



IBM Programmable Network Controller V3.0, when used with OpenFlow-enabled switches, provides architecture for centralized and simplified networking

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At a glance

Software Defined Networking (SDN) with OpenFlow enables a new way of networking that provides programmable access to the network. IBM® Programmable Network Controller is an SDN controller for an OpenFlow network. SDN is an evolving technology that has the potential to disrupt how data center networking is done. IBM is one of the leaders in SDN by offering a complete solution of the SDN Controller and OpenFlow-enabled switch.

IBM SDN with OpenFlow can help you to:

- Deploy more-efficient centralized networks
- Have more control over the network due to programmable OpenFlow network capabilities
- Build a dynamic and flexible infrastructure more suited for today's workloads
- Improve network control
- Increase flexibility and resiliency

For ordering, contact your IBM representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL (Reference: YE001).

Overview

IBM Programmable Network Controller provides network virtualization and network programmability of an OpenFlow network using an OpenFlow controller. It enables a new method of managing data center networking known as Software Defined Networking (SDN).

An SDN network is one in which the end-station connectivity is created and managed by logically centralized software residing on an external entity such as a server or a dedicated appliance. This arrangement differs from traditional networking where end station connectivity is created and managed by all the network elements working in coordination with other network elements and by using distributed network protocols. In an SDN network, the logically centralized software residing on a server or an appliance makes the decisions on forwarding of packets in the network and is known as an SDN controller.

Licenses for offerings in this announcement include Software Subscription and Support. Software Subscription and Support contracts are managed in Passport

Advantage® . Refer to the [Order handling](#) section of this announcement for further details.

If a new release of the offering in this announcement is made generally available in Passport Advantage after the announcement of the offering in System x® ordering systems, clients with valid Software and Subscription contracts may elect to take electronic delivery of the latest release.

Key prerequisites

Refer to the [Technical information](#) section.

Planned availability date

November 30, 2012

Description

OpenFlow protocol

A new protocol known as OpenFlow allows an SDN controller to program network switches. This paradigm provides an SDN controller fine grained control over network elements so that the SDN controller may define the network flows to meet the connectivity requirements of end stations.

A network element that implements OpenFlow protocol may have its data plane programmed by an SDN controller using OpenFlow protocol.

A network consisting of OpenFlow-enabled switches may be called an OpenFlow network.

IBM Programmable Network Controller, when used with OpenFlow-enabled switches, provides architecture for centralized and simplified networking.

IBM Programmable Network Controller provides network virtualization and network programmability of an OpenFlow network using an OpenFlow controller. IBM Programmable Network Controller enables a new method of managing data center networking known as Software Defined Networking (SDN).

Software Defined Networking

SDN is a new approach to controlling how data flows through a network. An SDN network is one in which the end-station connectivity is created and managed by logically centralized software residing on an external entity such as a server or a dedicated appliance. This arrangement differs from traditional networking where end-station connectivity is created and managed by all the network elements working in coordination with other network elements and by using distributed network protocols. In an SDN network, the logically centralized software residing on a server or an appliance makes the decisions on forwarding of packets in the network and is known as an SDN controller.

SDN with OpenFlow allows flow-based fine-grained control of the network, enabling IBM Programmable Network Controller to provide efficient and versatile network virtualization based on OpenFlow networks.

Due to its programmability, an OpenFlow network provides extreme flexibility in determining a path between two end stations. An OpenFlow-based SDN is extremely flexible as it allows the SDN controller to re-route a flow (end station to end station connectivity) in response to ever-changing business requirements.

OpenFlow-based SDN allows complete control of the network in real time. An SDN can virtualize the physical network such that multi-tenancy is enabled in the network. SDN controllers also provide northbound APIs using which your applications can interact with the network and tailor the network to the application needs. OpenFlow standards-based SDN also simplifies network configuration and management complexity, resulting in significant cost savings.

IBM Programmable Network Controller provides the following features:

1. Control of an OpenFlow network consisting of physical and virtual switches using the OpenFlow 1.0 specification and some vendor extensions
2. Topology discovery and maintenance of an OpenFlow-enabled network
3. Path control (flow) management (creation and deletion of paths)
4. Centralized management of networks
5. Virtualization of an OpenFlow network through the use of the Virtual Tenant Network (VTN) feature
 - Enables construction of multiple independent virtual networks by slicing one OpenFlow network virtually.
 - Requires no special software or setting for the server that is connected to the OpenFlow network.
 - Enables construction of a flat L2 network, without having to be aware of the IP address structure of the server.
 - Controls different VTNs as completely independent networks. Communication data that flows within a VTN will not reach a different VTN.
 - Enables VM migration within the same OpenFlow network without having to be aware of the physical location.
6. Web APIs for interaction with IBM Programmable Network Controller
7. WEB GUI for easy operation of IBM Programmable Network Controller

IBM offers a full portfolio of data center physical and virtual networking products, including solutions for integrated data center networking. IBM solutions can help you meet the networking requirements of the most-demanding applications, including virtualization.

Accessibility by people with disabilities

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

http://www.ibm.com/able/product_accessibility/index.html

Section 508 of the US Rehabilitation Act

IBM Programmable Network Controller V3.0 is capable as of November 30, 2012, when used in accordance with IBM's associated documentation, of satisfying the applicable requirements of Section 508 of the US Rehabilitation Act, provided that any assistive technology used with the product properly interoperates with it.

Product positioning

IBM Programmable Network Controller V3.0, when used with OpenFlow-enabled switches, provides architecture for centralized and simplified networking.

Program number

Program number	V.R.M	Program name
5641-PN1	3.0.0	IBM Programmable Network Controller with 1 Year SW S&S
5641-PN3	3.0.0	IBM Programmable Network Controller with 3 Year SW S&S

Product identification number

Program
PID number

5641-PN1
5641-PN3

Order handling

To allow for ease of order submission, the offerings in this announcement can be configured in conjunction with eligible System x hardware, software, and license-only configurations that can be created for this product based on existing supported System x hardware system units in a given business environment.

Licenses for offerings in this announcement include one year or three years of Software Subscription and Support. Software Subscription and Support renewals for all features are aligned through Passport Advantage Express® or Passport Advantage , reducing the administrative burden of keeping your Subscription and Support up to date.

If a new release of a given offering in this announcement is made generally available in Passport Advantage after the announcement of the offering in System x ordering systems, you may elect to take delivery of any release generally available for that offering during the product registration process.

Eligible software products, offered and selected during the ordering process with each hardware system, are enabled for electronic download for the system unit for which the product was ordered. Optionally, software and license-only orders can be created for these products based on existing supported hardware system units in the business environment. Offerings included in this announcement are available exclusively by electronic download.

Orders placed for the eligible offerings in this announcement will be routed and fulfilled through Passport Advantage Express . Invoicing for the initial license orders will occur through the System x order management systems. Subscription and Support renewals will be managed through Passport Advantage .

Passport Advantage allows you to have a common anniversary date for Software Subscription and Support renewals. The anniversary date, established at the order ship date for the initial product acquisition, will remain unchanged while your Passport Advantage Agreement remains in effect. New software purchases initially include 12 or 36 full months of Subscription and Support coverage. Subscription and Support in the second year (the first year of renewal) can be prorated to be coterminous with your common anniversary date but managed and invoiced through Passport Advantage . Thereafter, all Software Subscription and Support will renew at the common anniversary date and include 12 full months of Subscription and Support.

Offering Information

Product information is available via the Offering Information website

<http://www.ibm.com/common/ssi>

Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM , you may link directly to Business Partner information for this announcement. A PartnerWorld® ID and password are required (use IBM ID).

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=212-310>

Publications

No hardcopy publications are shipped with this program.

The IBM Publications Center

<http://www.ibm.com/shop/publications/order>

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided. Payment options for orders are via credit card (in the US) or customer number for 20 countries. A large number of publications are available online in various file formats, and they can all be downloaded by all countries, free of charge.

Technical information

Specified operating environment

Hardware requirements

The recommended configuration for redundancy in a production environment are two servers each with:

- 1 x Intel Xeon™ E5-2600 series processors with at least 8 cores
- 64 GB DDR3 memory
- 2 x 300 GB, 10,000 rpm, HDD, RAID-1
- 6 x 1000Base-T Ethernet ports
- Redundant power supplies
- DVD-ROM optical drive

The minimum hardware recommendation for a test environment -- PoC, demonstration, etc is one server with:

- 1 x Intel Xeon E5-2600 series processors with at least 8 cores
- 4 GB DDR3 memory
- 1 x 40 GB HDD
- 2 x 1000Base-T Ethernet ports
- Redundant power supplies
- DVD-ROM optical drive

Software requirements

Operating System

- Red Hat Enterprise Linux™ -- RHEL 6.1 (x86-64)

The program's specifications and specified operating environment information may be found in documentation accompanying the program, if available, such as a readme file, or other information published by IBM, such as an announcement letter. Documentation and other program content may be supplied only in the English language.

Compatibility

For detailed information about IBM and non-IBM devices, adapters, software, and network operating systems supported with xSeries® servers, visit

<http://www-03.ibm.com/servers/eserver/serverproven/compat/us/>

Contact your IBM representative or IBM Business Partner, or refer to the *IBM Sales Manual* for information on the compatibility of hardware and software for xSeries servers. The *Sales Manual* is updated periodically as new features and options are announced that support these servers.

Limitations

For additional information, refer to *Usage Restrictions* in the Terms and conditions section of this announcement, or to the license information document that is available on the IBM Software License Agreement website

<http://www.ibm.com/software/sla/sladb.nsf>

Planning information

Installability

Software Subscription and Support (also referred to as Software Maintenance) is included with licenses purchased through Passport Advantage and Passport Advantage Express. Product upgrades and technical support are provided by the Software Subscription and Support (Software Maintenance) offering as described in the Agreements. Product upgrades provide the latest versions and releases to entitled software, and technical support provides voice and electronic access to IBM support organizations, worldwide.

IBM includes one or three years of Software Subscription and Support (also referred to as Software Maintenance) with each program license acquired. The initial period of Software Subscription and Support (Software Maintenance) can be extended by the purchase of a renewal option, if available.

Packaging

For software products in this announcement, physical media and hardcopy documentation are not included in the deliverable package. The software code is delivered only via electronic download.

After receipt of an order, the Business Partner or customer will be required to register and accept Passport Advantage or Passport Advantage Express terms and conditions. The product includes the license and one or three years of Software Subscription and Support.

Your Proof of Entitlement for this program is a copy of a paid sales receipt, purchase order, invoice, or other sales record from IBM or its authorized reseller from whom you acquired the program, provided that it states the license charge unit (the characteristics of intended use of the program; for example, number of processors, number of users) and quantity acquired. This program, when downloaded from a

website, contains the applicable IBM license agreement and License Information, if appropriate, and will be presented for acceptance at the time of installation of the program. For future reference, the license and License Information will be stored in a directory such as LICENSE.TXT.

Security, auditability, and control

The products in this announcement use the security and auditability features of the operating system software.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities. The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

Software Services

IBM Software Services has the breadth, depth, and reach to manage your services needs. You can leverage the deep technical skills of our lab-based, software services team and the business consulting, project management, and infrastructure expertise of our IBM Global Services team. Also, we extend our IBM Software Services reach through IBM Business Partners to provide an extensive portfolio of capabilities. Together, we provide the global reach, intellectual capital, industry insight, and technology leadership to support a wide range of critical business needs.

To learn more about IBM Software Services or to contact a Software Services sales specialist, visit

<http://www.ibm.com/software/sw-services/>

Ordering information

Charge metric

Program name	PID number	Charge metric
IBM Programmable Network Controller V3.x with 1 Year SW S&S	5641-PN1	Per install
IBM Programmable Network Controller V3.x with 3 Year SW S&S	5641-PN3	Per install

Install: Install is a unit of measure by which the program can be licensed. An install is an installed copy of the program on a physical or virtual disk made available to be executed on a computer. Licensee must obtain an entitlement for each install of the program.

Note: A license is also required for each physical switch.

New licenses

Orders for new licenses will be accepted now. Electronic download ability begins on the planned availability date.

Basic license

To order the programs described in this announcement, specify the type model number, order type description, supply feature, and quantity of desired licenses for the appropriate one-time charge (OTC) features listed in the tables below. After receipt of your order, you will be requested to register through Passport Advantage Express to allow for entitlement for support and notification of upgrades.

Upon registration completion you will be provided with a website for the electronic download. The one-time charge for the product includes the license and one or three years of Software Subscription and Support.

Single entity offering (SEO) numbers in the table below can be ordered through ibm.com. The SEO numbers in the table below are equivalent to the type model number, description, supply feature, and OTC billing feature numbers as designated in the table. After receipt of your order, you will be requested to register through Passport Advantage Express to allow for entitlement for support and notification of upgrades. Upon registration completion, you will be provided with a website for the electronic download. The one-time charge for the product includes the license and one or three years of Software Subscription and Support.

Program number and feature description	OTC billing feature number	SEO number
5641-PN1 IBM Prg Ntwkk Ctrlr v3.x PrgFlow Ctrlr, Per Install w/1Yr SW S&S	0402	44X2765
5641-PN1 IBM Prg Ntwrk Ctrlr v3.x for 1 Switch, Per Install w/1Yr SW S&S	0405	44X2766
5641-PN1 IBM Prg Ntwrk Ctrlr v3.x for 10 Swtchs, Per Install w/1Yr SW S&S	0404	44X2767
5641-PN1 IBM Prg Ntwrk Ctrlr v3.x for 50 Swtchs, Per Install w/1Yr SW S&S	0403	44X2768
5641-PN3 IBM Prg Ntwkk Ctrlr V3.x PrgFlow Ctrlr, Per Install w/3Yr SW S&S	0407	44X2769
5641-PN3 IBM Prg Ntwrk Ctrlr v3.x for 1 Switch, Per Install w/3Yr SW S&S	0408	44X2770
5641-PN3 IBM Prg Ntwrk Ctrlr v3.x for 10 Swtchs, Per Install w/3Yr SW S&S	0406	44X2771
5641-PN3 IBM Prg Ntwrk Ctrlr v3.x for 50 Swtchs, Per Install w/3Yr SW S&S	0409	44X2772

Customization options

Select the appropriate feature numbers to customize your order with delivery options desired. These features can be specified on the initial or MES orders.

Expedite shipments

Feature	Description
3445	Expedite

Expedite shipments will be processed to receive 72-hour delivery from the time IBM Software Delivery and Fulfillment (SDF) receives the order.

Terms and conditions

The information provided in this announcement letter is for reference and convenience purposes only. The terms and conditions that govern any transaction with IBM are contained in the applicable contract documents such as the IBM International Program License Agreement, IBM International Passport Advantage Agreement, and the International Passport Advantage Express Agreement.

Licensing

IBM International Program License Agreement including the License Information document and Proof of Entitlement (PoE) govern your use of the program. PoEs are required for all authorized use.

This software license includes Software Subscription and Support (also referred to as Software Maintenance).

Agreement for Acquisition of Software Maintenance

These programs are licensed under the IBM Program License Agreement (IPLA). IBM includes one or three years of Software Subscription and Support (also referred to as Software Maintenance) with the initial license acquisition of each program acquired.

License Information form number

License ID: L-SARM-8XPM38

The program's License Information will be available for review on the IBM Software License Agreement website

<http://www.ibm.com/software/sla/sladb.nsf>

Limited warranty applies

Yes

Limited warranty

IBM warrants that when the program is used in the specified operating environment, it will conform to its specifications. The warranty applies only to the unmodified portion of the program. IBM does not warrant uninterrupted or error-free operation of the program or that IBM will correct all program defects. You are responsible for the results obtained from the use of the program.

IBM provides you with access to IBM databases containing information on known program defects, defect corrections, restrictions, and bypasses at no additional charge. For further information, consult the *IBM Software Support Handbook* found at

<http://www.ibm.com/support/handbook>

IBM will maintain this information for at least one year after the original licensee acquires the program (warranty period).

Program technical support

Technical support of a program product version or release will be available for a minimum of three years from the general availability date, as long as your Software Subscription and Support (also referred to as Software Maintenance) is in effect. This technical support allows you to obtain assistance (via telephone or electronic means) from IBM for product-specific, task-oriented questions regarding the installation and operation of the program product. Software Subscription and Support (Software Maintenance) also provides you with access to updates (modifications or fixes), releases, and versions of the program. You will be notified, via announcement letter, of discontinuance of support with 12 months' notice. If you require additional technical support from IBM, including an extension of support beyond the discontinuance date, contact your IBM representative or IBM Business Partner. This extension may be available for a fee.

Volume orders (IVO)

No

IBM International Passport Advantage Agreement

Passport Advantage applies

Yes, and through the Passport Advantage website at

<http://www.ibm.com/software/passportadvantage>

Usage restriction

Yes. For additional information, refer to the License Information document that is available on the IBM Software License Agreement website

<http://www.ibm.com/software/sla/sladb.nsf>

Software Subscription and Support applies

Yes. The offerings in this announcement include one year or three years of Software Subscription and Support (Software Maintenance) in the price of the license.

While your Software Subscription and Support is in effect, IBM provides you assistance for your routine, short duration installation and usage (how-to) questions, and code-related questions. IBM provides assistance via telephone and, if available, electronic access, only to your information systems (IS) technical support personnel during the normal business hours (published prime shift hours) of your IBM support center. (This assistance is not available to your end users.) IBM provides Severity 1 assistance 24 hours a day, every day of the year. For additional details, consult your *IBM Software Support Handbook* at

<http://www.ibm.com/support/handbook>

Software Subscription and Support does not include assistance for the design and development of applications, your use of programs in other than their specified operating environment, or failures caused by products for which IBM is not responsible under this agreement.

For more information about the Passport Advantage Agreement, visit the Passport Advantage website at

<http://www.ibm.com/software/passportadvantage>

System i Software Maintenance applies

No

Variable charges apply

No

Educational allowance available

Yes. A 15% education allowance applies to qualified education institution customers.

Statement of good security practices

IT system security involves protecting systems and information through prevention, detection, and response to improper access from within and outside your enterprise. Improper access can result in information being altered destroyed or misappropriated or can result in misuse of your systems to attack others. Without a comprehensive approach to security, no IT system or product should be considered completely secure and no single product or security measure can be completely effective in preventing improper access. IBM systems and products are designed to be part of a comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products, or

services to be most effective. IBM does not warrant that systems and products are immune from the malicious or illegal conduct of any party.

IBM Electronic Services

IBM has transformed its delivery of hardware and software support services to help you achieve higher system availability. Electronic Services is a web-enabled solution that offers an exclusive, no-additional-charge enhancement to the service and support available for IBM servers. These services are designed to provide the opportunity for greater system availability with faster problem resolution and preemptive monitoring. Electronic Services comprises two separate, but complementary, elements: Electronic Services news page and Electronic Services Agent.

The Electronic Services news page is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The Electronic Service Agent™ is no-additional-charge software that resides on your server. It monitors events and transmits system inventory information to IBM on a periodic, client-defined timetable. The Electronic Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to deliver proactive service that may result in higher system availability and performance. In addition, information collected through the Service Agent is made available to IBM service support representatives when they help answer your questions or diagnose problems. Installation and use of IBM Electronic Service Agent for problem reporting enables IBM to provide better support and service for your IBM server.

To learn how Electronic Services can work for you, visit

<http://www.ibm.com/support/electronic>

Prices

For current prices, contact IBM at 888-Shop-IBM (746-7426) or visit

<http://www-03.ibm.com/systems/x/>

To locate the web price, search on the feature number in the Search field.

Program number and feature description	OTC billing feature number	SEO number
5641-PN1 IBM Prg Ntwkk Ctrlr V3.x PrgFlow Ctrlr, Per Install w/1Yr SW S&S	0402	44X2765
5641-PN1 IBM Prg Ntwrk Ctrlr v3.x for 1 Switch, Per Install w/1Yr SW S&S	0405	44X2766
5641-PN1 IBM Prg Ntwrk Ctrlr v3.x for 10 Swtschs, Per Install w/1Yr SW S&S	0404	44X2767
5641-PN1 IBM Prg Ntwrk Ctrlr v3.x for 50 Swtschs, Per Install w/1Yr SW S&S	0403	44X2768
5641-PN3 IBM Prg Ntwkk Ctrlr V3.x PrgFlow Ctrlr, Per Install w/3Yr SW S&S	0407	44X2769
5641-PN3 IBM Prg Ntwrk Ctrlr v3.x for 1 Switch, Per Install w/3Yr SW S&S	0408	44X2770

5641-PN3	IBM Prg Ntwrk Ctrlr v3.x for 10 Swtschs, Per Install w/3Yr SW S&S	0406	44X2771
5641-PN3	IBM Prg Ntwrk Ctrlr v3.x for 50 Swtschs, Per Install w/3Yr SW S&S	0409	44X2772

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Order now

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Reference: YE001

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Note: Shipments will begin after the planned availability date.

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