SDC

An IEEE Standard

Service-oriented

Device Connectivity

Secure and Dynamic Networking of
Distributed Point-of-Care Medical Devices and Medical IT Systems

D-932-2019

Breaking Today's Boundaries in Medical Device Connectivity

Data exchange in acute care delivery takes a giant step forward with the addition of Service-oriented Device Connectivity (SDC) to the IEEE 11073 international standard for medical device communication. SDC is a web services-based architecture that enables interoperability amongst point-of-care medical devices and data exchange between point-of-care devices and HL7 compatible clinical and hospital information systems.

SDC enables a hospital's medical technologies to share data and information bi-directionally, securely and dynamically.

Standardized Communication
Networked SDC-capable devices and systems can communicate bi-directionally, sending and receiving data presented in a standardized communication nomenclature.

Secure Connectivity
Mutual authentication ensures that only approved devices and systems can interact, while transmitted data are encrypted to protect hospital assets and patient information against possible misuse or theft.

Dynamic Networking
Devices connect to create a dynamically scalable system based on fundamental risk management and approval concepts.

Sharing more data amongst point-of-care devices and hospital systems is a technological achievement. Putting the shared data to use is a breakthrough in the delivery of care.

WHY SDC IS NEEDED

According to the National Institute of Standards and Technology (U.S.), "The lack of interoperability between medical devices can lead to preventable medical errors and potentially serious inefficiencies that would otherwise be avoided."[1] Further, in a 2018 survey conducted by Deloitte Ltd, Hospital IT experts in Germany identified the lack of device interoperability and respective standards as a top barrier to significantly improving the delivery of care.[2]

Proprietary device integration before SDC improved data availability at the point of care and elevated the value of medical devices in assessing patient status. Now, with SDC, integrated devices could be interoperable, which would potentially advance how and when care is delivered for achieving better clinical outcomes.

[1]National Institute of Standards and Technology (2011). Medical Device Interoperability
[2]Deloitte Ltd. (2018). IT in the Hospital: Between Opportunities and Risks

HOW SDC IMPROVES ACUTE CARE DELIVERY

OPEN INFORMATION EXCHANGE

Increasing the availability of clinical information and admission data at the point of care could help improve clinical results and workflow. Clinicians could visualize more information than ever before in one place, accessing aggregated data from connected and interoperable sources when making critical treatment decisions. They could also experience more complete control over point-of-care devices, streamlining clinical workflows with the ability to bridge distances between data sources and patients. Taking this one step further, SDC and interoperability could automate clinical procedures, helping to reduce cost-of-care and demands on staff.

MEDICAL-GRADE DATA OUTPUT

SDC could help drive insights-based decision making. Having medical-grade data available when and where it could have the greatest impact on patient care makes for timely decisions. Applying data analytics in a retrospective review of medical-grade data could help in identifying best clinical practices around therapies and clinical procedures. Medical-grade data could also help enable process automation between devices, as it can be exchanged efficiently, in real time.

HIGH LEVEL OF DATA SECURITY

By enabling more point-of-care devices to share a network, SDC could help protect hospital assets and patient information against misuse and theft. Three main features of the SDC communication protocol contribute to data and system security:

- Integrity and confidentiality of information result from TLS protocol based mutual authentication of both client and server.
- Secure data transport is achieved by an end-to-end encryption based on a X.509 (ISO/IEC 9594-8) public key infrastructure for creation of digital certificates.
- Connectivity to identified devices on the network is managed based on whitelists for authorization.

REDUCED INTEGRATION COMPLEXITY

With the reduction of device and system Integration efforts, SDC provides both clinical and administrative advantages. Integrating devices to a conforming network interface could reduce the need for expensive and elaborate custom integration projects. Avoiding custom integrations could result in a clearer risk management position. Operating SDC-capable devices and systems could also help decrease administrative complexity by reducing cost-heavy middleware solutions, proprietary drivers and the need of time-consuming, labor-intensive updating. Further, connectivity and secure networking could help in providing transparency on the status and history of the medical device fleet and connected systems.

WHO DEVELOPED AND PUBLISHED THE SDC STANDARDS

Concepts for integrating operating room technologies were mainly developed in project OR.NET, commissioned by Germany's Federal Ministry of Education and Research (BMBF), are at the core of the SDC standard.

The OR.NET e.V. is a non-profit organization, which supports further development of the standard. Working groups comprised of subject matter experts from healthcare, industry and academia conduct research projects concerning the application of information and communication technologies (ICT) in the medical field.

ornet.org OR.NET e.V.

In September 2018, the IEEE Standards Committee approved the final specification of the IEEE 11073 SDC standard family, which was published then in January 2019.

The Institute of Electrical and Electronics Engineers (IEEE) is an international association of technical professionals spanning a wide range of interests, industries and disciplines. The organization is a leading developer and publisher of educational literature and technical standards that support the advancement and safe application of electrical technologies.

www.ieee.org IEEE

Disclosure: Dräger (Drägerwerk AG & Co. KGaA) is a corporate member of OR.NET e.V. Dräger employees participated in project working groups that developed the SDC concept as well as the IEEE working group.

WHAT'S DIFFERENT ABOUT AN SDC NETWORK

Before SDC, point-of-care devices with network capability would typically connect to only their own proprietary networks. A manufacturer's network-enabled vital signs monitors might serve as access points for their therapy devices.

SDC-capable devices connected directly to a network offer 'data transfer' advantages over devices using proprietary networks.

	Proprietary Monitoring Networks	SDC Network
Focus on	Patient Monitoring, Data Export	Point-of-Care Connectivity, Bidirectional Data Transport, Safe Remote Control, Process Automation, System Security
Data Processing	Export of relevant information	Export of complete data sets in high quality MedA
Protocol	Proprietary	Standardized
Semantic	Proprietary Coding System	IHE-compliant Nomenclature and Self-describing Data Structures
Cybersecurity	Network Access Control	Mutual Authentication & Encrypted Transport
Time Synchronization	Limited	Precise using NTP
Third-party Device Integration	Customized Solution	Open Platform

91 07 546 | 19.07.1