Newer Cisco SBA Guides Available

This guide is part of an older series of Cisco Smart Business Architecture designs. To access the latest Cisco SBA Guides, go to http://www.cisco.com/go/sba

Cisco strives to update and enhance SBA guides on a regular basis. As we develop a new series of SBA guides, we test them together, as a complete system. To ensure the mutual compatibility of designs in Cisco SBA guides, you should use guides that belong to the same series.

Physical Environmental Specifications Guide

SMART BUSINESS ARCHITECTURE

February 2012 Series

Preface

Who Should Read This Guide

This Cisco® Smart Business Architecture (SBA) guide is for people who fill a variety of roles:

- Systems engineers who need standard procedures for implementing solutions
- Project managers who create statements of work for Cisco SBA implementations
- Sales partners who sell new technology or who create implementation documentation
- Trainers who need material for classroom instruction or on-the-job training

In general, you can also use Cisco SBA guides to improve consistency among engineers and deployments, as well as to improve scoping and costing of deployment jobs.

Release Series

Cisco strives to update and enhance SBA guides on a regular basis. As we develop a new series of SBA guides, we test them together, as a complete system. To ensure the mutual compatibility of designs in Cisco SBA guides, you should use guides that belong to the same series.

All Cisco SBA guides include the series name on the cover and at the bottom left of each page. We name the series for the month and year that we release them, as follows:

month year Series

For example, the series of guides that we released in August 2011 are the "August 2011 Series".

You can find the most recent series of SBA guides at the following sites:

Customer access: http://www.cisco.com/go/sba

Partner access: http://www.cisco.com/go/sbachannel

How to Read Commands

Many Cisco SBA guides provide specific details about how to configure Cisco network devices that run Cisco IOS, Cisco NX-OS, or other operating systems that you configure at a command-line interface (CLI). This section describes the conventions used to specify commands that you must enter.

Commands to enter at a CLI appear as follows:

```
configure terminal
```

Commands that specify a value for a variable appear as follows:

```
ntp server 10.10.48.17
```

Commands with variables that you must define appear as follows:

```
class-map [highest class name]
```

Commands shown in an interactive example, such as a script or when the command prompt is included, appear as follows:

```
Router# enable
```

Long commands that line wrap are underlined. Enter them as one command:

```
wrr-queue random-detect max-threshold 1 100 100 100 100 100
100 100 100
```

Noteworthy parts of system output or device configuration files appear highlighted, as follows:

```
interface Vlan64
  ip address 10.5.204.5 255.255.255.0
```

Comments and Questions

If you would like to comment on a guide or ask questions, please use the forum at the bottom of one of the following sites:

Customer access: http://www.cisco.com/go/sba

Partner access: http://www.cisco.com/go/sbachannel

An RSS feed is available if you would like to be notified when new comments are posted.

Table of Contents

What's In This SBA Guide

About SBA

Cisco SBA helps you design and quickly deploy a full-service business network. A Cisco SBA deployment is prescriptive, out-of-the-box, scalable, and flexible.

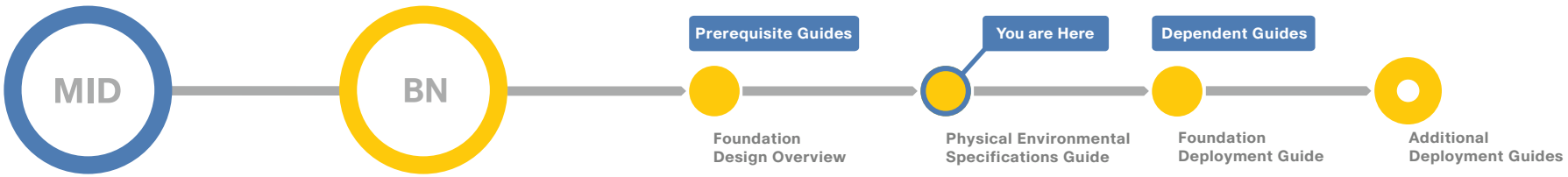
Cisco SBA incorporates LAN, WAN, wireless, security, data center, application optimization, and unified communication technologies—tested together as a complete system. This component-level approach simplifies system integration of multiple technologies, allowing you to select solutions that solve your organization's problems—without worrying about the technical complexity.

About This Guide

This guide is an *additional design overview*. It provides the following information:

- An introduction to a Cisco SBA design that can be added to an SBA foundation deployment
- An explanation of the requirements that shaped the design
- A description of the benefits that the additional design will provide your organization

An additional design overview always follows a foundation design overview on the Route to Success, shown below.



Route to Success

To ensure your success when implementing the designs in this guide, you should read any guides that this guide depends upon—shown to the left of this guide on the route above. Any guides that depend upon this guide are shown to the right of this guide.

For customer access to all guides: http://www.cisco.com/go/sba
For partner access: http://www.cisco.com/go/sbachannel

Environmental Specifications

Introduction

Environmental specifications are all of the physical specifications for a piece of equipment. When building a network, a server room, a switch closet, or even a midsize data center, you must take three things into consideration: power, cooling, and racking. To get started, consider these questions:

- How much power does the equipment use?
- What kind of cooling is required?
- What size is the hardware? That is, how deep is the equipment, and how many rack units does it occupy?
- How heavy is it? Will you need a lift to safely install it?

This guide helps you answer these questions. Each section describes the equipment's complete environmental specifications so that you can plan your sites. This allows you to fully plan for the equipment's installation and focus on configuring the architecture. This guide is divided into the following sections:

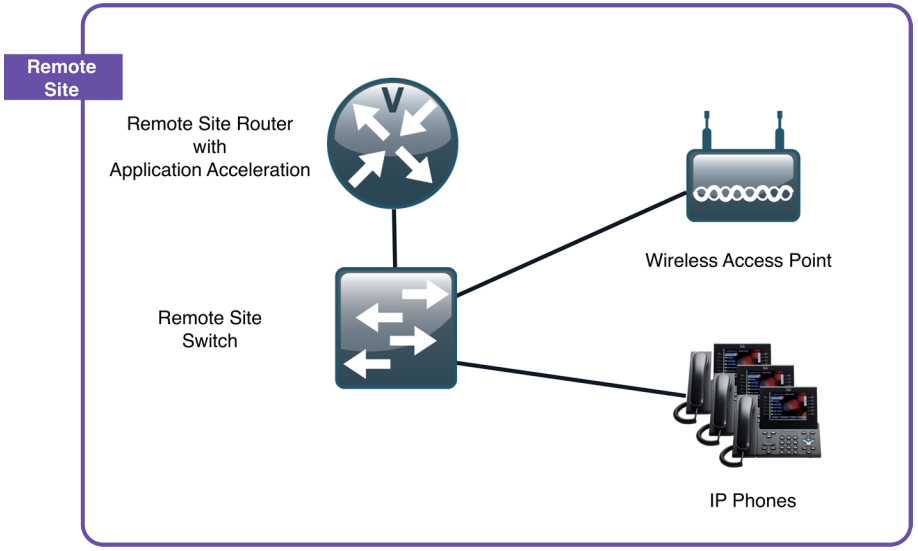
- Remote Site
- Network Core and Services
- Network Access
- Server Room
- Data Center

A more detailed spreadsheet is available as a companion to this guide and describes the following:

- Highest (100%) heat dissipation (Btu/hr)
- Lowest (5%) power (W)
- Lowest (5%) heat dissipation (Btu/hr)
- Power over Ethernet (PoE) maximum power (W)
- Hardware data sheet web links

For additional information about power, cooling, and equipment racking, contact Cisco partners who specialize in data center environmental products, such as Panduit and APC.

Remote Site



Notes

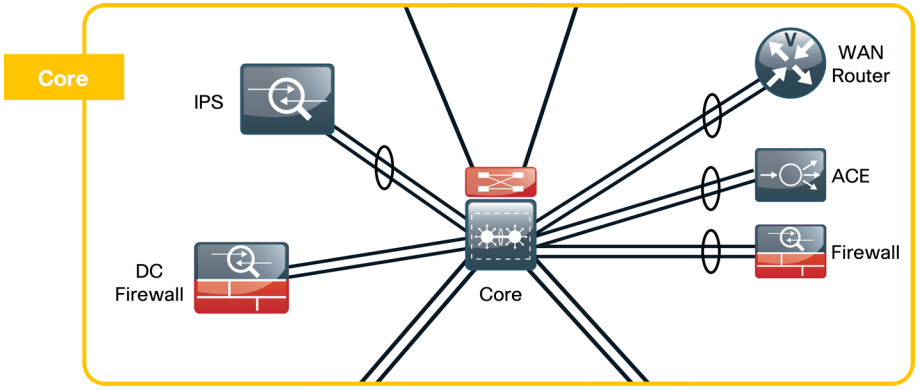
The remote site contains Cisco routers and switches. The types and quantities will vary based on capacities required.

Note: The modules in the routers do affect power requirements of the router. They do not, however, cause it to exceed the maximum amounts specified in the table.

Model	Rack Units	Dimensions (H x W x D in.)	Weight (lbs)	Airflow	Power Input	100% Power (W)
C2911-VSEC/K9 (Cisco 2951 ISR)	2	3.5 x 17.25 x 12	21	Side to Side	 ** (Single C13**)	330
C2921-VSEC/K9 (Cisco 2921 ISR)	2	3.5 x 17.5 x 18.5	34	Back and Side to Front	 ** (Single C13**)	750
C2951-VSEC/K9 (Cisco 2911 ISR)	2	3.5 x 17.5 x 18.5	34	Back and Side to Front	 ** (Single C13**)	750
WS-C3750X-24P-S (Catalyst 3750X)	1	1.75 x 17.5 x 18.0	15.8	Front and Sides to Back	 ** (Single C15**)	2500
WS-C3750X-48PF-S (Catalyst 3750X)	1	1.75 x 17.5 x 19.5	16.7	Front and Sides to Back	 ** (Single C15**)	2500
WS-C3560X-24P-S (Catalyst 3560X)	1	1.75 x 17.5 x 18.0	15.7	Front and Sides to Back	 ** (Single C15**)	2500
WS-C3560X-48PF-S (Catalyst 3560X)	1	1.75 x 17.5 x 19.5	16.6	Front and Sides to Back	 ** (Single C15**)	2500
WS-C2960S-24PS-L (Catalyst 2960S)	1	1.75 x 17.5 x 15.19	12.5	Side to Back	 (Single C13)	84
WS-C2960S-48FPS-L (Catalyst 2960S)	1	1.75 x 17.5 x 15.19	13	Side to Back	 (Single C13)	131

** Power Input is listed with the default configuration in mind. Please note that if resilience is required, an extra power supply will be needed and Power Input requirements will change.

Network Core and Services



Notes

The Network core consists of all the hardware required for a fully functional SBA architecture. The following table details your options.

Model	Rack Units	Dimensions (H x W x D in.)	Weight (lbs)	Airflow	Power Input	100% Power (W)
WS-C3750X-12S-E (Catalyst 3750X)	1	1.75 x 17.5 x 18.0	15.4	Side to Back	** (Single C13)	2500
WS-C3750X-24S-E (Catalyst 3750X)	1	1.75 x 17.5 x 18.0	15.6	Side to Back	** (Single C13)	2500
WS-C4507R+E (Catalyst 4507R+E)	11	19.19 x 17.31 x 12.5	*	Side to Side	** (Dual C19**)	*
WS-C6504-E (Catalyst 6504-E)	5	8.75 x 17.5 x 21.75	*	Side to Side	** (Single C19**)	*
C3945-VSEC/K9 (Cisco 3945 ISR)	3	5.22 x 17.25 x 18.75	60	Side and Back to Front	** (Single C15**)	800
C3925-VSEC/K9 (Cisco 3925 ISR)	3	5.22 x 17.25 x 18.75	60	Side and Back to Front	** (Single C15**)	800
ASA5540-AIP40-K9 (ASA 5540)	1	1.75 x 17.5 x 14.25	22	Front to Back	(Single C13)	190
ASA5520-AIP20-K9 (ASA 5520)	1	1.75 x 17.5 x 14.25	20	Front to Back	(Single C13)	190
ASA5510-AIP10-K9 (ASA 5510)	1	1.75 x 17.5 x 14.25	23	Front to Back	(Single C13)	190
IPS-4240-K9 (IPS 4240)	1	1.72 x 17.25 x 14.5	20	Front to Back	(Single C13)	-
IPS-4255-K9 (IPS 4255)	1	1.72 x 17.25 x 14.5	20	Front to Back	(Single C13)	-
IPS-4260-K9 (IPS 4260)	2	3.45 x 17.14 x 20.0	40	Front to Back	(Single C13)	-
WAVE-694-K9 (WAVE 694)	1	1.69 x 16.89 x 20.33	22.5	Front to Back	(Dual C13)	530
WAVE-594-K9 (WAVE 594)	1	1.69 x 16.89 x 20.33	22.5	Front to Back	(Dual C13)	530

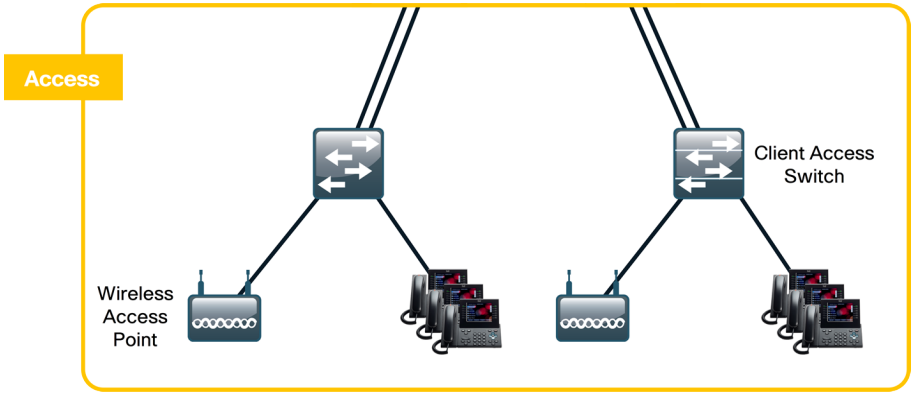
Model	Rack Units	Dimensions (H x W x D in.)	Weight (lbs)	Airflow	Power Input	100% Power (W)
WAVE-294-K9 (WAVE 294)	1	1.69 x 16.89 x 14.55	16.4	Front to Back	 (Single C13)	460
AIR-CT5508-12-K9 (Wireless LAN Controller 5508)	1	1.75 x 17.3 x 21.20	20	Front to Back	 ** (Single C13**)	115
MCS7835I3-K9-CMD1 (MCS 7835 (CUCM))	2	3.35 x 17.465 x 28.791	64	Front to Back	 (Dual C13)	189
UCS-C200M2-VCD2 (UCS C200M2 (CUCM & CUCx)	1	1.7 x 16.9 x 27.8	33	Front to Back	 (Dual C13)	385
UCS-C200M2-BE6K (UCS C200M2 (Business Edition 6000))	1	1.7 x 16.9 x 27.8	33	Front to Back	 (Dual C13)	385
MCS-7835-I3-CCX1 (MCS 7835 (UCCX))	2	3.35 x 17.465 x 28.791	64	Front to Back	 (Dual C13)	189
UCS-C200M2-VCD2 (UCS C200M2 (UCCX))	1	1.7 x 16.9 x 27.8	33	Front to Back	 (Dual C13)	385
CTI-4501-MCU-K9 (TelePresence MCU 4501)	2	3.43 x 17.4 x 19.25	24	Side to Side	 (Single C13)	787
CTI-VCS-Base-K9 (VCS Control)	1	1.72 x 16.8 x 18	17.6	Side to Side	 (Single C13)	250
CTI-VCS-Base-K9 (VCS Expressway)	1	1.72 x 16.8 x 18	17.6	Side to Side	 (Single C13)	250

* For configuration-specific information on the Catalyst 4507R and Catalyst 6504, use the following tool: http://tools.cisco.com/cpc/

** Power Input is listed with the default configuration in mind. Please note that if resilience is required, an extra power supply will be needed and Power Input requirements will change.

*** This device does not include mounting brackets. Listed Rack Units apply when using the accessory MNT-2PST-RACK.

Network Access



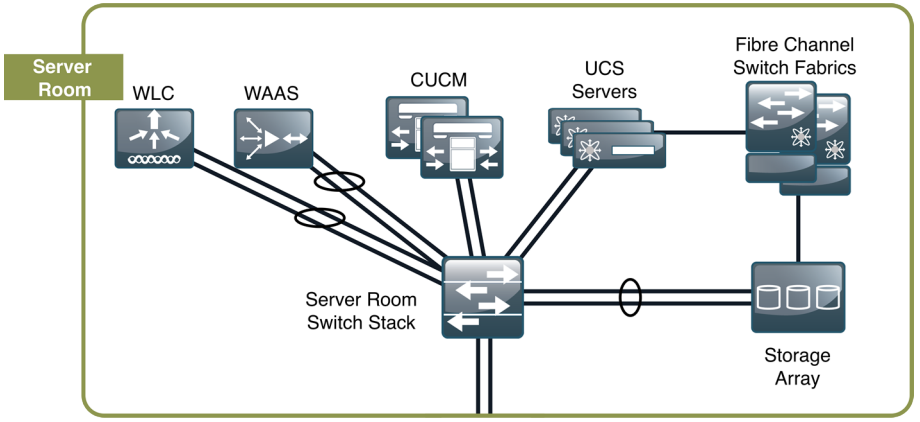
Notes

Access switches require one rack unit and consist of 24 or 48 PoE ports. The below table describes these switches.

Model	Rack Units	Dimensions (H x W x D in.)	Weight (lbs)	Airflow	Power Input	100% Power (W)
WS-C3750X-24P-S (Catalyst 3750X)	1	1.75 x 17.5 x 18.0	15.8	Front and Sides to Back	** (Single C15**)	2500
WS-C3750X-48PF-S (Catalyst 3750X)	1	1.75 x 17.5 x 19.5	16.7	Front and Sides to Back	** (Single C15**)	2500
WS-C3560X-24P-S (Catalyst 3560X)	1	1.75 x 17.5 x 18.0	15.7	Front and Sides to Back	** (Single C15**)	2500
WS-C3560X-48PF-S (Catalyst 3560X)	1	1.75 x 17.5 x 19.5	16.6	Front and Sides to Back	** (Single C15**)	2500
WS-C2960S-24PS-L (Catalyst 2960S)	1	1.75 x 17.5 x 15.19	12.5	Side to Back	(Single C13)	84
WS-C2960S-48FPS-L (Catalyst 2960S)	1	1.75 x 17.5 x 15.19	13	Side to Back	(Single C13)	131

** Power Input is listed with the default configuration in mind. Please note that if resilience is required, an extra power supply will be needed and Power Input requirements will change.

Server Room



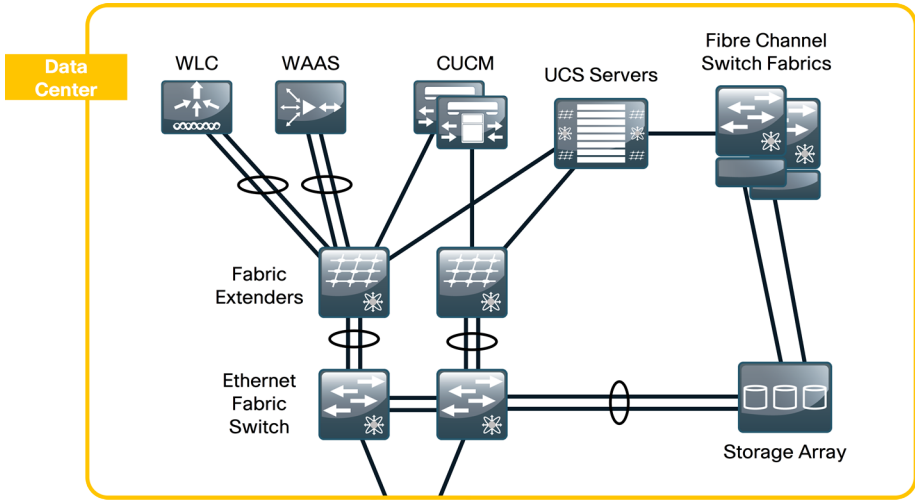
Notes

The server room requires one rack unit non-PoE switches, as well as firewalls and load balancing appliances.

Model	Rack Units	Dimensions (H x W x D in.)	Weight (lbs)	Airflow	Power Input	100% Power (W)
WS-C3750X-24T-S (Catalyst 3750X)	1	1.75 x 17.5 x 18.0	15.6	Front and Sides to Back	** (Single C15**)	2500
WS-C3750X-48T-S (Catalyst 3750X)	1	1.75 x 17.5 x 18.0	16.3	Front and Sides to Back	** (Single C15**)	2500
WS-C3560X-24T-S (Catalyst 3560X)	1	1.75 x 17.5 x 18.0	15.4	Front and Sides to Back	** (Single C15**)	2500
WS-C3560X-48T-S (Catalyst 3560X)	1	1.75 x 17.5 x 18.0	16.1	Front and Sides to Back	** (Single C15**)	2500
ASA5540-AIP40-K9 (ASA 5540)	1	1.75 x 17.5 x 14.25	22	Front to Back	(Single C13)	190
ACE-4710-1F-K9 (ACE 4710)	1	1.5 x 16.92 x 20.04	30.8	Front to Back	(Single C13)	345

** Power Input is listed with the default configuration in mind. Please note that if resilience is required, an extra power supply will be needed and Power Input requirements will change.

Data Center



Notes

You have several options for the data center for both Unified Computing and for switching. The UCS power calculator provides detailed information for specific configurations and is your best source for UCS equipment specifications.

Product Name	Rack Units	Dimensions (H x W x D in.)	Weight (lbs)	Airflow	Power Input	100% Power (W)
N5K-C5548UP-FA (Nexus 5548UP)	1	1.72 x 17.3 x 29.5	35	Front to Back	(Dual C13)	600
N2K-C2248TP-1GE (Nexus 2248TP)	1	1.72 x 17.3 x 17.7	17.3	Front to Back	(Dual C13)	400
N2K-C2232PP-10GE (Nexus 2232PP)	1	1.72 x 17.3 x 17.7	18.3	Front to Back	(Dual C13)	400
DS-C9148D-8G16P-K9 (MDS 9148)	1	1.72 x 17.51 x 19.78	22.2	Front to Back	(Dual C13)	120
DS-C9124-K9 (MDS 9124)	1	1.72 x 17.16 x 16	16.5	Front to Back	*** (Single C13***)	96
DS-C9134-K9 (MDS 9134)	1	1.72 x 17.16 x 18.89	20	Front to Back	*** (Single C13***)	96
ASA5585-S20P20SK9 (ASA 5585-X)	2	3.47 x 19 x 26.5	62	Front to Back	*** (Single C19***)	770
N10-S6100 (UCS B-Series 6120X)	1	1.72 x 17.3 x 30.0	*	Front to Back	*** (Single C13)	*
N20-C6508 (UCS B-Series 5108)	6	10.5 x 17.5 x 32.0	*	Front to Back	*** (Single C19***)	*
R200-1120402W (UCS C200 M2)	1	1.7 x 16.9 x 27.8	*	Front to Back	(Dual C13)	*
R210-2121605W (UCS C210 M2)	2	3.39 X 17.5 X 28	*	Front to Back	*** (Single C13***)	*
R250-2480805 (UCS C250 M2)	2	3.39 x 17.5 x 28	*	Front to Back	** (Single C13**)	*
ACE-4710-0.5-K9 (ACE 4710)	1	1.5 x 16.92 x 20.04	-	Front to Back	(Single C13)	345

* For specific requirements for your configuration, use the Cisco UCS power calculator:
http://www.cisco.com/assets/cdc_content_elements/flash/dataCenter/cisco_ucs_power_calculator/

** Power Input is listed with the default configuration in mind. Please note that if resilience is required, an extra power supply will be needed and Power Input requirements will change.

*** Default configuration for this model does not include a power supply. Power Input is listed as if a single power supply were installed for reference sake.

Power over Ethernet

IEEE 802.3af describes an Ethernet port that acts as a power source for devices such as Cisco Wireless Access-Points and Cisco IP Phones. PoE-capable Ethernet ports can deliver up to 15.4W over both 100Base-T and 1000Base-T connections.

IEEE 802.3at began to address the higher power standard for PoE and has yet to be ratified. While 802.3af was limited to 15.4W and had to work with Category 3 Cable, this new requirement limited operation to Category 6 and doubled the power to the end station at 30W per port. Cisco Pre-Standard Power was created to address these requirements before 802.3at could be ratified, giving you the ability to bring 20W per port.

Notes

Wireless Access Points

PoE requirements for Cisco access points within SBA are defined in the table below. The actual power draw can differ, depending on use. For more information, see Cisco Aironet Power Over Ethernet Application Note: http://www.cisco.com/en/US/docs/wireless/technology/poe/technical/reference/Power.html

Access Point	Power Usage (Watts)
Cisco Aironet 1142	15.4
Cisco Aironet 1262	15.4
Cisco Aironet 3602	15.4

Notes

IP Telephony

IP telephones can be powered locally with a power adapter or with Power over Ethernet. All phones can receive power from IEEE 802.3af-compliant data switches. The Cisco 7921G and Cisco 7925G are wireless phones and are powered by adapters for charging the phone. For more information, see Power over Ethernet (PoE) Power Requirements FAQ:
http://www.cisco.com/en/US/products/hw/phones/ps379/products_qanda_item09186a00808996f3.shtml

http://www.cisco.com/en/US/prod/collateral/voicesw/ps6788/phones/ps10326/data_sheet_c78-584412.html

IP Phone	Power Usage (Watts)
CP-7937G	Class 3 (15.4)
CP-7975	Class 3 (12.0)
CP-6901	Class 1 (2.77)
CP-6921	Class 2 (7.0)
CP-6941	Class 2 (7.0)
CP-6945	Class 1 (4.0)
CP-6961	Class 2 (7.0)
CP-8941	Class 1 (4.0)
CP-8945	Class 2 (7.0)
CP-8961	Class 4 (15.4)
CP-9951	Class 4 (15.4)
CP-9971	Class 4 (15.4)

Notes

Conclusion

This guide provided environmental specifications for the components of the SBA foundation and data center architectures. For further information, reference the product-specific data sheets.

Notes

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