



A Case for Midspan Power-over-Ethernet Controllers



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This white paper examines the substantial financial impact ADC's Midspan Power-over-Ethernet Controller can have on your business.



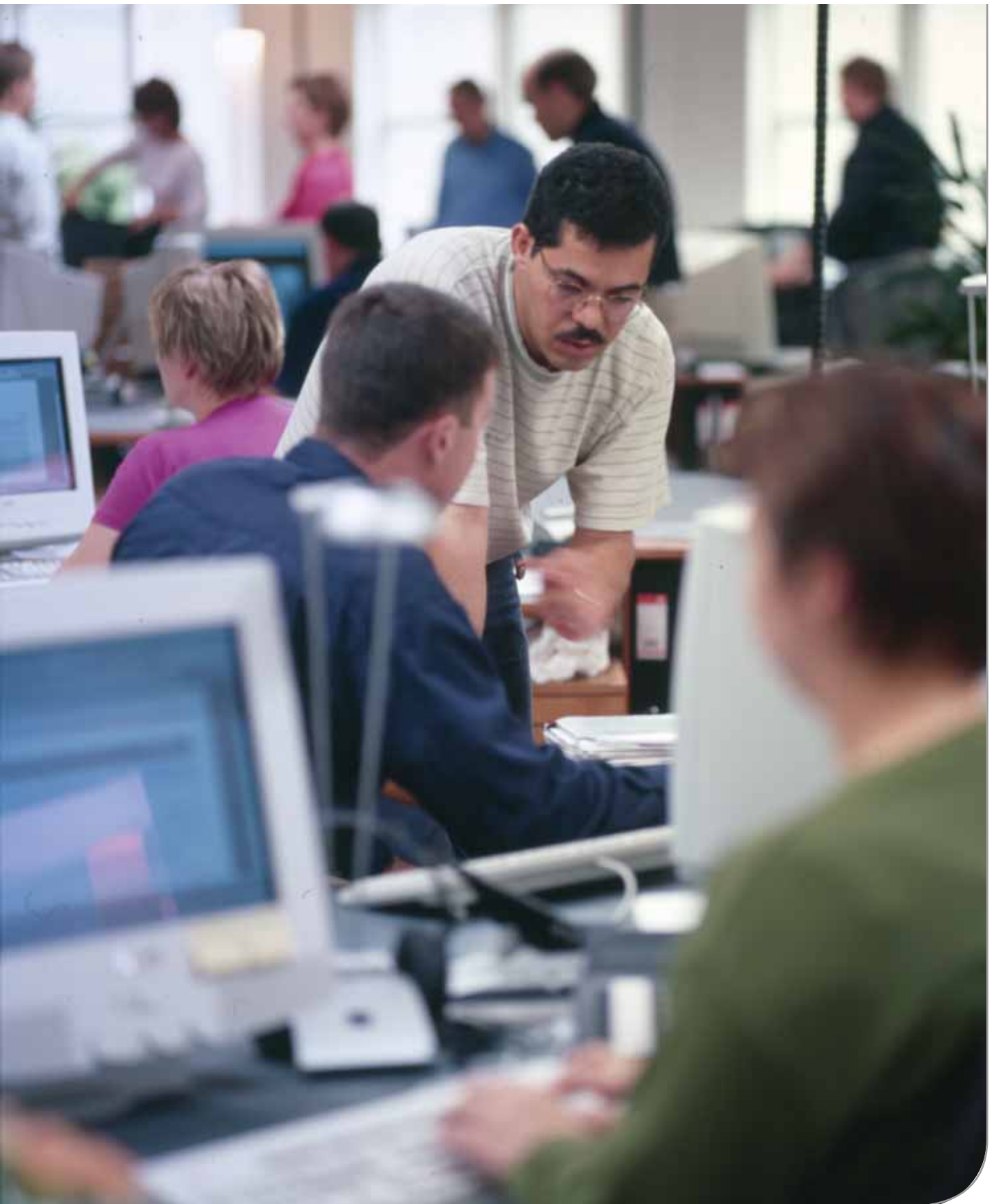
Introduction

The approval of the IEEE 802.3af Power over Ethernet (PoE) standard in June 2003 removed a significant barrier to the widespread adoption of IP telephony, the expansion of WiFi networks, and the increased use of IP network cameras and RFID scanners.

This standard allows electric power to be sent along the same cables that carry Ethernet data. PoE-enabled switches and controllers can now deliver power over standard Category 5e or 6 Ethernet cabling to remote PoE-enabled devices such as IP phones, WLAN access points, security systems, and RFID scanners. PoE simplifies the deployment of literally any IP-based device, particularly in areas where it may be difficult or expensive to run separate power cabling.

When expanding a network using PoE, businesses face a basic choice as to how to deliver power over Ethernet. They can rip out their existing switches and replace them all with new PoE-enabled switches. Or they can buy a midspan controller, which sits between an existing Ethernet switch and powered devices, and delivers both power and Ethernet data to the devices.

This white paper examines the substantial financial impact that using ADC's midspan Power-over-Ethernet (PoE) controllers, rather than buying new PoE-enabled switches, can have on your business. Investment in ADC midspan PoE controllers yields immediate savings in purchase and installation costs, as well as permanent and ongoing benefits due to lower support and maintenance costs, reduced power consumption, and increased productivity due to decreased device downtime. These benefits facilitate a rapid payback of solution costs and a high return on investment.



The Benefits of Power-over-Ethernet Midspan Controllers

As networks encompass a wider range of IP devices, notably IP telephones, WiFi access points, IP-enabled security cameras, and RFID scanners, delivering power to devices becomes a problem.

Before PoE, these devices required separate cabling, AC outlets, and wall warts, an extremely expensive proposition for initial deployment. Cabling and outlets also required ongoing support and maintenance. PoE solves the problem by eliminating the need for AC outlet installation, cutting maintenance and support costs, and decreasing the cost of running power to the devices.

ADC midspan PoE controllers offer significant financial benefits when compared to replacing existing Ethernet switches with new PoE-compliant switches. For all sized businesses, they yield immediate savings in purchase, installation and configuration costs.

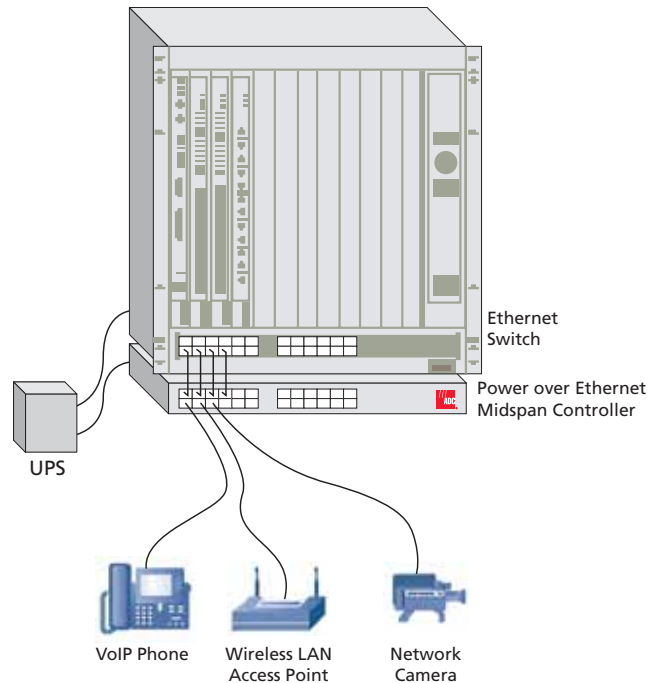
Businesses have invested billions of dollars in existing IP architecture that does not adhere to PoE standards. Therefore, they face a basic decision when deploying PoE — should they rip out their existing Ethernet switches and replace them with PoE-compliant switches, or instead keep their investment in their existing infrastructure, and add midspan controllers, such as the ADC midspan PoE controller, which sits between an existing Ethernet switch and powered devices and delivers power and Ethernet data to the devices?

Figure 1 shows a typical installation using ADC's midspan PoE controller. 10/100Base-T data is routed via a standard RJ45 cable from the Ethernet switch to the midspan PoE controller. The midspan PoE controller injects power into the unused pairs if a PoE-compliant device is detected on the remote end. Appropriate cable management and installation practices should be used to route these cables, because critical voice and data traffic is being transmitted over the Ethernet cables.

ADC midspan PoE controllers offer significant financial benefits when compared to replacing or upgrading existing Ethernet switches and replacing them with new PoE-compliant switches:

- They cost less than new PoE switches, and can be installed more easily and at less cost.
- They offer increased productivity because of greater device uptime.
- They require less support and maintenance.
- They require less power.
- They offer easier upgrade options.
- They offer increased flexibility, and have the capability of only enabling nodes that require power.
- They include an optional SNMP module that enables software management and complies with RFC 3621.
- The chassis can be daisy-chained — up to five chassis can be controlled with one SNMP card and one IP address.

Figure 1:
ADC's Midspan Power-over-Ethernet Controller



The Business Case for ADC's Midspan Power-over-Ethernet Controllers

ROI Study Methodology

ADC collaborated with an independent research organization that specializes in ROI and cost benefit analysis to perform an objective analysis of the financial benefits generated by the deployment of ADC's midspan PoE controllers compared to buying new PoE Ethernet switches. The study evaluated three typical scenarios: a small remote office of 50 users, a medium-sized business with 500 users, and a large enterprise with 5,000 users at five different sites.

The study analyzed each area of savings offered by use of the device, and considered such factors as:

- Purchase price of the midspan controllers
- Purchase price of new PoE-enabled switches
- Installation costs
- Ongoing maintenance and support costs
- Ongoing management costs
- Productivity gains due to increased availability
- Power consumption
- Downtime of IP devices when using PoE-enabled switches versus midspan controllers

The results were calculated and then extrapolated for subsequent years for a five-year analysis period. While results will vary with each customer scenario, these cases are representative of high-growth environments. Companies of different sizes and with heavier use of their networks may experience greater benefits. (Results shown are not a guarantee of equivalent performance.)

Contributing to these results are lower acquisition and installation costs; lower support, maintenance, and power costs; and increased user productivity due to the increased availability of IP devices when compared to buying new PoE-enabled Ethernet switches.

ROI Highlights

Small office (50 remote users)

- Immediate savings from lower acquisition and installation costs: over \$8,000
- Total benefits over the five-year study timeframe: over \$45,000
- Payback of the startup investment: Less than three months
- Annual benefit per employee: \$183
- Five-year ROI: 337%

Medium Office (500 users)

- Immediate savings from lower acquisition and installation costs: Over \$57,000
- Total benefits over the five-year study timeframe: over \$202,000
- Payback of the startup investment: six months
- Annual benefit per employee: \$81
- Five-year ROI: 97%

Large Office (5,000 users at five offices)

- Immediate savings from lower acquisition and installation costs: over \$1.1 million
- Total benefits over the five-year study timeframe: over \$2.3 million
- Payback of the startup investment: five and a half months
- Annual benefit per employee: \$93
- Five-year ROI: 115%

Financial Analysis

Table 1 on the following page contains the input data used in our analysis.

Table 2 summarizes the value created by the ADC solution on a cumulative basis for the three different business scenarios. (More details about each scenario can be found later in this white paper.) Startup costs are separated from recurring costs, with one-time solution deployment expenses categorized as startup costs. All expenses incurred after the solution is placed into production are listed in the recurring costs. The analysis uses the classic definition of payback period. The calculation involves a comparison of the net benefit generated by using ADC Midspan PoE Controllers versus the investment, fully reflected in the startup costs.



Table 1 – Input Data

	Small Remote Office (20 – 55 users)	Medium Office (500 users)	Large Enterprise (5000 users, 5 sites)
Typical revenue per year (small, medium, and large categories)			
ADC Solution			
Model number of device required	PWR-24AC	PWR-24AC	PWR-24AC
Number of devices required	2	20	210
Price per device	\$1,200.00	\$1,200.00	\$1,200.00
Title of appropriate IT resource (see below)	Technician I	Technician I	Technician I
Salary of IT resource	\$38,603.00	\$38,603.00	\$38,603.00
Time needed to install (man days) per device	0.125	0.125	0.125
Power consumption requirements per device per year (KW-Hours)	2000	2000	2000
IT management time required per year (% FTE) per device	2%	2%	2%
Support cost per device (% of purchase price?)	0%	0%	0%
Alternate Solution (new switch with power)			
Device required	24-port Ethernet switch	48-port Ethernet Switch	432-port Ethernet Switch
Number of devices required	2	6	40
Price per device	\$5,000.00	\$12,830.00	\$32,870.00
Title of appropriate IT resource (see below)	Network Engineer I	Network Engineer III	Network Engineer III
Salary of IT resource	\$54,723.00	\$79,124.00	\$79,124.00
Time needed to install (remove old, install new) man days/device	1	2	5
Power consumption requirements per device per year (KW-Hours)	4000	20000	35000
IT management time required per year (% FTE), per device including threat resolution	2%	4%	5%
Support cost per device (% of purchase price?)	5%	7%	10%
General		IT Title and Salary	
Cost of power per kilowatt-hour	\$0.08	Hardware Engineer (Level II – \$56,323, Level V – \$83,548)	
Cost of SNMP card	\$300	Network Engineer (Level I – \$54,723, Level III – \$79,124)	
Typical downtime of a device due to power management (days)	1	Telecommunications Engineer (Level II – \$59,245, Level V – \$92,392)	
Instances per year that a device goes down due to above (total)	1	Telecommunications Technician (Level I – \$38,603, Level III – \$60,886)	
Average number of people affected when a device goes down	30		
Percentage of work they are unable to perform when device is down	25%		
Average salary of worker	\$35,000		

Table 2 – Business Case Summary

Business Type	Small Remote Office (50 users)	Medium Office (500 users)	Large Enterprise (5000 users, 5 sites)
Annual ROI	337%	97%	115%
Cumulative Five Year Net Benefit	\$45,656	\$202,745	\$2,318,542
Payback Period (Months)	2.7	6	5.5
Annual Benefit Per Employee	\$183	\$81	\$93
Project Costs			
Project Startup Costs	\$2,737	\$25,571	\$268,497
Recurring Costs (5 Years)	\$7,721	\$77,206	\$810,663
Total Project Costs (5 Years)	\$10,458	\$102,777	\$1,079,160
One-Time Benefits			
Lower acquisition price	\$7,900	\$53,580	\$1,062,200
Reduced installation costs	\$384	\$3,281	\$56,967
Recurring Benefits (5 Years)			
Lower annual support and management costs	\$5,724	\$44,686	\$637,977
Productivity benefits	\$30,048	\$69,198	\$169,398
Reduced power consumption	\$1,600	\$32,000	\$392,000
Total 5-Year Benefit	\$45,656	\$202,745	\$2,318,542
Financial Analysis			
Net Value	\$35,198	\$99,967	\$1,239,382
Annual ROI	337%	97%	115%
Payback Period (months)	2.7	6	5.5
Annual Business Metrics			
Annual Benefit Per Employee	\$183	\$81	\$93



Project Costs

The project costs include all expenses related to the deployment of ADC midspan PoE controllers and keeping existing Ethernet switches, compared to the alternative of buying new PoE switches. Costs include the initial purchase prices of the devices, as well as the labor costs involved in installation and deployment. Ongoing costs such as power consumption of the devices were also included, as were the annual support costs required for each device, and the annual IT management time required for each device.

Benefits

The benefits provided by ADC's midspan PoE controllers fall into two main categories: one-time benefits, and recurring benefits.

One-time benefits include:

- Lower acquisition costs
- Lower installation costs

ADC's midspan PoE controllers costs significantly less than PoE switches — approximately \$1,200 for an ADC midspan PoE controller versus \$5,000, nearly \$13,000, or nearly \$33,000 for a new PoE switch, depending on the exact model of switch purchased. In medium-sized and large networks, fewer PoE switches would have to be purchased than midspan controllers, but the total cost of midspan controllers is significantly less than PoE switches.

Installing a midspan controller is significantly easier and less expensive than installing a new PoE switch. Midspan controllers can be installed by a technician in approximately one hour, while Ethernet switches required a higher-priced network engineer to install them. Ethernet switches typically require from one to five days for installation and configuration, depending on the switch model being installed and the network size and complexity.

Recurring benefits include:

- Lower annual support and management costs
- Reduced power consumption
- Productivity benefits

ADC midspan PoE controllers require significantly less support and maintenance than PoE switches, and they can be supported by staff with less technical expertise — and at a lower salary — than staff required to support new PoE switches. Midspan controllers require only two percent IT management time per device per year, and the support costs, as calculated as a percent of each device's purchase price, is literally zero. New Ethernet switches, by way of

contrast, require two percent management time per device per year for a small network; four percent management time per device per year for a medium-sized network; and five percent management time per device per year for a large network. Support costs per Ethernet switch are five percent of the purchase price of each switch per year for a small network; seven percent of the purchase price of each switch per year for a medium-sized network; and ten percent of the purchase price of each switch per year for a large network.

Among the major benefits of the ADC midspan PoE controllers are lower acquisition and installation costs; lower support, maintenance, and power costs; and increased user productivity due to the increased availability of IP devices when compared to buying new PoE-enabled switches. Of particular note are the immediate savings offered by the lower purchase prices of the devices, and their lower installation costs.

Midspan controllers require less power than new PoE switches, and offer significant annual power savings. Each midspan controller requires 2000 kilowatt hours per year, while PoE-enabled switches require far more electricity: 4,000 kilowatt hours per year for a typical model required for a small network; 20,000 kilowatt hours per year for a typical model required for a medium-sized network; and 35,000 kilowatt hours per year for a typical model required for a large network.

ADC midspan PoE controllers increase user productivity compared to new PoE switches because IP devices such as IP telephones and wireless access points will have less downtime when the controllers are used. Each port on the ADC midspan PoE controller has its own full power so power is not shared among devices such as IP telephones and wireless access points. By contrast, PoE-enabled switches have to provide power management to different ports as devices need it; power is shared among the different ports. That means that when using a PoE switch, ports and their IP devices may need to be power-rationed or, worst case, shut down in order to provide power for other ports and IP devices on the same switch. The result is, those IP telephones, wireless networks and other IP devices whose power has been switched off will be unavailable, so user productivity on networks with PoE enabled Ethernet switches is less than on networks that use midspan PoE controllers.



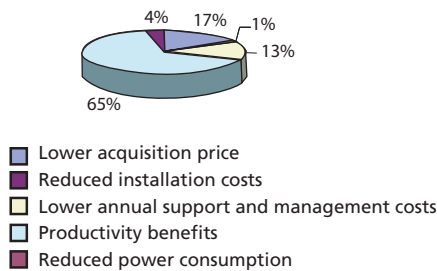
The Business Case for a Small Office

In a small office, productivity gains are the largest benefits, although reduced support and management costs and the lower purchase price of the solution offer substantial savings as well.

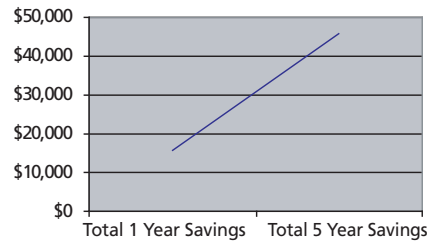
The scenario assumes that two ADC midspan PoE controllers would be required for the network, and compares that to the purchase of two new PoE-enabled

switches. The ADC midspan PoE controllers would cost \$7,900 less than the Ethernet switches, and would require \$384 less to install. The ADC midspan PoE controllers would use 4000 fewer kilowatt hours of electricity per year, for \$1,600 in savings over five years. The ADC midspan PoE controllers would require \$5,724 less in maintenance and support over the five years. The increased availability of IP devices with the ADC midspan PoE controllers would lead to \$30,048 in productivity gains.

Benefits for a Small Office



One to Five Year Savings (500 users)



ROI Analysis for ADC Power over Ethernet (PoE) — Small Remote Office (50 User) Scenario

Project Summary								
5 Year ROI	337%							
Cumulative Five Year Net Benefit	\$45,656							
Payback Period (Months)	2.7							
Annual Benefit Per Employee	\$183							
Project Costs	Start Up	Year 1	Year 2	Year 3	Year 4	Year 5	Total	
Total Project Costs	\$2,737	\$1,544	\$1,544	\$1,544	\$1,544	\$1,544	\$10,458	
Benefits	Start Up	Year 1	Year 2	Year 3	Year 4	Year 5	Total	
Lower Acquisition Price	\$7,900						\$7,900	
Reduced Installation Costs	\$384						\$384	
Lower Annual Support and Management Costs		\$1,145	\$1,145	\$1,145	\$1,145	\$1,145	\$5,724	
Productivity Benefits		\$6,010	\$6,010	\$6,010	\$6,010	\$6,010	\$30,048	
Reduced Power Consumption		\$320	\$320	\$320	\$320	\$320	\$1,600	
Total Benefits	\$8,284	\$7,474	\$7,474	\$7,474	\$7,474	\$7,474	\$45,656	
Financial Analysis		Year 1	Year 2	Year 3	Year 4	Year 5	Total	
Net Value	\$5,547	\$5,930	\$5,930	\$5,930	\$5,930	\$5,930	\$35,198	
5 Year ROI	337%							
Payback Period (months)	2.7							
Business Metrics								
Annual Benefit Per Employee	\$183							

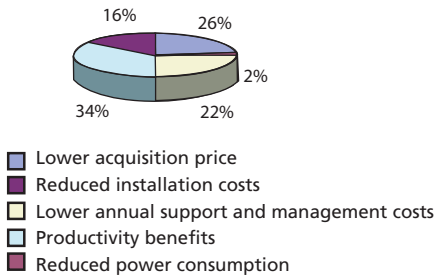
The Business Case for a Medium-Sized Office

In a medium-sized office, as with a small office, the largest benefit is productivity gains, although the lower acquisition costs, the lower annual support and management costs, and reduced power consumption also add substantial benefits.

The scenario assumes that 20 ADC midspan PoE controllers would be required for the network, and

compares those costs and benefits to the purchase of six new PoE-enabled switches. The ADC midspan PoE controllers would cost \$53,580 less than the Ethernet switches, and would require \$3,281 less to install. The ADC midspan PoE controllers would use 80,000 fewer kilowatt hours of electricity per year, for \$32,000 in savings over five years. The ADC midspan PoE controllers would require \$44,686 less in maintenance and support over the five years. The increased availability of IP devices with the ADC midspan PoE controllers would lead to \$69,198 in productivity gains.

Benefits for a Medium -Sized Office



One to Five Year Savings (500 users)



ROI Analysis for ADC Power over Ethernet (PoE) — Medium Office (500 User Scenario)

Project Summary							
5 Year ROI	97%						
Cumulative Five Year Net Benefit	\$202,745						
Payback Period (Months)	6.0						
Annual Benefit Per Employee	\$81						
Project Costs	Start Up	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Project Costs	\$25,571	\$15,441	\$15,441	\$15,441	\$15,441	\$15,441	\$102,777
Benefits	Start Up	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Lower Acquisition Price	\$53,580						\$53,580
Reduced Installation Costs	\$3,281						\$3,281
Lower Annual Support and Management Costs		\$8,937	\$8,937	\$8,937	\$8,937	\$8,937	\$44,686
Productivity Benefits		\$13,840	\$13,840	\$13,840	\$13,840	\$13,840	\$69,198
Reduced Power Consumption		\$6,400	\$6,400	\$6,400	\$6,400	\$6,400	\$32,000
Total Benefits	\$56,861	\$29,177	\$29,177	\$29,177	\$29,177	\$29,177	\$202,745
Financial Analysis		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Net Value	\$31,290	\$13,736	\$13,736	\$13,736	\$13,736	\$13,736	\$99,967
5 Year ROI	97%						
Payback Period (months)	6.0						
Business Metrics							
Annual Benefit Per Employee	\$81						



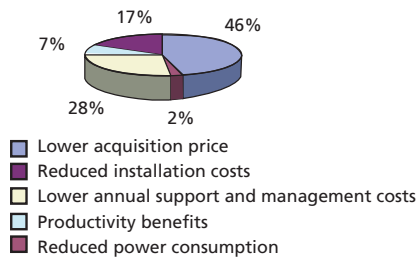
The Business Case for a Large Enterprise

In a large enterprise, the benefits picture changes dramatically compared to small and medium-sized offices. The biggest benefit comes from the savings in the purchase price of the devices, although lower annual support and maintenance costs and reduced power consumption add significant benefits as well.

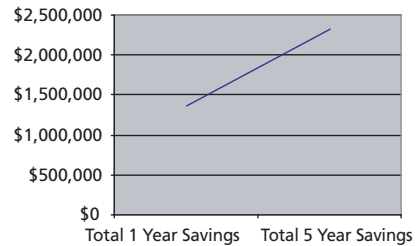
The scenario assumes that 210 ADC Midspan PoE Controllers would be required for the network, and

compares those costs and benefits to if 40 new PoE-enabled Ethernet switches. The purchase of ADC Midspan PoE Controllers would cost \$1,062,200 less than the PoE switches, and would require \$56,967 less to install and configure. The ADC midspan PoE controllers would use 980,000 fewer kilowatt hours of electricity per year, for \$392,000 in savings over five years. The ADC midspan PoE controllers would require \$637,977 less in maintenance and support over the five years. The increased availability of IP devices with ADC midspan PoE controllers would lead to \$169,398 in productivity gains.

Benefits for a Large Enterprise



One to Five Year Savings (500 users)



ROI Analysis for ADC Power over Ethernet (PoE) - Large Enterprise (5000 User) Scenario

Project Summary								
5 Year ROI	115%							
Cumulative Five Year Net Benefit	\$2,318,542							
Payback Period (Months)	5.5							
Annual Benefit Per Employee	\$93							
Project Costs		Start Up	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Project Costs		\$268,497	\$162,133	\$162,133	\$162,133	\$162,133	\$162,133	\$1,079,160
Benefits		Start Up	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Lower Acquisition Price		\$1,062,200						\$1,062,200
Lower Labor Savings for Installation		\$56,967						\$56,967
Lower Annual Support and Management Costs			\$127,595	\$127,595	\$127,595	\$127,595	\$127,595	\$637,977
Productivity Benefits			\$33,880	\$33,880	\$33,880	\$33,880	\$33,880	\$169,398
Reduced Power Consumption			\$78,400	\$78,400	\$78,400	\$78,400	\$78,400	\$392,000
Total Benefits		\$1,119,167	\$239,875	\$239,875	\$239,875	\$239,875	\$239,875	\$2,318,542
Financial Analysis			Year 1	Year 2	Year 3	Year 4	Year 5	Total
Net Value		\$850,670	\$77,742	\$77,742	\$77,742	\$77,742	\$77,742	\$1,239,382
5 Year ROI		115%						
Payback Period (months)		5.5						
Business Metrics								
Annual Benefit Per Employee		\$93						

Summary

The use of ADC midspan PoE controllers can yield significant one-time and ongoing benefits when compared to buying new PoE-enabled switches, due to lower purchase prices, savings in installation costs, lower annual support and maintenance costs, reduced power consumption, and increased productivity because of the greater availability of IP devices.

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