

smartflex™ Product Line: Technical White Paper

Overview

What may seem like magic is the result of years of hard work by veterans of the imaging industry. Keeping in mind that a meter collection system is only as good as the information and accuracy of the information it provides, smartflex™ is architected and designed to take advantage of the advanced features and benefits of the Microsoft .NET platform. What wasn't possible just a few years ago is delivered by smartflex™ in a compact and user friendly interface. The result is it no longer takes a skilled technician to install software and then spend time to configure and maintain the system as with similar products. Viewer USB may be used by a typical sales person for the purposes of a print assessment, Onsite deployed by a technician with minimal software and networking experience and WebAudit may be initiated by the sales person or even the end-user.

How It Works

The core engine, which is the heart of smartflex™, identifies networked printers, copiers and MFP's using the Simple Network Management Protocol (SNMP). SNMP is an application layer protocol that facilitates the exchange of Management Information Base (MIB) between network devices. A Management Information Base (MIB) is a collection of hierarchically organized characteristics of a managed device, comprised of one or more object instances, which are essentially values. An object identifier (or object ID) uniquely identifies a managed object in the MIB hierarchy. Using patent pending Identity Mapping Technology (IMT), smartflex™ correctly identifies re-branded models. Once identified, information is extracted using a combination of SNMP and Hyper-Meter Technology (HMT) that combines a mixture of multiple protocols, communicating and extracting information from a multitude of different areas within a device depending on its architectural design.

Requirements

Printers, copiers and MFP's must have the SNMP protocol enabled for discovery and extraction of information. The SNMP protocol is part of the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite; therefore a network using the TCP/IP protocol which allows communication over the SNMP port 161 are base requirements. By default the "public" SNMP community name is used, but may be modified in the smartflex™ applications to support custom environment settings. The target devices must reply to a "ping". This indicates that communication won't be blocked during an audit.

Security Concerns

Viewer and WebAudit may be launched from a Windows 2000/XP/2003 workstation or server with restricted user permissions to the target network. Although SNMP commands support both read and write operations, smartflex™ applications only read networked devices and do not modify any default or custom device settings.

Onsite allows audit information to be sent from the target network to a remote destination as an attachment to an email (default port 25) with support for TLS, an XML stream (default port 80) with support for SSL (default port 443). By default, this information is encrypted, and requires a user and pass combination for authentication when logging in, as well as passing data to the remote destination.

Only the information which is extracted during an audit may be saved or transferred to smartflex™ applications. The end-users' confidential data files are not viewed or saved by any smartflex™ applications. Viewer pages display the main user interface in a web page fashion. It does not communicate over the internet except for obtaining a license, or during use of the included dynamic reports. For the action of performing audits on end-users' networks, you do not require internet access.

Virus Concerns

smartflex™ application files have been digitally signed to prevent execution if a virus has infected the file integrity. This method ensures the virus is not activated, and prevents spreading the virus from one network to another. For additional assurance, we recommend using antivirus software to scan the contents of the USB key in between visits to the end-users network.

Network Discovery

The Automatic Network Discovery Settings (ANDS) feature uses a mixture of algorithms to discover and communicate with the different network elements such as the current workstation or server, routers, hubs switches and other network hardware.

Firewalls and other network hardware may prevent or limit the discovery of the network configuration. Networks with multiple physical locations typically have firewalls in between each Local Area Network (LAN) and the public internet that connects these locations via a Wide Area Network (WAN). The network IP ranges (segments) may be manually added to smartflex™, with the minimum requirement that the target devices can be “pinged” from the originating location.

WAN's and Network Traffic

smartflex™ uses default timeout settings of 1000ms. Using unicast settings, each IP within the configured ranges will be queried and if no response is received within 1 second, a timeout will occur. Depending on the amount of network traffic and the general network latency, the default timeout may need to be adjusted. Differences in the total number of devices from one audit to another within the same relative timeframe, is a good indicator the timeout setting needs to be increased.

The audits use an intelligent system that extracts minimal information for each printer, copier or MFP's. Unlike similar products that send a fixed set of queries (a superset of all possible queries) to every networked device, smartflex™ only sends the relevant queries according to the fields the identified device supports, with each device query being no more than a few kb of data. To further reduce the amount of network bandwidth used during a discovery, the smartflex™ core engine communicates with no more than 20 devices at a single time, with the capability to extract information from up to 5 devices per second in an optimized environment. The amount of network traffic at any given time is minimal as a result.

Manufacturer Support

smartflex™ is manufacturer engine neutral. It supports all of the major manufacturers and model families. Manufacturer architectural design limitations may prevent extraction of all identification and meter values. This typically occurs on older models, prior to the year 2000.

Locally Connected Printers

Agent is the only solution of its kind to extract information from one or multiple local printers attached to any Windows port type, such as USB, parallel, blue tooth or infrared. The Agent service contains a proprietary multi-tier MIB which accompanies its own SNMP server, thereby creating a bridge over the computer that is otherwise a road-block. During an SNMP query on the network, the Agent service wakes up and communicates direct over the port with the printer. The Agent then extracts the hardware reported life-time meters, serial number, toner coverage's, toner levels, service alerts and more.

The Agent does not interrupt the job flow. It is a passive service that sits dormant in the background. It is invoked only when called upon by one of smartflex™'s collection applications; Viewer, Onsite or WebAudit and then shuts back down. Unlike other solutions, it is not an application that runs intrusively on an ongoing basis. It does not invasively monitor the spooler to count pages as they are printed. In addition, solutions that interrupt the job to capture data are limited in their use. They only report a cumulative page count (not actual engine page counts) and result in inaccuracies, especially when jobs are cancelled and/or not printed successfully. They are also limited to a single page count and are not able to report serial numbers, toner coverage's, toner levels, service alerts and more.

Agent may be deployed to the workstations using a solution such as Microsoft SMS. Reconfiguration of antivirus or software firewalls may be required if blocking the SNMP port 161, and/or the alternative Agent fallback port 33333.

JetDirect's and Compatibles

smartflex™'s core engine supports HP JetDirects and compatible devices. During an SNMP query on the network, the smartflex™ core engine communicates with the JetDirect or compatible device and extracts the hardware reported life-time meters, serial number, toner coverage's, toner levels, service alerts and more.

Frequently Asked Questions (FAQ's)

Does smartflex™ work with internet proxies?

Yes. Viewer and Onsite are local applications and use Internet Explorer (IE) settings. In Internet Explorer on the Tools menu -> Internet Options -> Connections TAB -> LAN Settings button -> place a check mark in "Bypass proxy server for local addresses" box. The "Secure" settings must also be configured to license smartflex™, and generate the Dynamic Reports included in Viewer. In Internet Explorer on the Tools menu -> Internet Options -> Connections TAB -> LAN Settings button -> Advanced button -> add the appropriate "Secure" value for "Proxy address to use" and "Port".

How does the Viewer USB key work?

Viewer USB is installed and licensed to a company approved USB key. When plugged in to a recipient computer, this key will launch as a removable drive. The Viewer software is run directly from this key. No software is installed onto the computer.

What are the Viewer USB key minimum requirements?

Viewer USB must be run from a computer with Microsoft 2000/XP/2003 operating system. The Microsoft .NET Framework and other minimum requirements come embedded on the USB key, therefore they are not required to be installed onto the computer at any point. Refer to the included help documentation for a list detailed requirements.

Does the Viewer require internet access?

No. Viewer does not communicate over the internet except for obtaining a license, or during use of the included dynamic reports. For the action of performing audits on end-users' networks, you do not require internet access.

What are the Onsite minimum requirements?

Onsite must be run from a computer with Microsoft 2000/XP/2003 operating system. The Microsoft .NET Framework version 1.1 is required for Onsite v1.xx, and version 2.0 for Onsite v2.xx. Microsoft Data Access Components (MDAC) must be installed unless the computer has one of the following pre-installed; Microsoft Access or a version of Microsoft SQL. Refer to the included help documentation for a list detailed requirements.

Does Onsite require Microsoft Internet Information Services (IIS)?

No. Onsite includes its own server to display the web pages and is set up automatically during the installation.

Can you install Onsite on a computer which already hosts another IIS website?

Yes. Onsite uses port 33330 by default, but this may also be configured to use a different port if required.

How much ongoing maintenance does Onsite require?

Onsite is a service which runs in the background and performs audits and exports to configured destinations on predefined schedules. It's recommended to use subnets (IP ranges) instead of fixed IP's so that when adding new devices to the network, they will be discovered and included in the audit results, limiting manual intervention.

Can you access Onsite remotely?

Yes. Onsite may be accessed from another location using the target computer IP and port, i.e.

<http://192.168.1.20:33330> for internal access, or http://<external_ip_or_url>:33330 for external access.

What hosting options are available for Central?

There are a few hosting options available:

1.	Hosted Internally	Dealer may install internally at their office and provide internal and/or external access to their employees and end users (customers).
2.	Third Party	Outside hosting service such as GoDaddy (www.godaddy.com).
3.	smartflex™ Hosted - shared	Hosting service provided by smartflex™ using a shared hosted server.
4.	Smartflex™ Hosted - dedicated	Hosting service provided by smartflex™ using a dedicated hosted server.

How does the WebAudit process work?

From Central, the dealer specifies the end-users' (customers) applicable billing cycle. At this time, an email is automatically generated and sent to the appropriate contact informing them it is time to collect their meters. The instructions include a URL, whereby when the end-user clicks the link, it automatically launches their web browser, ready to perform the action. The end-user then clicks 'start' and 'save'. Done. No software is installed at any time. A link to the WebAudit page may also be posted on the dealers existing website, i.e. Enter Meter Readings web page. This allows the user to automate the collection, rather than having to manually walk from device to device, print configuration page and transcribe the meters.

How does the Meter Validation process work?

From Central, the dealer specifies the end-users' (customers) applicable billing cycle. At this time, an email is automatically generated and sent to the appropriate contact informing them it is time to "validate" their meters. The devices are filtered to include only managed (devices under contract) devices with missing meters. After supplying the missing meters, the end-user then "submits" the meters. Optional features allow the end-user to submit service copies, and notes for each device.