Service-oriented architecture

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Cloud computing services, which makes use of a service-oriented architecture (SOA), are now being used to extend process control capabilities. The need to receive inputs from the world in real-time has elevated the need for the use of smart transducers to provide inputs and control for Machine-2-Machine (M2M) intelligence. The problem has been one of bandwidth, protocols and performance of devices that could use SOAs. The approach, introduced a decade ago, has grown and will now be offered as a standard process control solution for cement plants.

The Institute of Electrical and Electronics Engineers (IEEE)'s Committee on Sensor Technology is pursuing the establishment of a proposed 1451.1d standard to induce session initiation management and packet transport for smart transducers, including sensors, actuators, and devices. This capability will provide a missing link for 'consumer' devices consisting of either sensors or actuators to contact a 'provider' to request access to the 'Service'. IEEE1451.1d provides session initiation management and makes use of Extensible Mark-up and Presence Protocol (XMPP). This capability will provide a means to connect various devices to through a service provider.

The evolution of cloud services will take two forms a local intranet: a 'private' cloud to connect sensors within a facility or utilising the Internet and a 'public' cloud to exchange information with other facilities. The challenge can be met with multiple technologies, but provide a unified way of managing the networks and still ensure that the end devices are trusted to participate.

Today's process controls systems have been closed systems but they make use of industrial standard protocols, such as MODBUS TCP. To offer the ability to extend the infrastructure and leverage existing devices, which make use of industry standards, are an important consideration. This can be addressed with the right platform and software that facilitates the capabilities necessary.

It has been difficult for sensors implemented with low bit rate technologies to obtain capabilities for management of large networks. In utilising IEEE 1451.1d as part of a SOA solution, it could be viewed as an IP

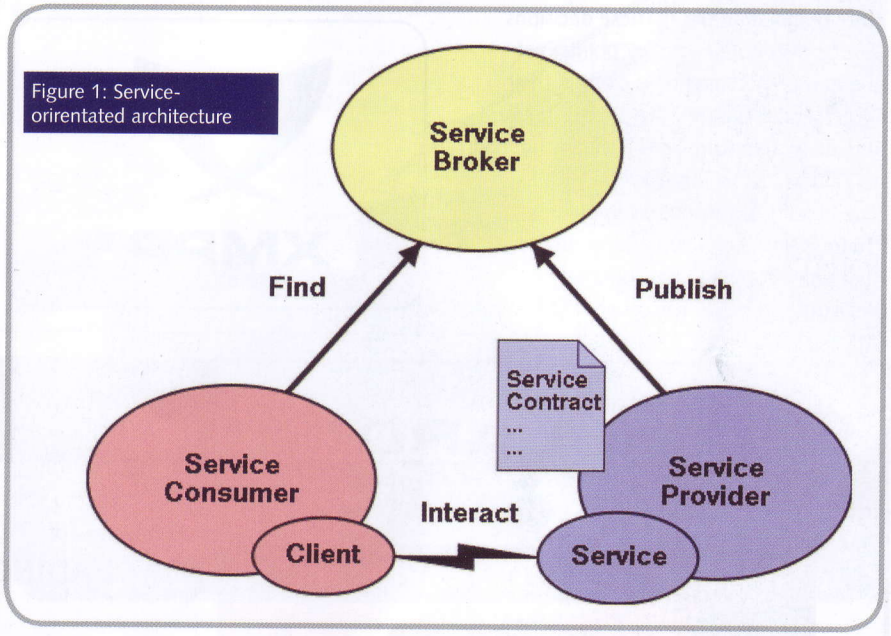

Figure 1: Service-orirentated architecture

PBX which was used for the phone system. Now any field device can simply make a call to offer their information or the service seekers can connect to various devices on their network. The IPDX requires that all domains of use are registered with a 'registrant/service broker' and the devices would exchange information to validate that the access is authorised and the characteristics of the devices can facilitate the exchange.

IEEE 1451.1d makes use of a Transducer Electronic Data Sheet (TEDS) which is in XML that is used as part of the exchange initially to make the consumers presence known and/or service provider who also has to do so before the two can exchange information.

There is a 'service contract' between the two that validates the protocol and other attributes are acceptable. If there known related to a particular vendor's implementation then these differences can be addressed during the exchange of information. This provides a mechanism to facilitate interoperability.

The IPDX would handle this accommodation on the server during packet transport, which handles the signalling and encapsulation of packets within a XMPP data stream. It is also possible to provide packet filtering, for example, since each packet is monitored and policies can be used to limit the transport of specific packets.

The IPDX offers greater flexibility, interoperability, scalability and security. The data packets can be sent over any wired or wireless links and IPDX offers greater control of data packets. The capabilities can be extended over any network, including the Internet. It will be possible to subscribe to a service