takes advantage of 2900/3900 increased power levels offering up to 1040 watts per chassis
  - Per port autosensing and configuration of power levels
- Industry leading security and authentication
- Auto Smartports for plug and play port configuration

Gigabit Ethernet
# Switch Types

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ISR G2—Earth and Customer Friendly

Future
- More on Roadmap

Real Savings
- Around 50% savings in Power
- Real $$ savings

Earth Friendly
- Long lasting operational life
- Reduced recycling impact
- Less CO2 in the atmosphere

Built to Last Solution
- Modularity for HW and applications
- Field upgradeable mainboards (3900)
- Cisco Software (IOS) and Services support
- Built to last with long product lifecycle

Design
- Able to power off components of the system during non working hours
- Mainboards lead (Pb) free – (RoHS6)
- Power supplies at least 85% efficient
- Improved factory packing solutions
- Improved internal cooling
Power Management Modules and Scenario

Support Available in:
- ISM (SRE)
- SM (SRE—EtherSwitch)
- PVDM3
- EHWICs

Policy: 12 Hours on per Working Day

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66% of the Time It Could Be Off
Energy Efficiency = Real Results

5 Year Results

- 54% Savings in Energy
- 451 Tons of CO2
- 83 Cars Removed
- $87 K in Savings

Per Site/Year - 50 Sites

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<th>kWh Saved</th>
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<td>IP Phones</td>
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<td>SRE</td>
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<td>66%</td>
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<tr>
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<td>66%</td>
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<td><strong>Total</strong></td>
<td><strong>50</strong></td>
<td><strong>54%</strong></td>
<td><strong>54%</strong></td>
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IOS Software Evolution
Evolution of Software Packaging and Activation

1990s
- Many Images, Feature Upgrades
- Complex to Support

2004
- IOS Reformation
- Introduced with ISRs
- Reduced Complexity/Images
- Some SW Licensing

2010
- Licensed
- Ease Of Ordering
- Operational Simplicity
- Services On Demand
**IOS Software Packaging Evolution Summary**

### Current

- Advanced Enterprise Services
- Advanced IP Services
- Enterprise Services
- Adv. Security
- SP Services
- Ent. Base
- IP Voice
- IP Base

### New

**Universal Image**

- Security
- U.C.
- Data
- IP Base

#### Simplified Software Management

A single IOS Universal Image will ship with all ISR G2 platforms

Four IOS enforceable licenses enable full suite of functionality that were previously offered in eight images

#### Less Costly Software Upgrades

IOS feature upgrades can be done by enabling a new license key, reducing the need for truck-roll to remote offices

#### Enable Development of New Software Based Business Models

Services on Demand—purchase upgrades as you need them via Cisco licensing
New Model

- Each device is loaded with a universal IOS image
- A Software Activation License enables specific functionality
- Each SAL is unique to a particular device
  - A Feature Set is purchased via a “Product Activation Key” (PAK)
    - Product ID + Serial Number + PAK = Software Activation License
- New devices are shipped with the Software Activation License pre-installed
- New functionality can be “switched on” with a new SAL
  - Simply order a PAK for the desired Feature Set
1. Customer purchases product activation keys (PAKs) for desired feature set and obtains Unique Device Identifier (Product ID + Serial Number), for the device he wants to upgrade.

2. Using the Cisco website, the customer can purchase and generate a license for a feature set on that specific device.

3. License is installed and activated using Cisco License Manager, Router Call-Home, or manual copy and install.

4. These steps are the same for additional feature sets.
Introducing Cisco IOS Release 15 M and T

- New release strategy with feature delivery in a shorter amount of time
- Proactive support policies, consistent release numbering, clearer software deployment and migration guidance
- Predicable new feature release and rebuild schedules
Release 15 M and T

- Follow-on to Release 12.4 Mainline and 12.4T
- Features and platform support inheritance from Release 12.4T
- Proactive release support policies and software migration guidelines
  - Extended Maintenance M releases for long-term support
  - Standard Maintenance T releases between EMs for faster Cisco feature delivery
- Predictable release and maintenance rebuild schedules with measurable milestones
- New release three times/year; Extended Maintenance (EM) release every 18–20 months
- Initial rollout, Release 15.0(1)M, with 1941, 2900, and 3900
Release 15.0 Numbering and Delivery

Single Train Release Model

Improved Quality and Management

Predictable Schedules

EM1

EM2

Extended Maintenance Releases
Summary Review
What’s New with Cisco ISR G2?

<table>
<thead>
<tr>
<th>Cisco ISR</th>
<th>Cisco ISR G2</th>
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<tbody>
<tr>
<td>Up to 45 Mbps with Services</td>
<td>Up to 150 Mbps with Services</td>
</tr>
<tr>
<td>Single Network processor</td>
<td>Multi-core</td>
</tr>
<tr>
<td>X with 160GB Service Module Performance and Capacity</td>
<td>Up to 7X with Dual Core and 1TB storage</td>
</tr>
<tr>
<td>Voice Only Onboard DSPs</td>
<td>Voice + Video</td>
</tr>
<tr>
<td>Fast Ethernet with PoE. Based on Catalyst 3560/3750 Switch Modules</td>
<td>FE/Gigabit Ethernet with PoE+ Based on Catalyst 3560–E/2960</td>
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<tr>
<td>Multiple IOS Images</td>
<td>Single Universal IOS Image</td>
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<tr>
<td>Hardware Coupled Service Delivery</td>
<td>Virtual Services “On-demand”</td>
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<tr>
<td>Single Motherboard Redundancy</td>
<td>Redundant power supplies. Field-upgradeable motherboard</td>
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<tr>
<td>EnergyWise Energy Efficiency</td>
<td>EnergyWise with slot based controls.</td>
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</table>

Up to 5X the Performance. Similar price points.
The New Branch Experience
Integrated Services Routers Generation 2

Service Virtualization
- Services on demand
- Customized services
- Cloud extension

Video-Ready
- Rich media applications
- High performance
- Application optimization

Operational Excellence
- Greener technology
- Operational simplicity
- Investment protection

Business Innovation

Customer Experience

Lowest TCO