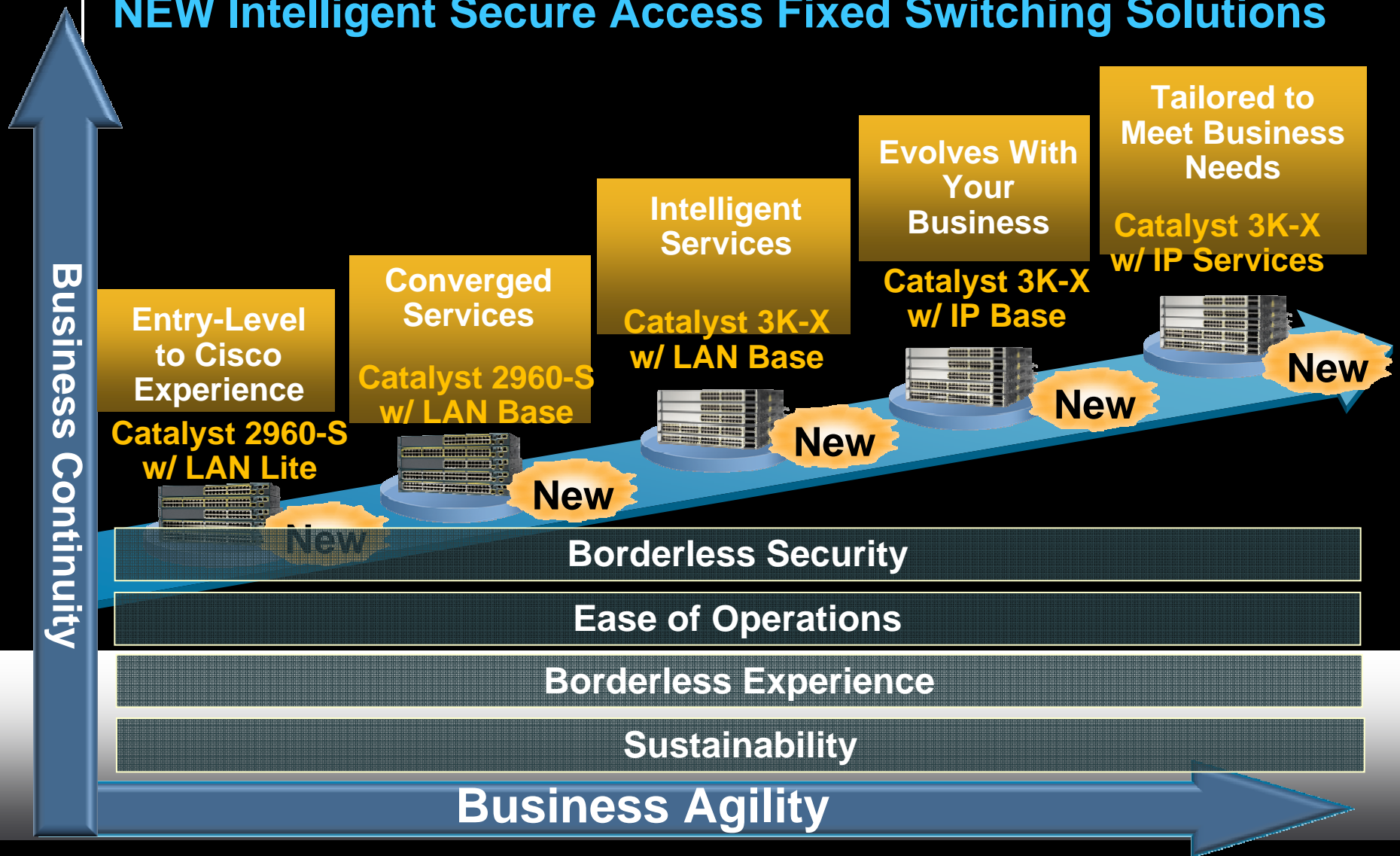# Borderless Access

Catalyst 3560-X & 3750-X Switches

Addressing Business Transformation
NEW Intelligent Secure Access Fixed Switching Solutions

Business Continuity

Entry-Level to Cisco Experience

Catalyst 2960-S w/ LAN Lite

Converged Services

Catalyst 2960-S w/ LAN Base

Intelligent Services

Catalyst 3K-X w/ LAN Base

Evolves With Your Business

Catalyst 3K-X w/ IP Base

Tailored to Meet Business Needs

Catalyst 3K-X w/ IP Services

New
New
New
New
New

Borderless Security

Ease of Operations

Borderless Experience

Sustainability

Business Agility

Introducing Catalyst 3750-X & 3560-X

Innovation Leadership: What's New

- 24/48 10/100/1000 ports

- Seamless upgrades from 4x1G to 2x10G
  - No special hardware required, just replace the optics

- StackPower Technology – Industry First
  - Distributes power in the stack where it is needed

- Dual Field Replaceable Power Supplies/Fans
  - Switch can be upgraded and serviced in the field

- TrustSec Enabled
  - Provides advanced authentication and adds encryption on user-facing ports

- Full 802.3at PoE+ Support
  - Standards based power delivery up to 30 watts per port supporting next-generation high-power devices

- Enhanced Limited Lifetime Hardware Warranty
  - NBD delivery where available
  - 90-day 8x5 TAC support

New
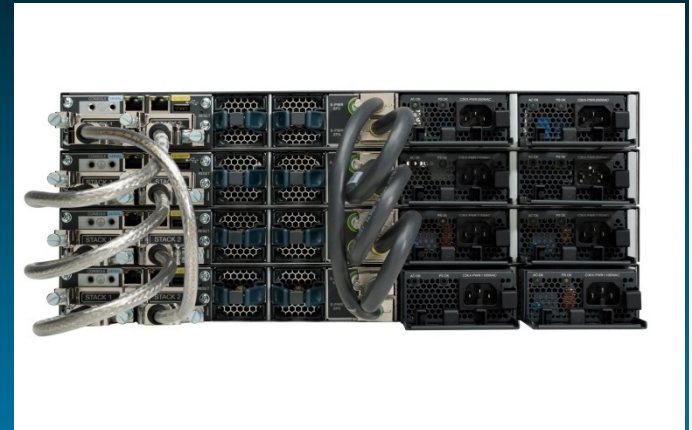
- **3 Software Options: LAN Base, IP Base, IP Services**
  - **Flexible software features and lower entry level pricing**

StackPower
Main features

Industry Leadership

- Innovative technology, aggregates and shares available input power capacity in a Stack

- Flexible arrangement of power supplies in a stack

  Up to 8.8Kw power in a stack

- Supports a "zero-footprint" RPS deployment

- Intelligent power shedding

- Stackpower decouples a PS from its physical location in the stack!

- Up to 4 switches can be part of Stackpower

  Independent from Stackwise (Stackwise Plus)

- No need for RPS though an XPS is available!

StackPower Close up

Console, 10/100 port, and USB type A
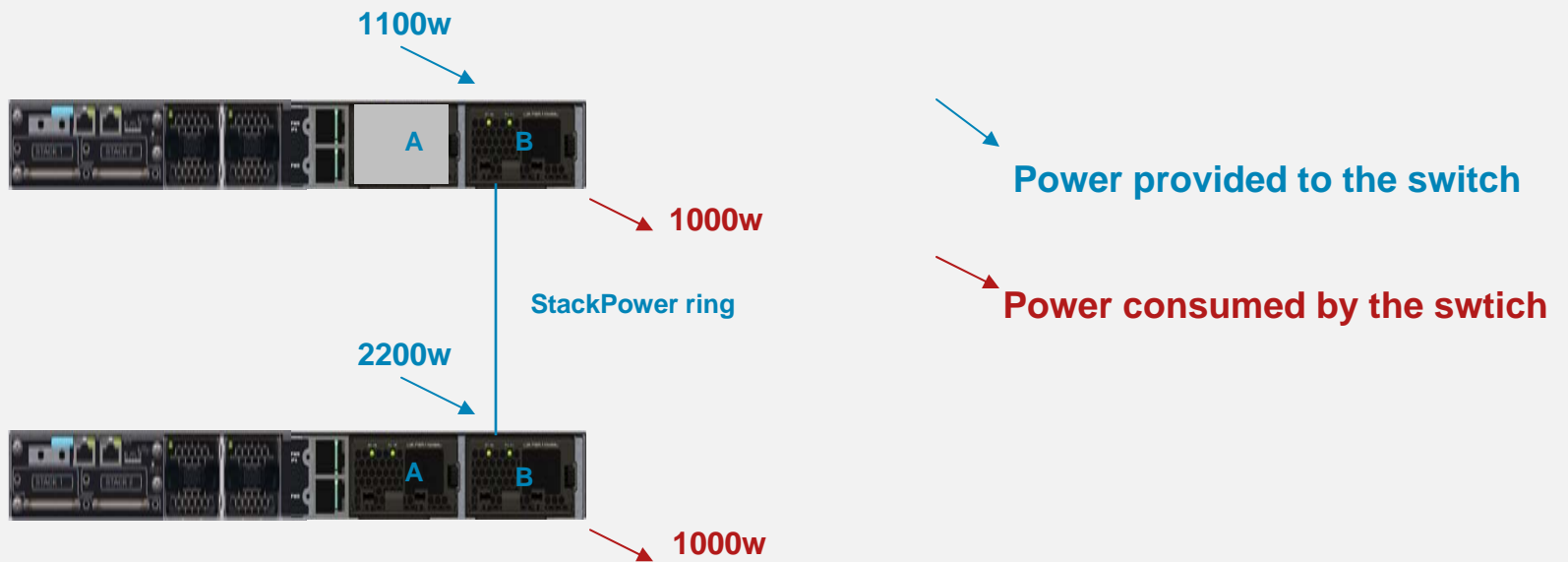
Stackwise Plus 4 Switches

FRU Dual Redundant Fans

StackPower Cables

Redundant, Dual PS, either AC/AC, AC/DC, AC, or DC combinations
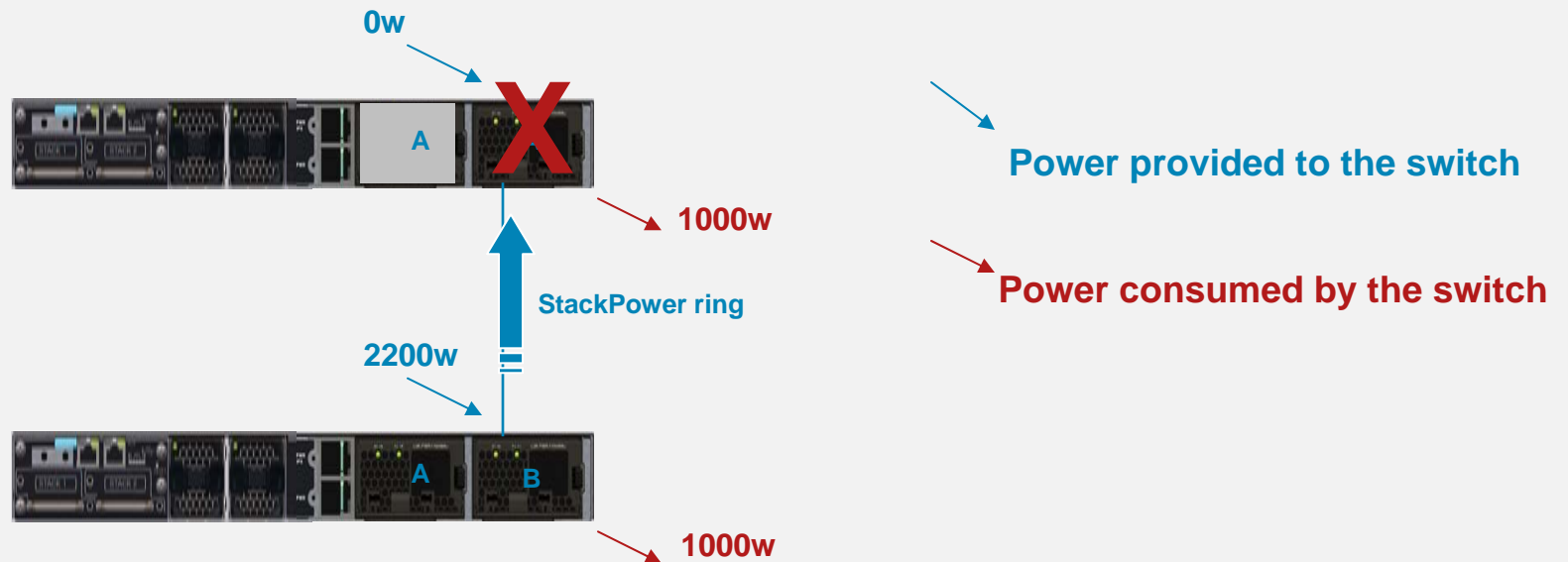
StackPower
Extra Power Supply

1100w

A   B

1000w

StackPower ring

2200w

A   B

1000w

Power provided to the switch

Power consumed by the swtich

Power Available	Power Used	Power Available
3 x 1100W = **3300W**	2 x 1000W = **2000W**	3300W - 2000W = **1300W**

1300W of unused power

StackPower
Failure with extra power supply

0w

1000w

StackPower ring

2200w

1000w

Power provided to the switch

Power consumed by the switch

Power Available	Power Used	Power Available
2 x 1100W = **2200W**	2 x 1000W = **2000W**	2200W - 2000W = **200W**

StackPower provides power to switch 1
Zero-Footprint RPS

StackPower
Unused power

715w

A   B

→ 240w

Power provided to the switch

StackPower

Power consumed by the switch

715w

A   B
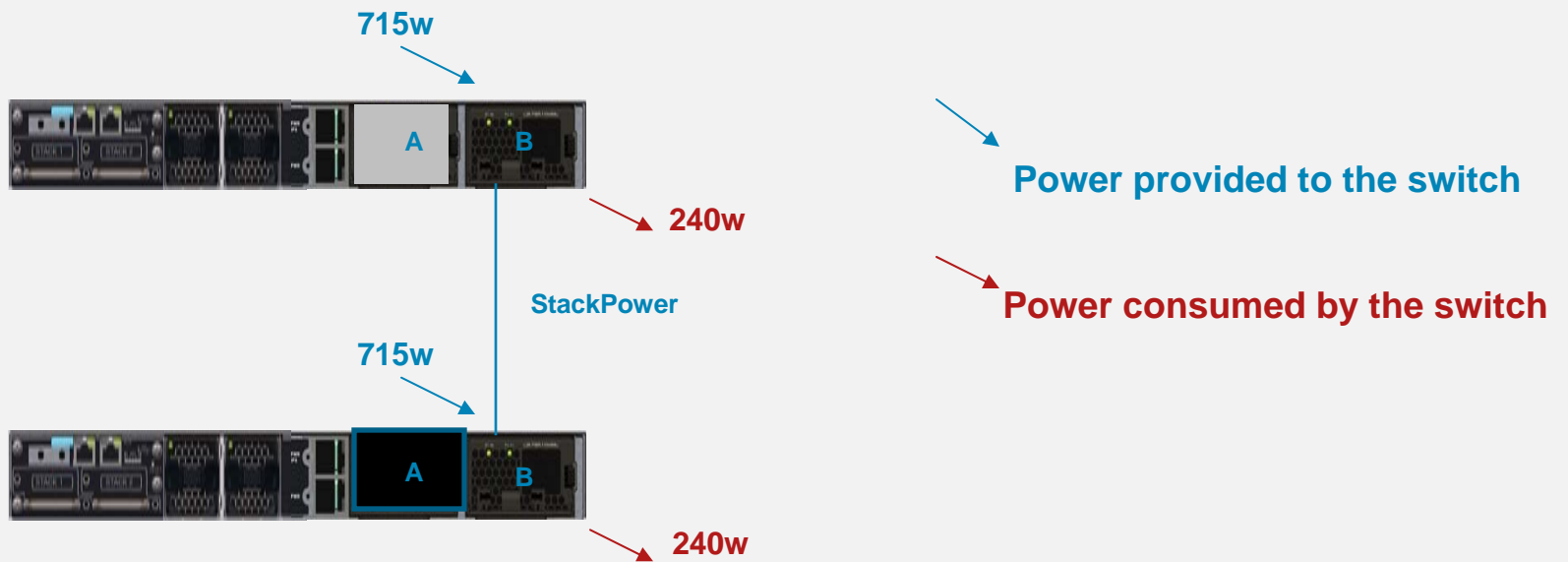
→ 240w

Power Available	Power Used	Power Available
2 x 715W = **1430W**	2 x 240W = **480W**	1430W - 480W = **950W**

950W of unused power

StackPower
Failure with extra power redirected

0w

A X

240w

StackPower

715w

A B

240w

Power provided to the switch

Power consumed by the switch
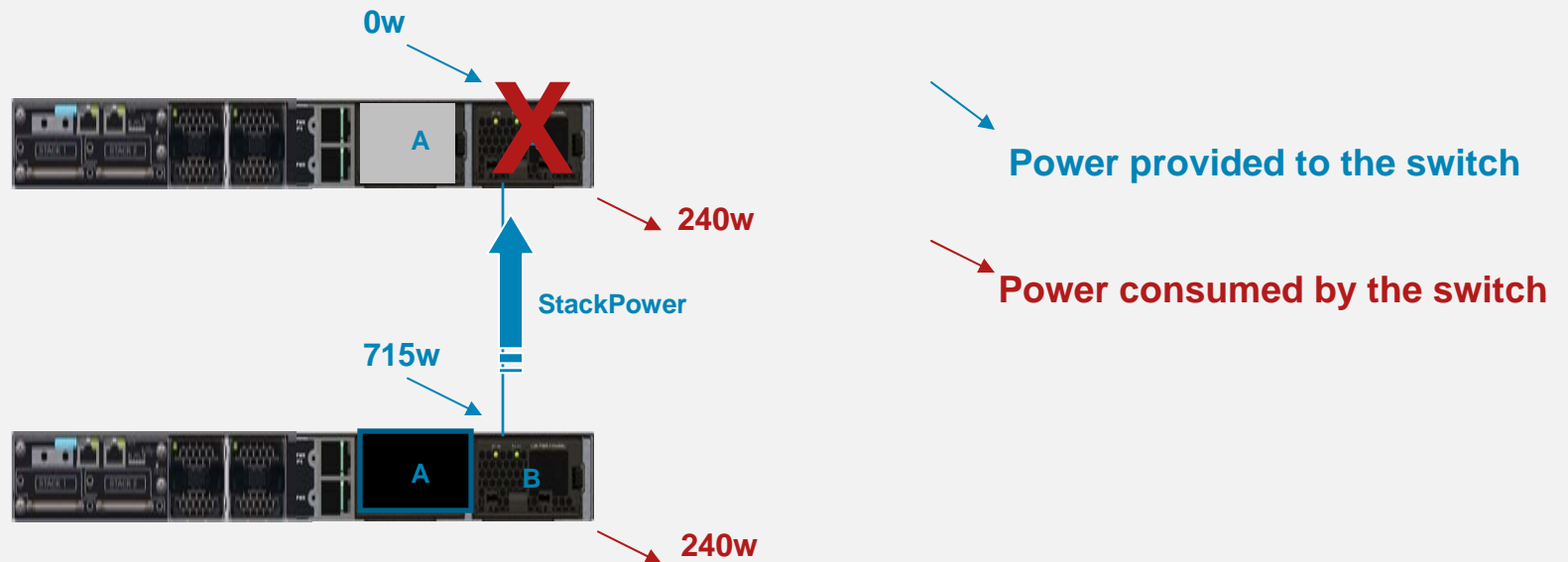
Power Available	Power Used	Power Available
1 x 715W = **715W**	2 x 240W = **480W**	715W - 480W = **235W**

StackPower provides power to switch 1
Self redundant

StackPower
Capabilities Overview

Switch A
Full POE on 48-ports 740w PoE
Need = 986w

Switch B
48-ports, Data Only, Needs 246w

Switch C
Full POE+ on 48-ports 1,440w PoE
Needs 1,686w

Switch D
48-ports, Data Only, Needs 246w

715w

350w

715w

350w

Power requirements:
246w * 4 + 740 + 1440 = 3,172w
Available Power = 2,130w
Deficit = 1,042w

Options:
Add one 1,100w PS slot B of any switch to cover the deficit. No extra capacity

Add two 1,100w PS to any two switches in slot B to over 1,042w deficit plus 1,100w for redundancy.

Note capability to boot up a switch that doesn't have a PS and even provide PoE+ on that switch.
Stackpower can provide complementary power as well as Redundant power depending on requirements and configuration.

Intelligent Load shedding

StackPower will preserve the most important resources in case of failure

- Switches and PoE device can be assign a High or Low priority

- In a case of a failure the lower priority PoE device are shed first.

- The amount of load shedding depends on the amount of oversubscribed power

- StackPower will prioritize keeping the switches running

- Default priority per port can be re-programmed (all ports are Low priority by default)

- Intelligent mechanism to shed load during failure scenarios

StackPower
Summary

Scalable infrastructure for PoE+

Complements PoE+ on switches with smaller power supplies

Better utilization of available power capacity by sharing

Flexible installations when AC outlet availability is constrained

3x 350W PS Vs. one x 1.1KW PS

Unprecedented reliability and efficiency

Idle power can be used as backup

"zero footprint" RPS

1+n redundancy is better than 1:n redundancy

Intelligent load-shedding

Sustainability

Highly efficient power supplies: 80% efficiency at 10% load

Energywise can off-line supplies when extra capacity is not required

Wire Rate Performance with StackWise Plus

- All models provide wire rate, non-blocking performance as defined in RFC 2544

- 128 Gbps Switch Fabric

- Local switching ensures that local traffic does not traverse the stack

Benefit

- Capable of handling bandwidth-intense applications like data backup, remote operating system updates, database access, collaborative development, file sharing, scientific modeling, medical imaging, and video production

- Prepares network for next-gen OSs like Microsoft Vista's remote imaging, data synchronization, and computer-to-computer search

Network Module

Optional

- Can be configured when ordering
- Can be added latter on
- Hot swappable, does not require a restart.

Provides flexibility with two options:

- Four 1G ports (SFP)
- Two 10Gig port (SFP+) or four 1G ports (SFP)

Adopt new SFP+ 10G optics

- No need for TwinGig adaptor

Network Modules Catalyst 3750-X & 3560-X Series	
C3KX-NM-1G=	1G network module
C3KX-NM-10G=	10G network module
C3KX-NM-BLANK=	Default

PoE+ Support
Main features

Support for new standard PoE+ (802.3at)

- 30W per port Vs. 15.4W per port

- Backward compatible with legacy PoE (802.3af)

- Can provide 30W per port on all 48-ports simultaneously (Full PoE+)

Future proof network for next generation devices

MACsec

Supported in Hardware

- Link-layer cryptography with 128-bit Advanced Encryption Standard (AES) cryptography
- Line rate, no impacts to CPU or switching fabric

Standards based

- IEEE 802.1AE encryption
- IEEE 802.1X-Rev Key exchange protocol (MKA)

Developed in conjunction with Intel

Dual Redundant Power supplies & fans

- Four Power Supplies options
  - 1100W AC
  - 715W AC
  - 350W AC
  - 440W DC (future availability)

- Switches come by default with one power supply, a second one can be configured

- High efficiency

- Support any combination Size/AC/DC

- Hot Swappable

- Redundant fan modules

Models	Default Power Supply
24 Port Data Switch	C3KX-PWR-350WAC
48 Port Data Switch	
24 Port PoE Switch	C3KX-PWR-715WAC
48 Port PoE Switch	
48 Port Full PoE Switch	C3KX-PWR-1100WAC

Power Supply – Front end Power
Typical Efficiency curve

Typical values

- **80% Efficiency at 10% load**
- Efficiency up to 92% at any load between 25% and 90%

Load vs Efficiency

New Power supplies

Older Power supplies
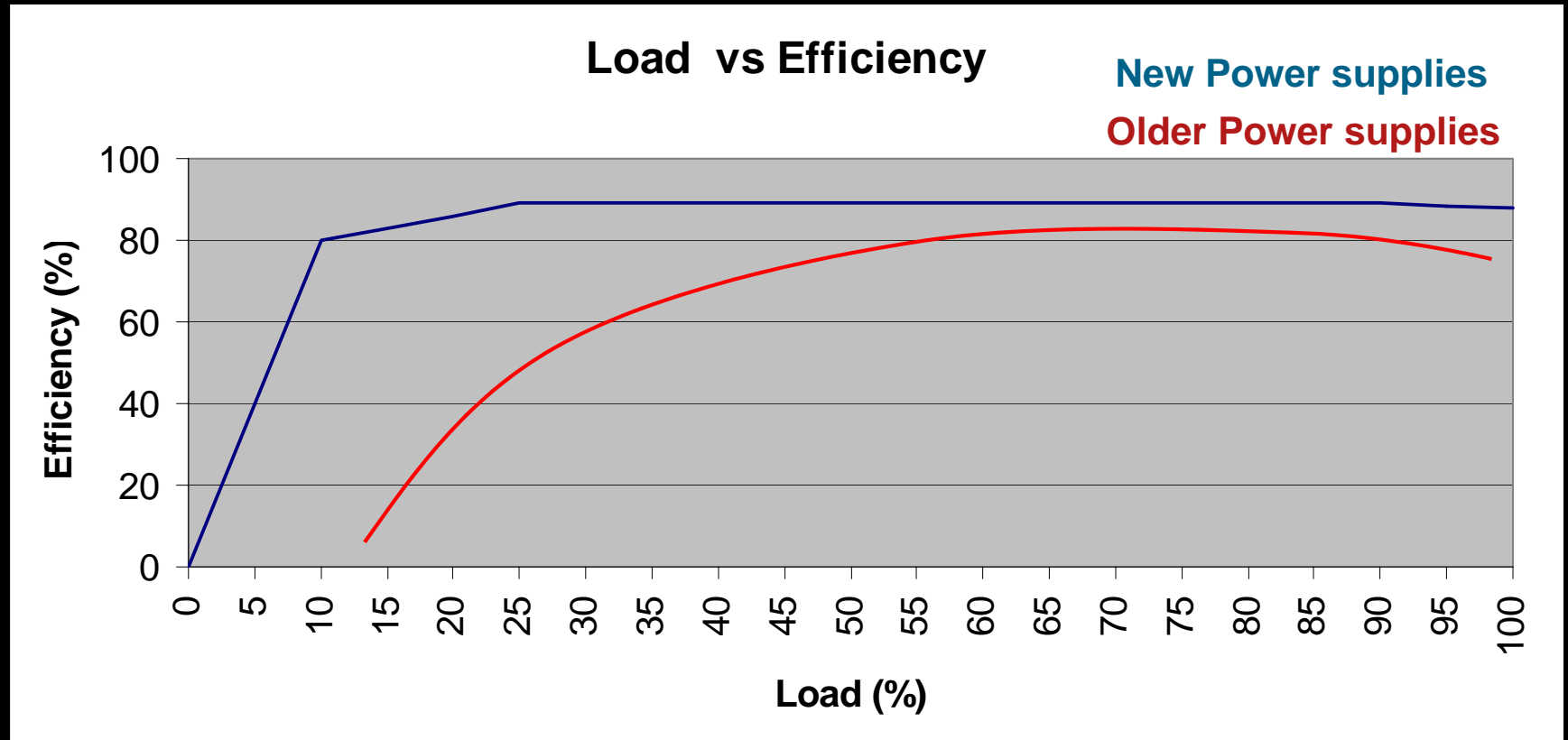
Models comparison

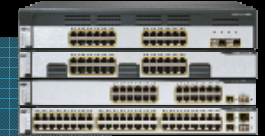|	3750-X	3750-E	3750G
StackPower	Yes	No	No
FRU Network Module	Yes	No	No
FRU Power Supplies	Yes, (dual)	Yes (single)	No
MACsec	Yes (Downlink)	No	No
PoE+ 30W/port	Yes	No	No
IOS LAN Base Option	Yes	No	No
Management Options	Console RJ45, **USB console**, and Out of band Ethernet	Console RJ45 and Out of Band Ethernet	Console RJ45
RPS / XPS	XPS	RPS	RPS
EnergyWise	Report Actual Power use PoE & System	Report Actual Power use PoE	Report Budgeted Power

LAN Base vs. IP Base and IP Services Highlights

New

Cisco® Catalyst® 3560-X and Catalyst 3750-X
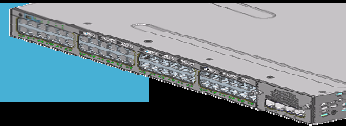
Cisco Catalyst 3560 and Catalyst 3750, Including E and X Series

Functions	LAN Base	IP Base	IP Services
Layer 2+	• **Enterprise access Layer 2** Wide range of Layer 2 access features for enterprise deployments	• **Complete Access Layer 2** Supports all Cisco Catalyst 2000 and Catalyst 3000 Layer 2 features, including hot standby protocols; supports Cisco StackPower™ technology (Cisco Catalyst 3750-X)	
Layer 3	• **No routing support** Support for SVI with no IP routing support	• **Enterprise access Layer 3** RIP, static and stub PIM, and EIGRP	• **Complete access Layer 3** OSPF, EIGRP, BGP, IS-IS VRF-lite, WCCP, and PBR
Manageability	• **Basic manageability** Support for a wide range of MIBs, IPSLA Responder, and RSPAN	• **Enterprise access Layer 3** Gold-Lite and Smart Install Director	• **Complete access Layer 3** EEM and IPSLA Initiator
Security	• **Enterprise access security** DHCP Snooping, IPSG, DAI, PACLs, Cisco Identity 4.0, NAC and 802.1x features	• **Complete access security** Router and VLAN ACLs, private VLANs, complete identity and security, TrustSec SXP, and IEEE 802.1AE (Cisco Catalyst 3560-X and Catalyst 3750-X)	
QoS	• **Enterprise access QoS** Ingress policing, Trust Boundary, AutoQoS, and DSCP mapping	• **Complete access QoS** Support for all Cisco Catalyst 2000 and Catalyst 3000 QoS features, including per-VLAN policies	

Note: IP Services feature set includes all IP Base features. IP Base feature set includes all LAN Base features.

Catalyst 3750-X & 3560-X
Model comparison

IOS	Model	Stackable	StackPower	Full PoE	PoE+	Description	
LAN Base	WS-C3750X-24T-L	Yes	Available with upgrade to IP Base	-	-	24-port 10/100/1000, 350W AC, LAN Base	Optional 10G / 1G Network Modules
	WS-C3750X-48T-L	Yes		-	-	48-port 10/100/1000, 350W AC, LAN Base	
	WS-C3750X-24P-L	Yes		Yes	Yes	24-port PoE+ 10/100/1000, 715W AC, LAN Base	
	WS-C3750X-48P-L	Yes		-	Yes	48-port PoE+ 10/100/1000, 715W AC, LAN Base	
	WS-C3750X-48PF-L	Yes		Yes	Yes	48-port PoE+ 10/100/1000, 1100W AC, LAN Base	
IP Base	WS-C3750X-24T-S	Yes	Yes	-	-	24-port 10/100/1000, 350W AC, IP Base	
	WS-C3750X-48T-S	Yes	Yes	-	-	48-port 10/100/1000, 350W AC, IP Base	
	WS-C3750X-24P-S	Yes	Yes	Yes	Yes	24-port PoE+ 10/100/1000, 715W AC, IP Base	
	WS-C3750X-48P-S	Yes	Yes	-	Yes	48-port PoE+ 10/100/1000, 715W AC, IP Base	
	WS-C3750X-48PF-S	Yes	Yes	Yes	Yes	48-port PoE+ 10/100/1000, 1100W AC, IP Base	
LAN Base	WS-C3560X-24T-L	-	-	-	-	24-port 10/100/1000, 350W AC, LAN Base	
	WS-C3560X-48T-L	-	-	-	-	48-port 10/100/1000, 350W AC, LAN Base	
	WS-C3560X-24P-L	-	-	Yes	Yes	24-port PoE+ 10/100/1000, 715W AC, LAN Base	
	WS-C3560X-48P-L	-	-	-	Yes	48-port PoE+ 10/100/1000, 715W AC, LAN Base	
	WS-C3560X-48PF-L	-	-	Yes	Yes	48-port PoE+ 10/100/1000, 1100W AC, LAN Base	
IP Base	WS-C3560X-24T-S	-	-	-	-	24-port 10/100/1000, 350W AC, IP Base	
	WS-C3560X-48T-S	-	-	-	-	48-port 10/100/1000, 350W AC, IP Base	
	WS-C3560X-24P-S	-	-	Yes	Yes	24-port PoE+ 10/100/1000, 715W AC, IP Base	
	WS-C3560X-48P-S	-	-	-	Yes	48-port PoE+ 10/100/1000, 715W AC, IP Base	
	WS-C3560X-48PF-S	-	-	Yes	Yes	48-port PoE+ 10/100/1000, 1100W AC, IP Base	

IP Base Models can be upgraded to IP services feature set at the time of order

Catalyst 3750-X and 3560-X
Key Innovations

- StackPower - Innovative technology that increases HA

  Reduces operating costs with efficient power use

  "Green Power supplies" High efficiency 80% efficiency @ 10% loads

  Capability to boot up switches without PS – Resiliency

  Zero-footprint RPS – less PS, outlets, and rack space required

- FRU Network modules help to protect customers' investment

- Standards based HW encryption – Closely integrated w/ Intel NIC

- Increased flexibility:

  PoE+ support via AC & DC power supplies

  Power source options, combination of PS, AC/DC, and XPS

  Flexible uplink options via Network modules

  OIR Network modules & FRU components (PS & Fans)

- HW Instrumentation to integrate with EnergyWise