Application Note

SKF @ptitude Analyst hardware connectivity to RDC

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Introduction

This document contains some basic information on SKF on-line surveillance hardware and the process of collecting that data from remote locations to a centralized Remote Diagnostic Center (RDC). This document pays particular attention to wireless devices. It also briefly describes some (but not all) methods of connectivity. This document includes:

- An overview of SKF on-line surveillance systems
- Connectivity options
- An example of a setup at a customer site with a firewall and IT restrictions

On-line Surveillance Systems

SKF offers a wide range of products for on-line surveillance. The variations of the products include different wireless protocols, single and multi-channel measurements, variations in measurement setup and specific requirements for the environment like ATEX or other approvals. Recent additions and product improvements to the wireless portfolio are introduced below.

SKF Multilog On-line System WMx

The SKF Multilog On-line System WMx is a compact, eight-channel, field-mounted monitoring device that communicates using industry standard 802.11b/g wireless networking. It collects the following data:

Acceleration
Velocity
Displacement
Temperature
Bearing condition

The WMx automatically uploads the data for viewing, alarm evaluation, and analysis in SKF @ptitude software. The user can choose to power the unit by battery or use a standard mains-powered DC power supply.

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SKF Wireless Machine Condition Sensor - CMWA 8800

The SKF Wireless Machine Condition Sensor combines a sensor, data collector and radio into one compact, battery-operated device that measures both vibration and temperature data. This system, which is approved for use in hazardous areas requiring ATEX Zone 0 certification, provides a balance-of-plant monitor. The CMWA 8800 wirelessly transmits the data via the WirelessHART™ communication protocol. Both static and dynamic data are sent to the SKF @ptitude Monitoring Suite software.

A direct connection can be made from the gateway to a process control system. When this is used, each sensor sends 4 parameters to the Distributed Control System (DCS).

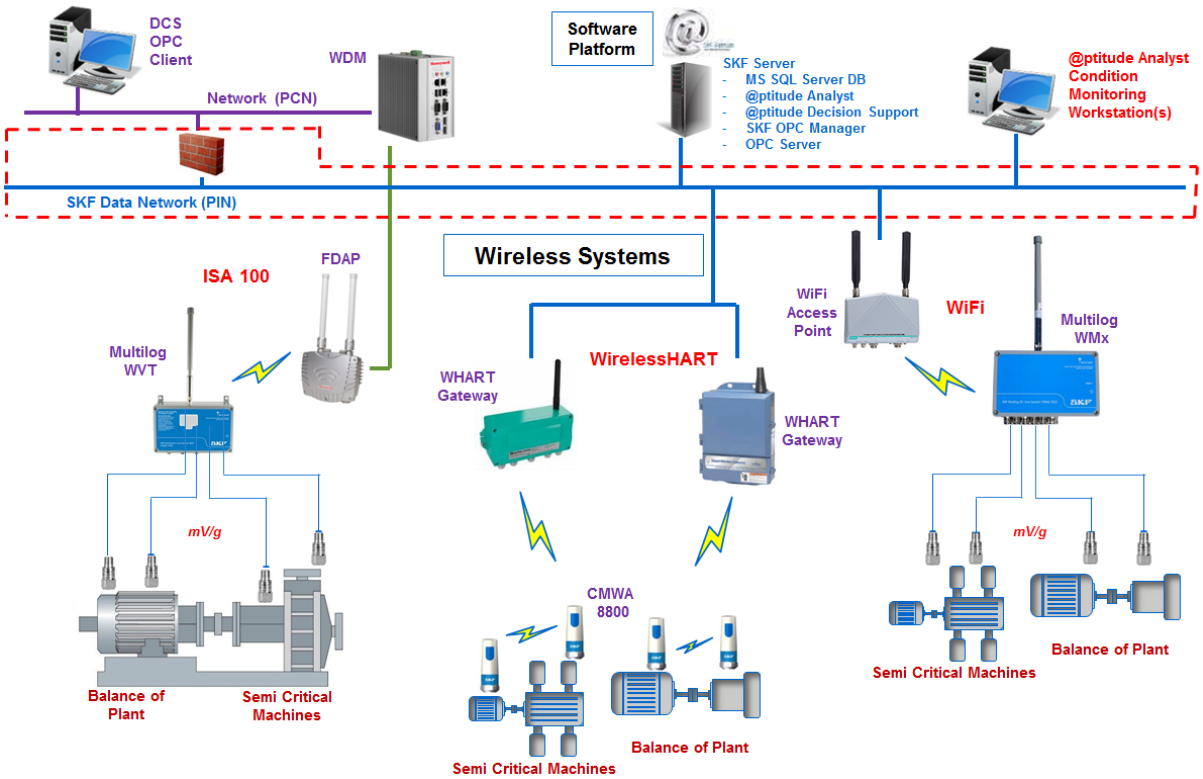
SKF Multilog On-line System WVT

Developed for ISA100 standard networks, the SKF Multilog On-Line System WVT periodically outputs 17 condition monitoring measurements to a process control system. Advanced diagnostic data can be transmitted to SKF's @ptitude Analyst software platform for further analysis and maintenance planning. The user can choose to power the unit by battery or use a standard mains-powered DC power supply.

All these wireless systems complement portable data collection programs for assets that require more frequent monitoring than is economically feasible by a hand held data collector. The wireless devices are also used at locations that cannot be monitored safely otherwise, or when the higher cost of a full wired monitoring system cannot be justified. When used as part of an advanced monitoring solution, these systems provide an integrated condition monitoring system designed to provide early fault detection and prevention that can improve machine reliability, availability performance and profitability.

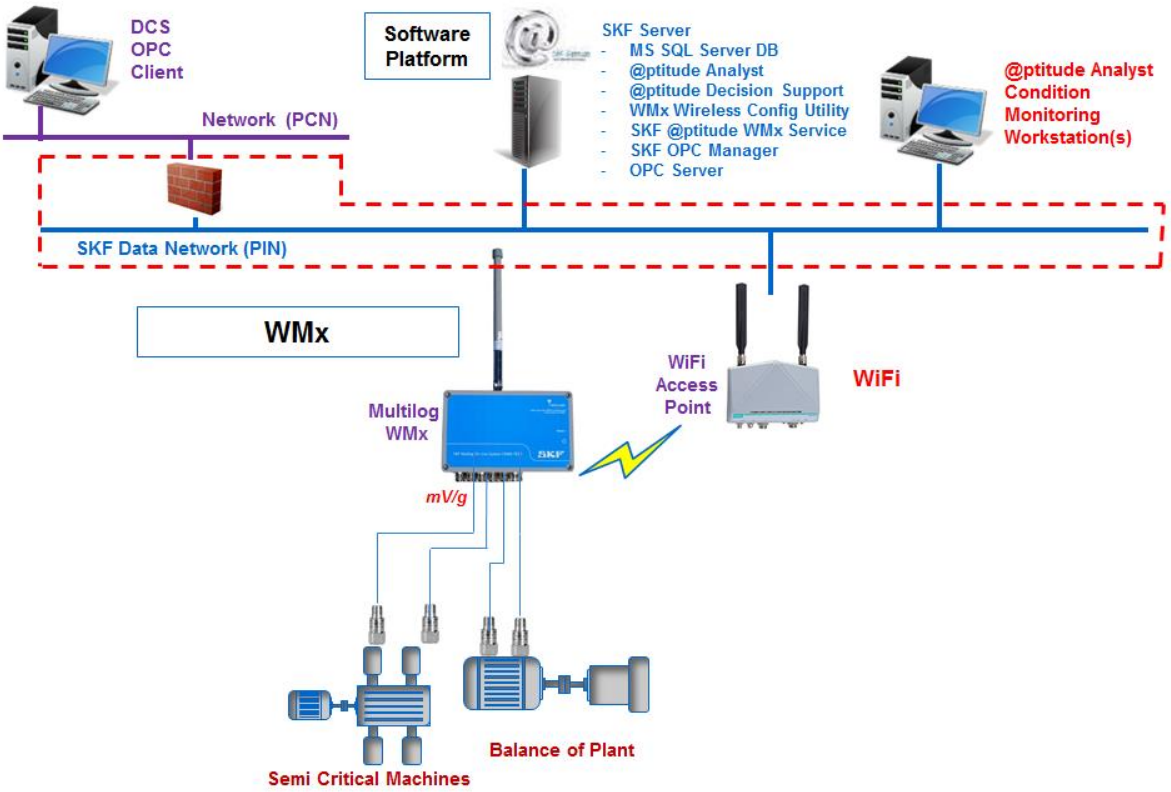
Overview of Connectivity

The following sections provide an overview of the communication method for each Wireless Device.



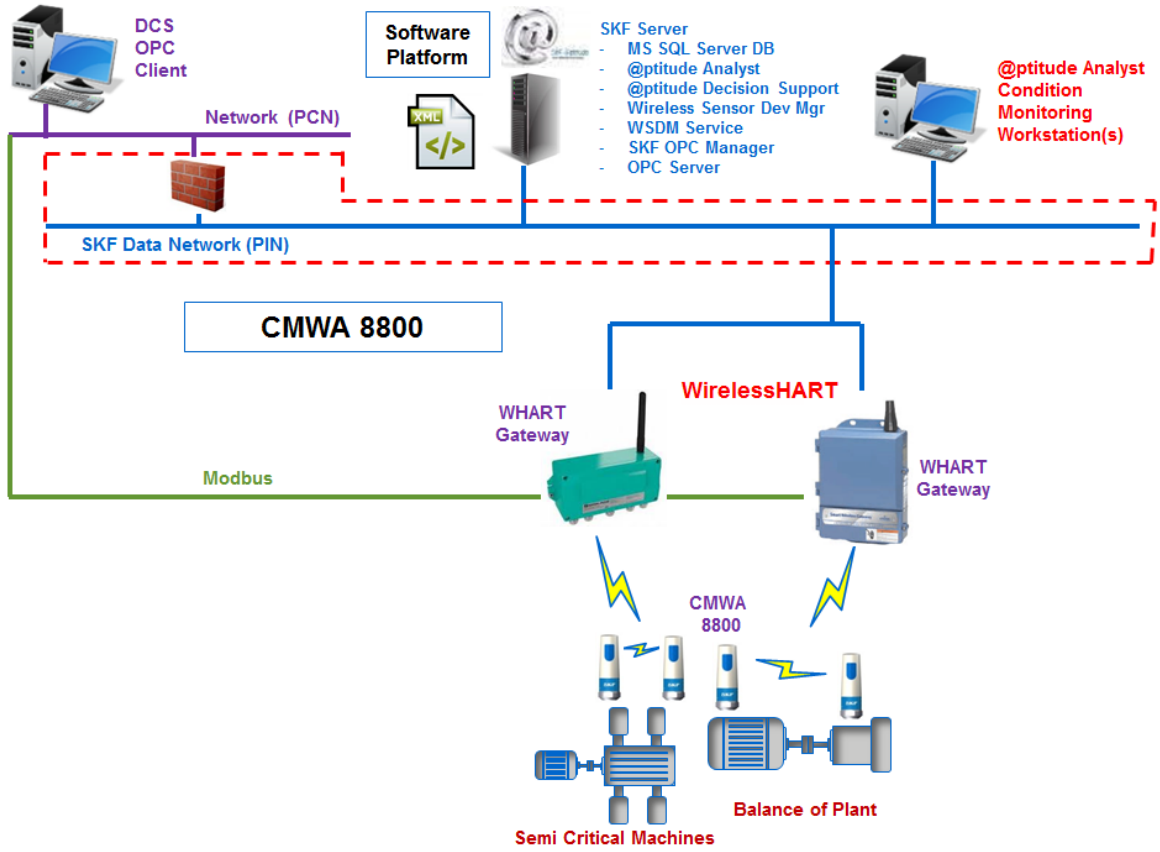
SKF Multilog On-line System WMx

The SKF Multilog On-line System WMx uses standard WiFi 802-11g/n network with TCP/IP communication to transmit the vibration and temperature readings to the @ptitude Analyst software. Configuration and creation of WMx devices and points is done from the @ptitude Analyst software. configuration program (WMx Wireless Configuration Utility) is used to set the IP address and port for the WMx device during initial configuration. A Windows service (SKF @ptitude WMx service) must be running at all times on the SKF Server to allow communication to the devices.



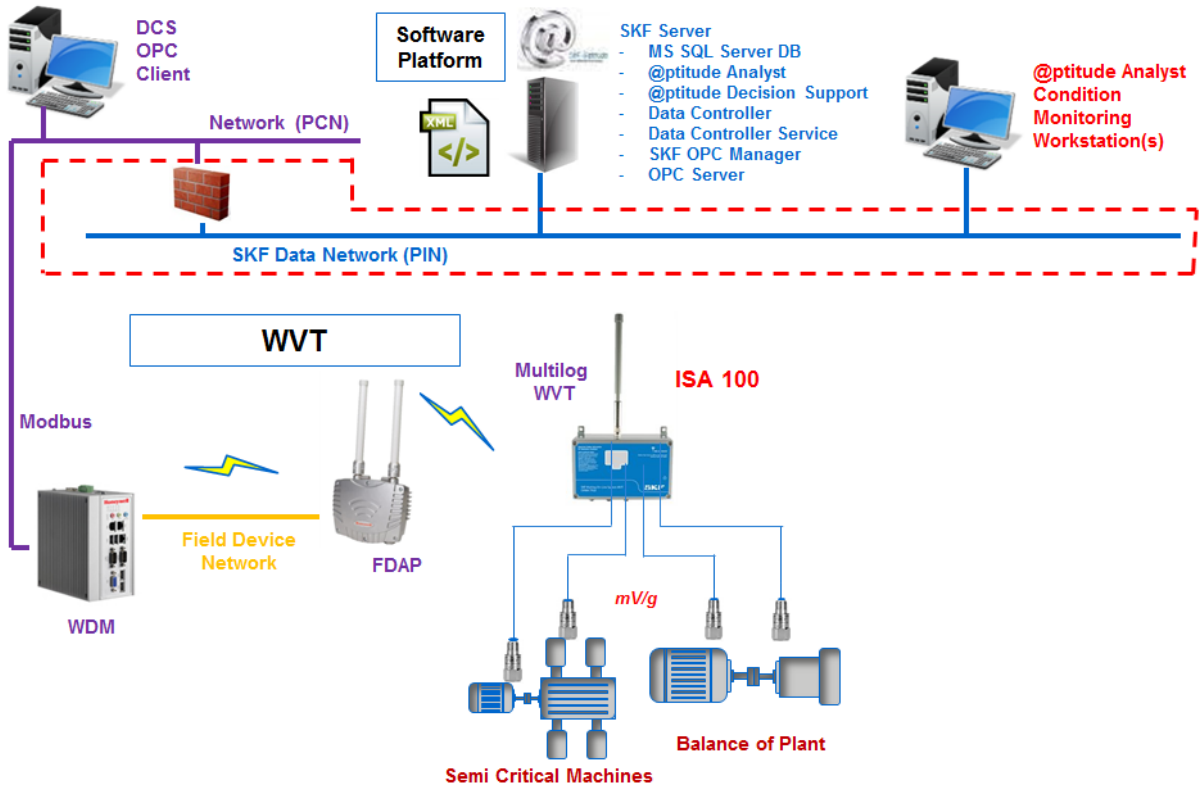
SKF Wireless Machine Condition Sensor - CMWA 8800

The SKF Wireless Machine Condition Sensor communicates through a WirelessHART Network to a WirelessHART gateway. The gateway can be connected to either the Process Control Network (PCN) or the SKF Data Network (PIN). The Gateway provides the connection through which configuration is sent and data is retrieved. A configuration program (Wireless Sensor Device Manager - 8800) is used to set intervals for data collection and point setup. A key component of the normal process of retrieving the condition monitoring data is the generation of XML files by a Windows Service (Wireless Sensor Device Manager – 8800 Service) running on the SKF Server. This service must be running at all times on the SKF Server to allow communication to the devices.



SKF Multilog On-line System WVT

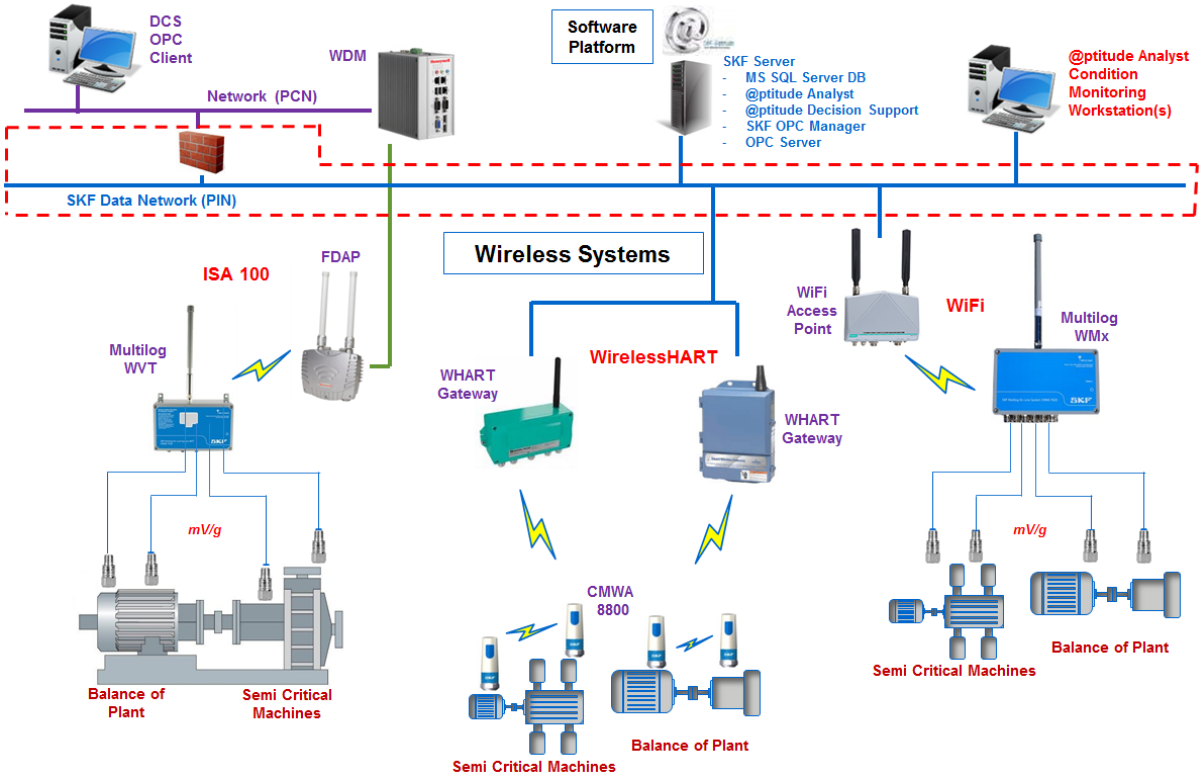
The SKF Multilog On-line System WVT communicates through an ISA100 Network via a Wireless Device Manager (WDM) that can be connected to either the Process Control Network (PCN) or to the SKF Data Network (PIN). The WDM then communicates to a Field Device Access Point (FDAP), which in turn communicates to the WVT. This WDM and FDAP together provide the data path through which configuration is sent and data is retrieved. A configuration program (Data Controller) is used to set intervals for data collection and point setup. A key component of the normal process of retrieving the condition monitoring data is the generation of XML files by a Windows Service (Data Controller Service) running on the SKF Server. This service must be running at all times on the SKF Server to allow communication to the devices.



Overview of connectivity with all components installed locally

Installation with no Cloud Connectivity (local network)

In the case of all three wireless options, the data is stored in the SKF Server using a Windows Service. With the WVT and the CMWA 8800 devices, there are XML files that are created in the process. Ports are required to be open within the SKF Network and Process Control Network based on the Security rules in place within the facilities networks. All of the wireless systems can be used at the same time and all the diagnostic data is viewed on the @ptitude Analyst software together with the data from the hand held Microlog devices and the wired on-line IMx devices.

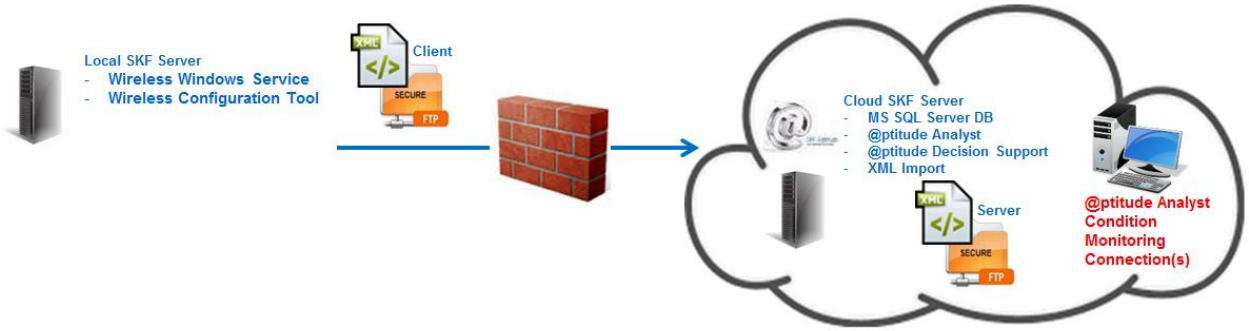


Overview of connectivity with Remote Diagnostic Center

Installation with Cloud Connectivity

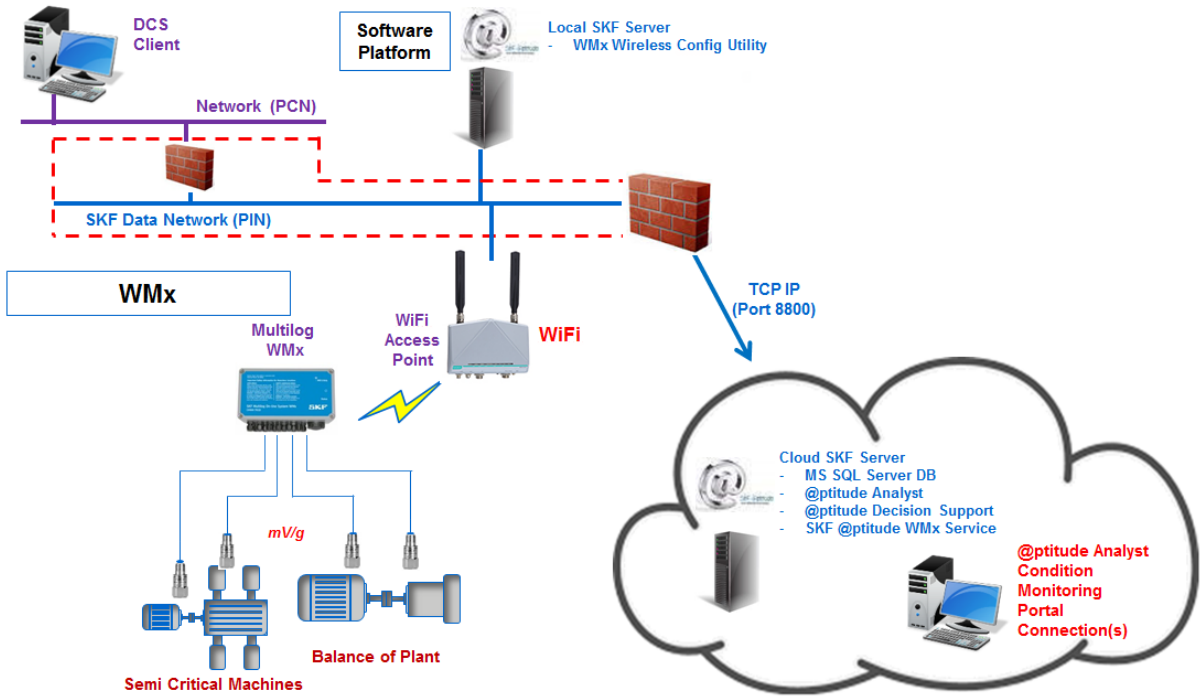
The current industry trend is to connect devices and people into global networks. This is typically described as connecting “to the cloud”. To be able to do this, IT firewalls and other IT related questions need to be taken into account.

The key difference in Cloud Connectivity is the separation of functions in the SKF Server. The condition monitoring database is moved to the Cloud. The configuration functions stay at the plant level. For wireless devices where XML files are generated, the files must be transferred outside of the plant to the Cloud. This can be done using a Secure FTP tool, such as WinSCP.



Cloud-based SKF Multilog On-line System WMx

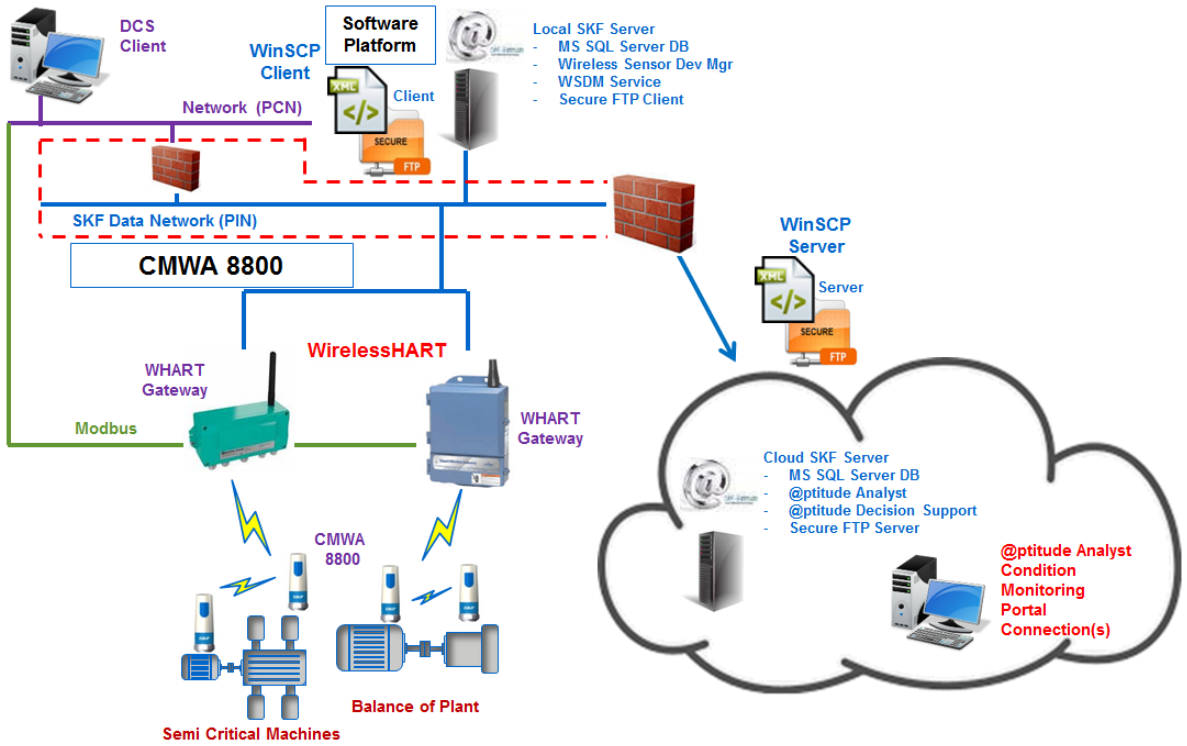
The SKF Multilog On-line System WMx does not require XML files be transmitted. All communication is accomplished by using a TCP/IP Port. This TCP/IP port has to be opened in the firewall to allow data to the Cloud SKF Server directly from the WMx. The only necessity for a local SKF computer is the initial TCP/IP configuration of the WMx devices, and potentially any OPC communication.



Cloud-based SKF Wireless Machine Condition Sensor - CMWA 8800

The SKF Wireless Machine Condition Sensor requires XML files transmitted through the firewall. This can be done with a Secure FTP Tool. The condition monitoring files are gathered on the Local SKF Server and transmitted to the Cloud SKF Server.

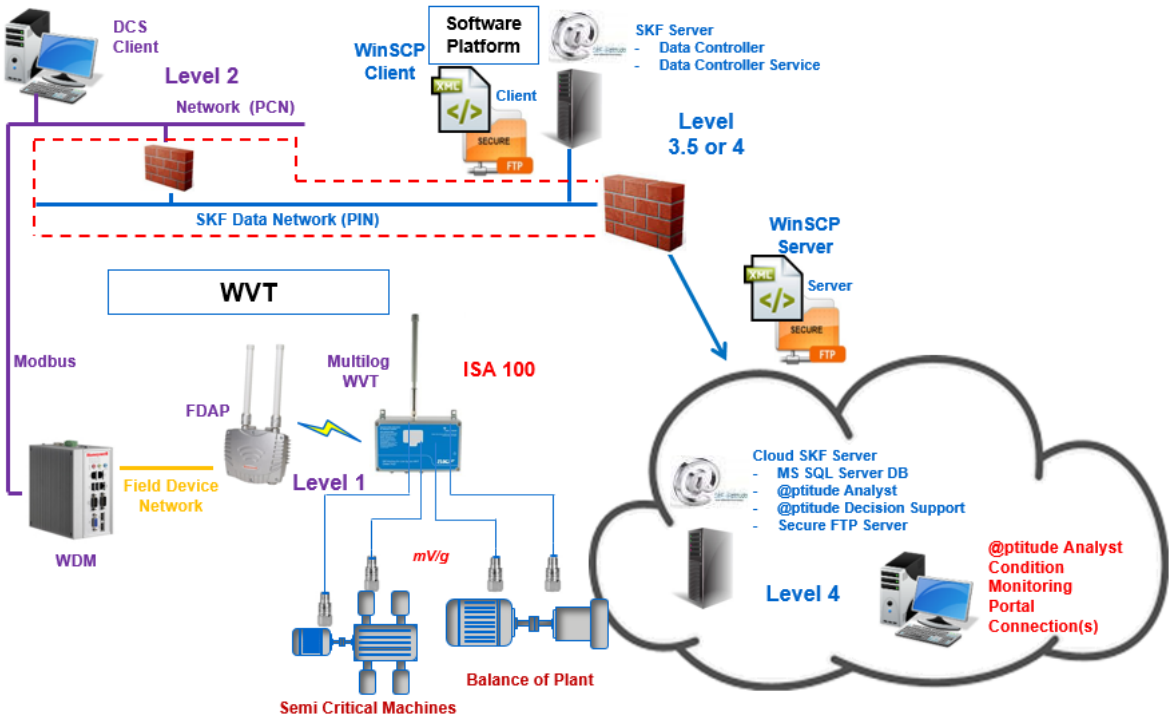
1. The WirelessHART gateway and sensor nodes are deployed in the field.
2. The WirelessHART Gateway are configured with dual connectivity: one connection to DCS and the other connection to Gateway/Sensor Data Controller software and Service at the Local SKF Server.
3. XML files are saved/stored at the Local SKF Server.
4. XML files are pulled up to Cloud SKF Server via secured FTP and consumed by SKF @ptitude Analyst.
5. Data is published to end users for analysis via the SKF Cloud Portal Connection.



Cloud-based SKF Multilog On-line System WVT

The SKF Multilog On-line System WVT requires XML files transmitted through the firewall. This can be accomplished with a Secure FTP Tool. The condition monitoring files are gathered on the Local SKF Server and transmitted to the Cloud SKF Server.

1. The ISA100 WDM/FDAP and WVT with the sensors are deployed in the field.
2. The WDM is configured with dual connectivity: one connection to DCS and the other connection to Wireless Sensor Device Manager and WSDM Service at Local SKF Server. These networks are normally separated by a firewall.
3. The XML files are saved/stored at Local SKF Server.
4. The XML files are pulled up to Cloud SKF Server via secured FTP and consumed by SKF @ptitude Analyst.
5. Data is published to end users for analysis via the SKF Cloud Portal Connection.



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