# Cisco IOx

Updated: February 21, 2018
Document ID: 1456958531920692

Overview

The Cisco® IOx application environment combines IoT application execution within the fog, secure connectivity with Cisco IOS® Software, and powerful services for rapid, reliable integration with Internet of Things (IoT) sensors and the cloud. By bringing application execution capability to the source of IoT data, customers overcome challenges with high volumes of data and the need for automated, near–real time system responsiveness. Cisco IOx offers consistent management and hosting across network infrastructure products, including Cisco routers, switches, and compute modules. Cisco IOx allows application developers to work in the familiar Linux application environment with their choice of languages and programming models with familiar open-source development tools.
(See Figure 1.)

Figure 1.   Major Components of the Cisco IOx Application Environment
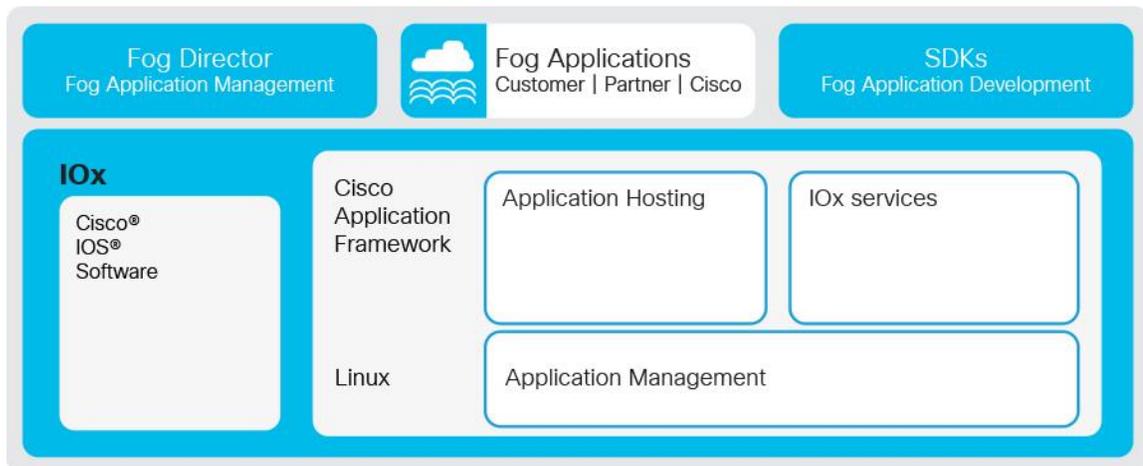
Benefits

- Reach business outcomes associated with IoT initiatives more rapidly with application execution within the fog
- Reach production scale rapidly by offering flexible application development and deployment approaches
- Build new business with the ability to process high volumes of data in the fog and deliver closed-loop system control in real time

Cisco IOx Components

- **Cisco IOx:** Cisco IOx provides uniform and consistent hosting capabilities for Fog Applications across Cisco network infrastructure. The application environment brings together Cisco IOS, the industry-leading networking operating system, and Linux, the leading open source platform. With Cisco IOx, your developers benefit from familiar processes and open source tools prevalent with Linux while generating applications that execute on Cisco IoT network infrastructure.

- **Fog Director:** Cisco Fog Director allows administrators to manage, administer, monitor, and troubleshoot Fog applications running in the Cisco IOx environment remotely over the network.

- **SDK and development tools:** Cisco IOx SDK is a collection of tools and methodology guidelines to help developers to package their applications for execution on IOx-enabled network infrastructure products.

  Cisco IOxClient is a command line utility for developers to control application lifecycle tasks within typical developer systems.

  Cisco IOx Local Manager is an embedded application included with the Cisco IOx Application Framework (CAF). The web-based application provides local management of applications hosted on IOx-enabled network infrastructure.

- **Fog Applications:** Fog applications ready for execution on IOx-enabled infrastructure may be supplied by ecosystem partners and/or Cisco; or developed with a range of common programming languages. IOx services speed development by providing common functions such as data transformation.

Table 1.   Primary Features

Capability	Features
Rapid application bridging and deployment	• Use Docker tooling to generate containers for deployment on IOx-enabled network infrastructure • Examples available in Devhub.cisco.com for quick start • IOx client command-line utility for application development lifecycle support
Developer training	• Developer documentation available in DevNet • Self-provisioning developer sandbox for training and testing • Developer sample code and how-to guides
Broad support for application types	• Container Applications: Use existing code and run-time libraries as a Linux container that can be built using Docker tooling • Virtual Machines: Use existing applications packaged as a VM (on supported network infrastructure) • PaaS applications: use high-level language code and IOx provided run time services ◦ Python 2.7 language runtimes (Supported for all IOx enabled devices)
Application lifecycle management at scale	User interface or API-driven application lifecycle management across large deployments: • Install and uninstall applications • Start and stop applications • Perform upgrade • View operational status • Backup and restore application data • Monitor applications and associated network infrastructure • Access logs for troubleshooting
Network infrastructure independent application development and deployment	• Consistent deployment and management applications independent of network infrastructure • Consistent and device-independent APIs for applications/services, networking, and physical resources
Built-in security for application deployment and management	• Segregation of application and networking functions • Built-in container security for service isolation • Secure control plane communications between Fog Director and IOx applications • Use of VPN and/or IPSec tunnel services through integration with Cisco IOS software services

Capability	Features
Choice of application tools for maximizing productivity	Choose tools specific to development and application lifecycle need • IOx client: Accelerate development and testing with a command line tool • Local Manager: Test initial deployment of fog applications on IOx-enabled network infrastructure • Fog Director – Deploy applications and services at scale with maximum productivity for operations and administrators
Barrier-free trials	Use self-provisioned sand-box in DevNet with Fog Director, network infrastructure and sample code

Resources available for services by network infrastructure product.

See https://developer.cisco.com/site/iox/docs/#supported-platforms for detailed information.

IOx Support for Cisco Network Infrastructure Products for IoT

The following Cisco network infrastructure products listed in Table 2 are currently supported by Cisco IOx.

Table 2.   IOx-Enabled Network Infrastructure

Product Family	SKUs
Cisco 800 Series Industrial Integrated Services Routers	All IR 829 & IR 809 SKUs
Cisco Industrial Ethernet 4000 family of switches	All SKUs of IE 4000 Family
Compute Module for Cisco 1000 Series Connected Grid Routers	All SKUs
Cisco IR510 WPAN Industrial Router	TBD

Licensing

Cisco IOx and Fog Director are licensed on a per-device, term subscription basis.

- IOx and Fog Director are available as part of the single PID.
- License for IOx and Fog Director can be ordered with a subscription term of 1, 3, or 5 years.
- Subscription term includes software upgrades and support.
- Customers can choose a subscription-billing model of either a monthly payment for the duration of the term or prepaid for the whole term.
- Begin with the following top level PID: IOX-SOFTWARE.
- Then configure the IOX CORE OPTION with the appropriate platform specific PIDs and subscription term.

Table 3.   IOX CORE OPTIONS

License PID	Description
IOX-809-CORE	IOx and Fog Director license for IR809 family of products
IOX-829-CORE	IOx and Fog Director license for IR829 family of products
IOX-IE4K-CORE	IOx and Fog Director license for Industrial Ethernet family of products
IOX-CGMSRV-CORE	Cisco IOx Core Software for the CGR server module
TBD	IOx and Fog Director license for IR510 family of products

Figure 2 below, is an example snipped from an actual Cisco Commerce Workspace (CCW) Estimate using the IR829:

Figure 2. CCW Screenshot showing IOx Licensing
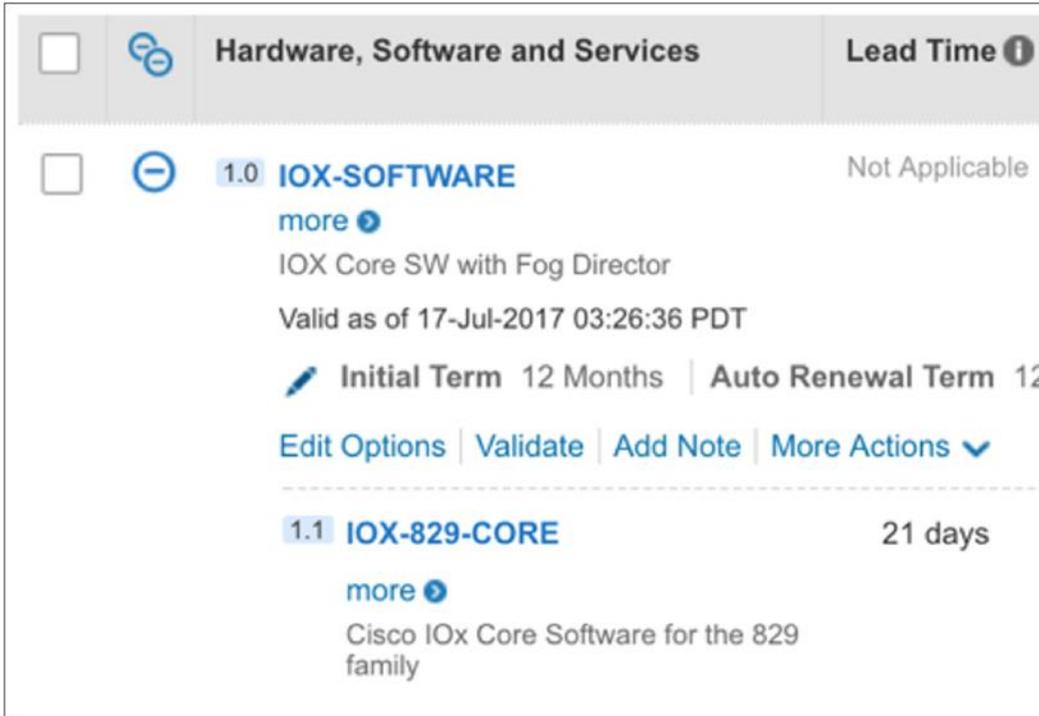
Cisco Capital Financing to Help You Achieve Your Objectives

Cisco Capital can help you acquire the technology you need to achieve your objectives and stay competitive. We can help you reduce CapEx. Accelerate your growth. Optimize your investment dollars and ROI. Cisco Capital financing gives you flexibility in acquiring hardware, software, services, and complementary third-party equipment. And there's just one predictable payment. Cisco Capital is available in more than 100 countries. Learn more.