Philips Interoperability Consulting

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innovation + you

Agenda

Why interoperability is important

Details for PIC iX interoperability

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Key challenges in healthcare

Some of these can be influenced by the quality of the information flow through the healthcare organization

ECRI Institute's Top 10 Patient Safety Concerns for 2017*

1. Information management in EHRs
2. Unrecognized patient deterioration
3. Implementation and use of clinical decision support
4. Test result reporting and follow-up
5. Antimicrobial stewardship
6. Patient identification
7. Opioid administration and monitoring in acute care
8. Behavioral health issues in non-behavioral-health settings
9. Management of new oral anticoagulants
10. Inadequate organization systems or processes to improve safety and quality

Key challenges in interoperability

As technology gets embedded throughout the healthcare continuum, clinicians need their data platforms to communicate with each other – to be interoperable – so their patient data can be:
- Exchanged quickly and effectively between a large number of devices
- Collected and sorted reliably for each patient, across different systems
- Distributed correctly to support clinical decisions

How can Philips allow systems from different vendors to communicate with each other without complicating processes?

Imagine

A NICU nurse, looking after preemies

Surrounded by equipment that measures vital signs, supports breathing, administers treatment

She has to check various devices for the settings, values, and events for the baby's chart

The longer it takes, the more it could disturb the fragile patient

But the doctors need that collated chart – available at the bedside – to make confident decisions

How can interoperability help?

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Imagine

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A region where hospitals work together to provide comprehensive care

A patient moves to a hospital closer to home as his condition improves

The new caregivers need to accurately identify the patient, to access his case history (vital signs, waveform strips, lab results, and so on)

They also want to cross-check with colleagues at the previous hospital – at best by sharing an EMR with up-to-date information

How can interoperability help?

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Imagine

Biomeds and IT specialists want to protect the hospital's IT investment when installing a new patient monitoring system

This needs to happen easily – though the hospital's IT landscape is complex

Not all of the systems – or vendors – are as flexible as they could be

Need to work with a partner who understands the impact IT decisions can have on clinician satisfaction

How can interoperability help?

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Imagine

- Expert guidance for your staff, **to support system interoperability**

- Enabling transfer and exchange of data– to **give clinicians access to the data they use**

- Supporting your efforts in **achieving the full potential of workflows and processes**

- We provide guidance to meet the needs of your specific IT and clinical concerns, **for interoperability in your environment**

- This is the value of **Philips Interoperability Consulting**

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Understanding interoperability

Why does interfacing make a difference?

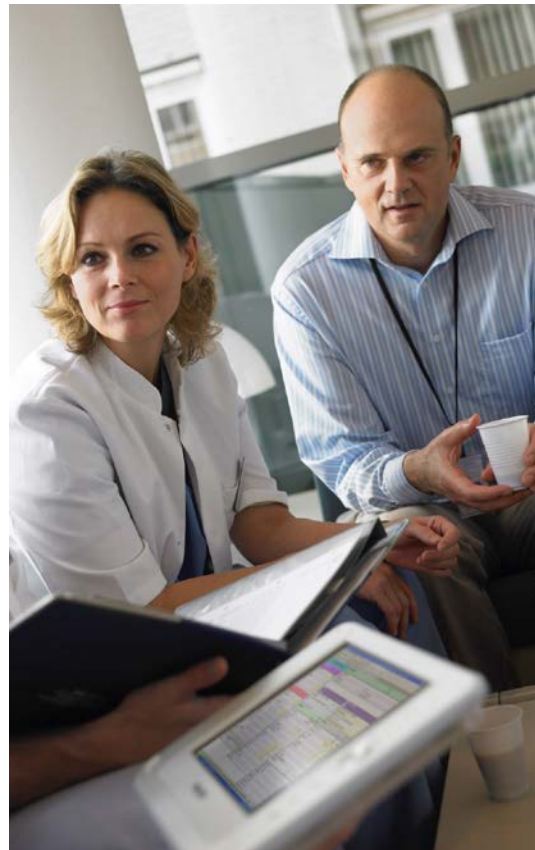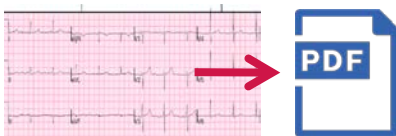Interfacing means bridging systems to one another:

- Allowing data to flow between them

- Acting as a translator

- Applying format translation/ data mapping/ conversion

Interoperability in the hospital environment

The hospital environment has various systems collecting information which needs to be
- Shared with other systems
- Understood by other systems
- Accessible for clinicians to use

Interoperability gets your systems working together to get the data where it needs to be throughout the enterprise.

Hospital enterprise systems

Hospital information system (HIS)	Lab information system (LIS)	Electronic medical record (EMR)	Radiology information system (RIS)	Computerized physician order entry (CPOE)
• Patient demographics • Orders and work lists • Billing	• Lab results • Lab reports	• Vital signs • Reports	• PACS	• Orders and work lists

Regional systems
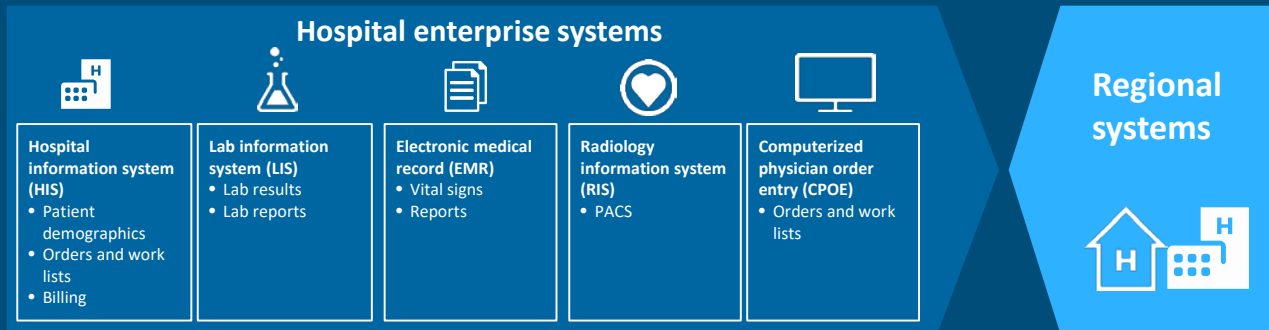
Interoperability in the hospital environment

Clinicians need the right patient information in the right place at the right time
Interoperability simplifies workflows within the department and across the hospital and beyond

Interoperability touchpoints in the patient monitoring environment					Beyond the caregiving environment
Emergency	Surgery	Intensive care unit / critical care unit	Neonatal intensive care unit	General ward	Remote results: • Review cases • Research • Teaching • Workflow assessment
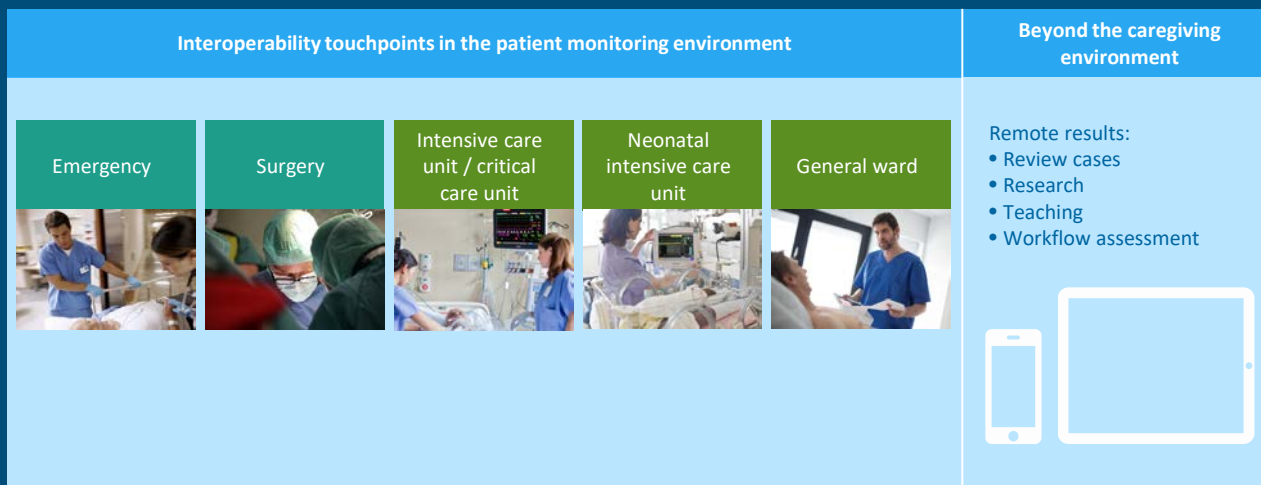
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Helping you gather, sort and send the information relevant to your clinicians

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Hospital enterprise systems

Hospital information system (HIS)
- Patient demographics
- Orders and work lists
- Billing

Lab information system (LIS)
- Lab results
- Lab reports

Electronic medical record (EMR)
- Vital signs
- Reports

Radiology information system (RIS)
- PACS

Computerized physician order entry (CPOE)
- Orders and work lists

Regional systems

Patient demographics, or physician orders

Results, reports and observations

Emergency

Surgery

Intensive care unit / critical care unit

Neonatal intensive care unit

General ward

Beyond the caregiving environment

Remote results:
- Review cases
- Research
- Teaching
- Workflow assessment
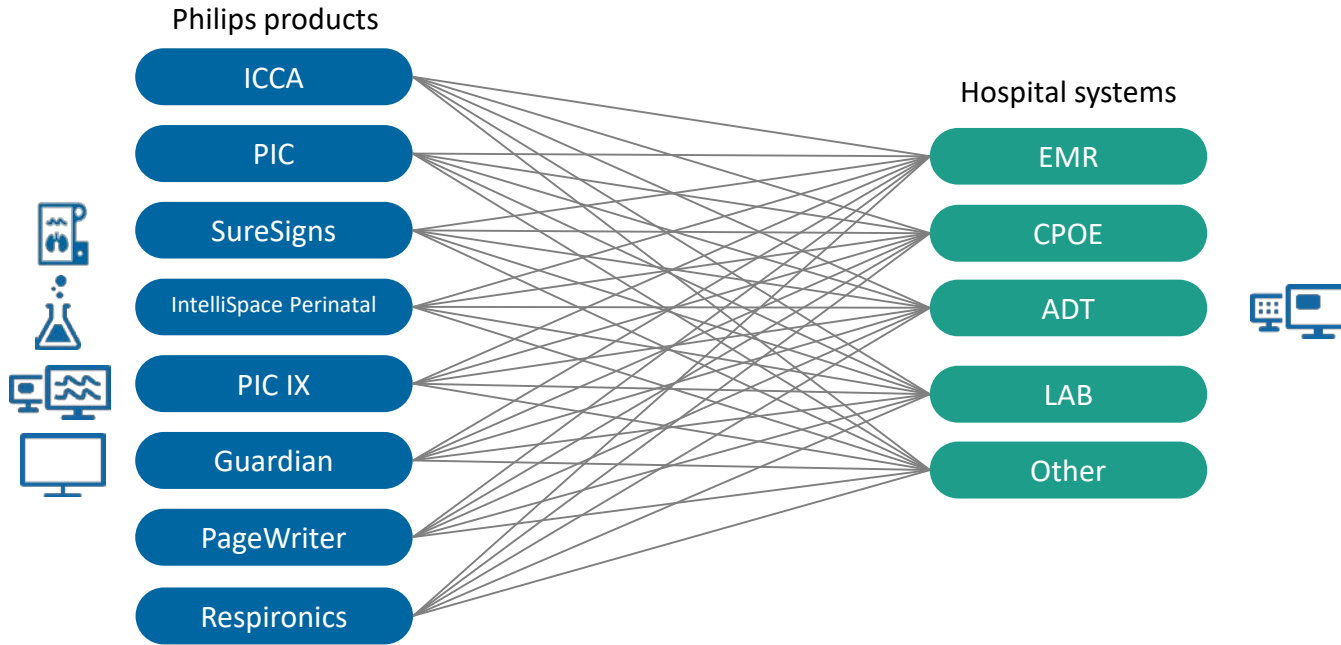
Integration and interoperability in one comprehensive solution
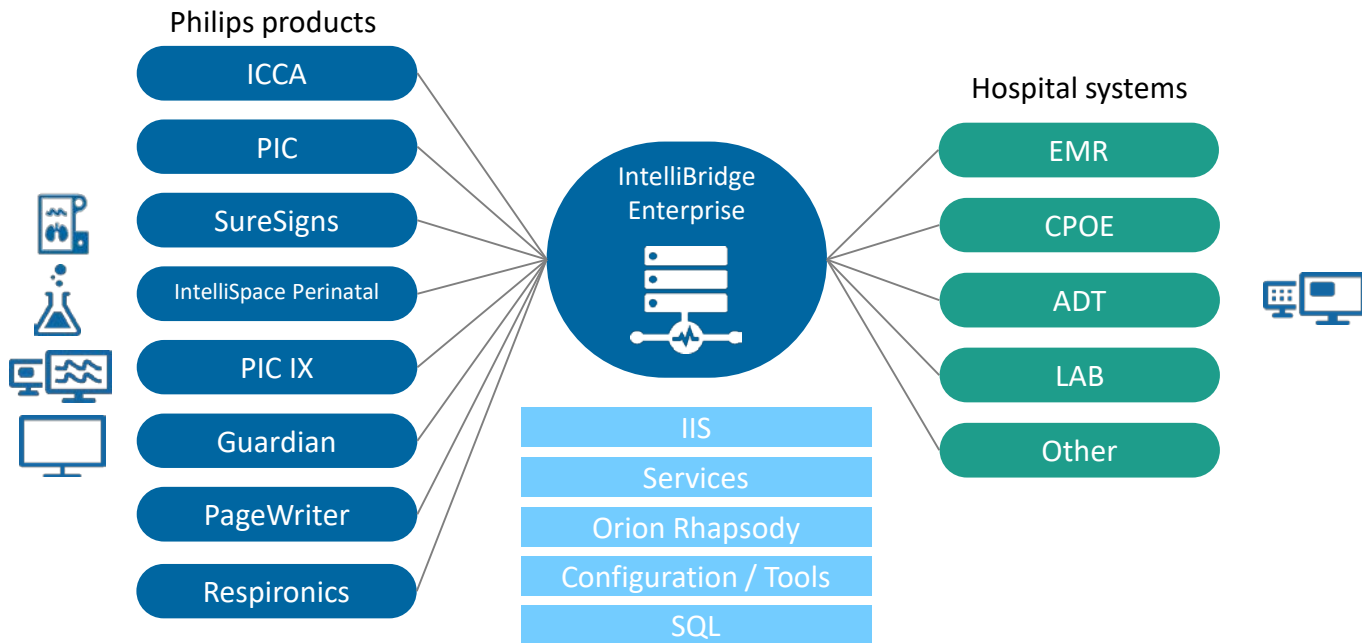
Philips IntelliBridge Enterprise

Before IntelliBridge Enterprise

After IntelliBridge Enterprise

Simplifying enterprise-wide interoperability and creating a single point of contact solution for bidirectional interfacing and communications.

Philips products

- ICCA
- PIC
- SureSigns
- IntelliSpace Perinatal
- PIC IX
- Guardian
- PageWriter
- Respironics

IntelliBridge Enterprise

- IIS
- Services
- Orion Rhapsody
- Configuration / Tools
- SQL

Hospital systems

- EMR
- CPOE
- ADT
- LAB
- Other

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Benefits of IntelliBridge Enterprise

Support clinical workflows
- Ease the effort of transferring current or retrospective vital signs data and reports to other systems
- Reduces the potential for transcription errors

Tackle installation and operating expenses
- Simplify development and testing for new interfaces
- Standardize communication for easy maintenance

Enhance supportability
- Proactive email notifications
- Alert Viewer, to let users view errors or exceptions
- Audit Trail, to keep track of configuration changes

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PIC iX interoperability services: using IntelliBridge Enterprise to provide interoperability
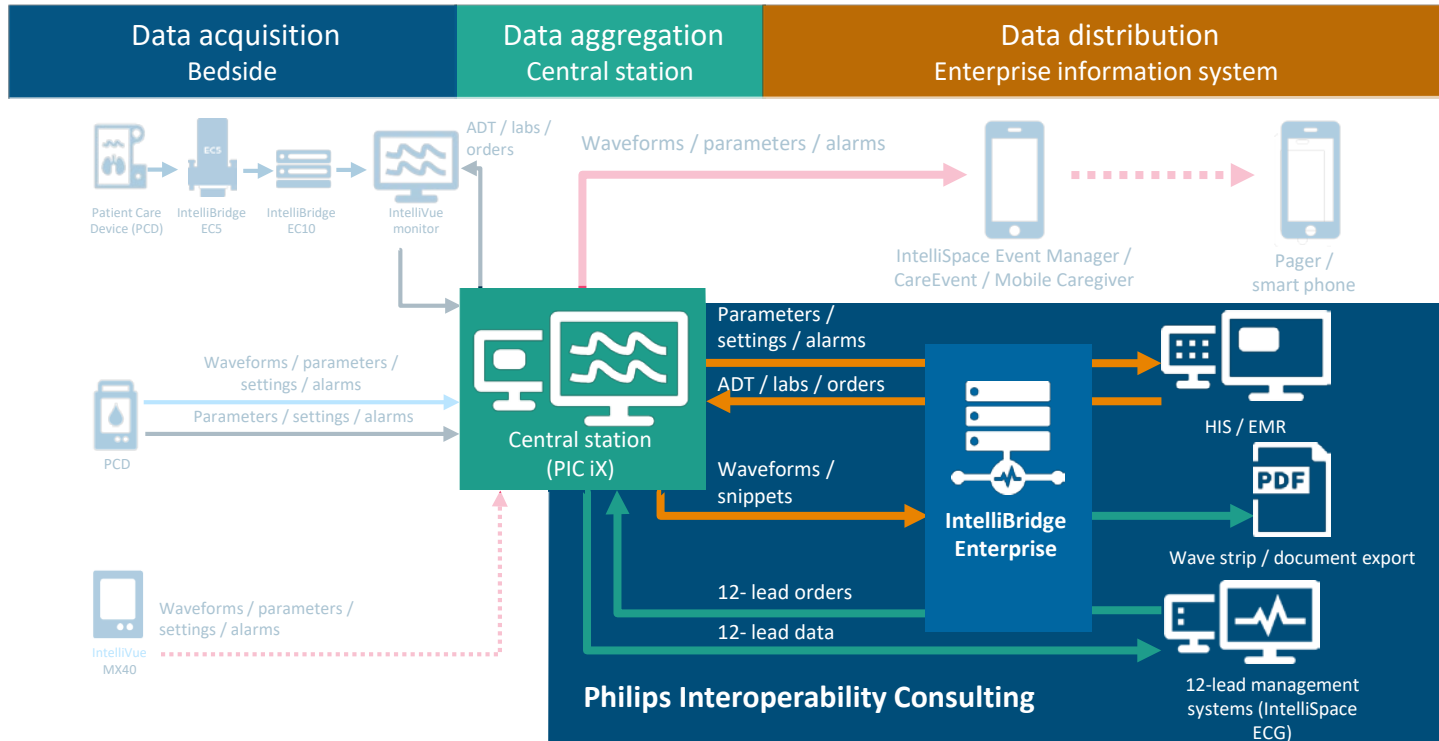
Philips Interoperability Consulting

Philips Interoperability Consulting for PIC iX

1 Interface implementation services using IntelliBridge Enterprise

Standard interface implementation   **Customized interface implementation**

2 Interface design services for using your hospital broker

A closer look

Philips Interoperability Consulting
Interface implementation services using IntelliBridge Enterprise

Standard implementation services using IBE

Baseline assessment → Interface Implementation → Verification and testing → Maintenance *

Customized implementation services using IBE

Baseline assessment → Design consultancy → Interface implementation → Verification and testing → Maintenance *

* Requires minimum Right Fit contract. Conditions apply. Offerings are available in selected countries and for selected products only.
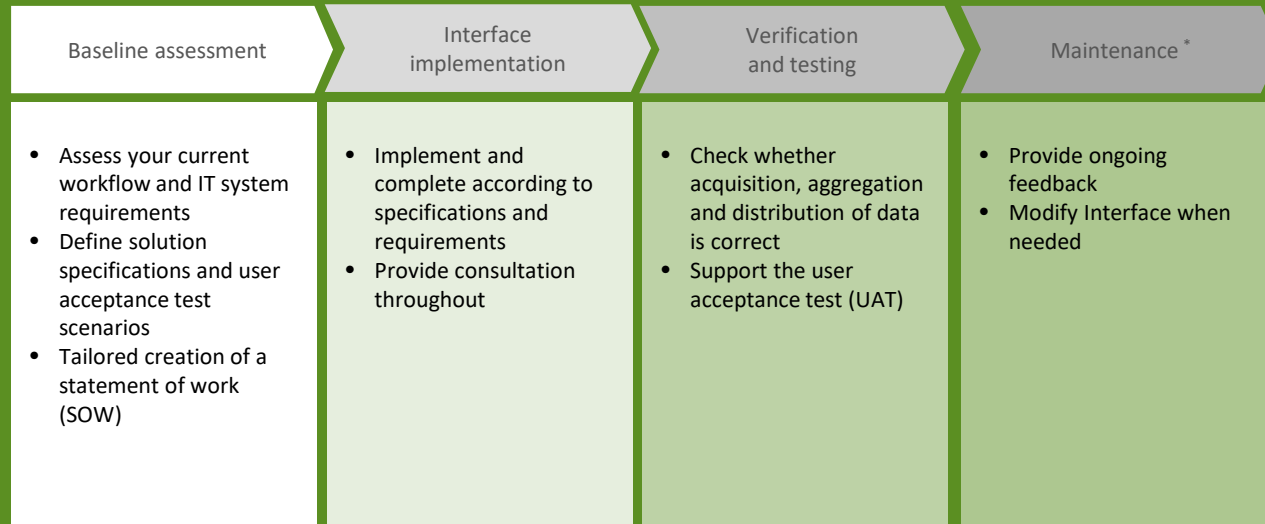
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When you need an interfacing solution from a single source
Standard Interface Implementation (via IBE)

How we deliver this service to you:

Baseline assessment	Interface implementation	Verification and testing	Maintenance *
• Assess your current workflow and IT system requirements • Define solution specifications and user acceptance test scenarios • Tailored creation of a statement of work (SOW)	• Implement and complete according to specifications and requirements • Provide consultation throughout	• Check whether acquisition, aggregation and distribution of data is correct • Support the user acceptance test (UAT)	• Provide ongoing feedback • Modify Interface when needed

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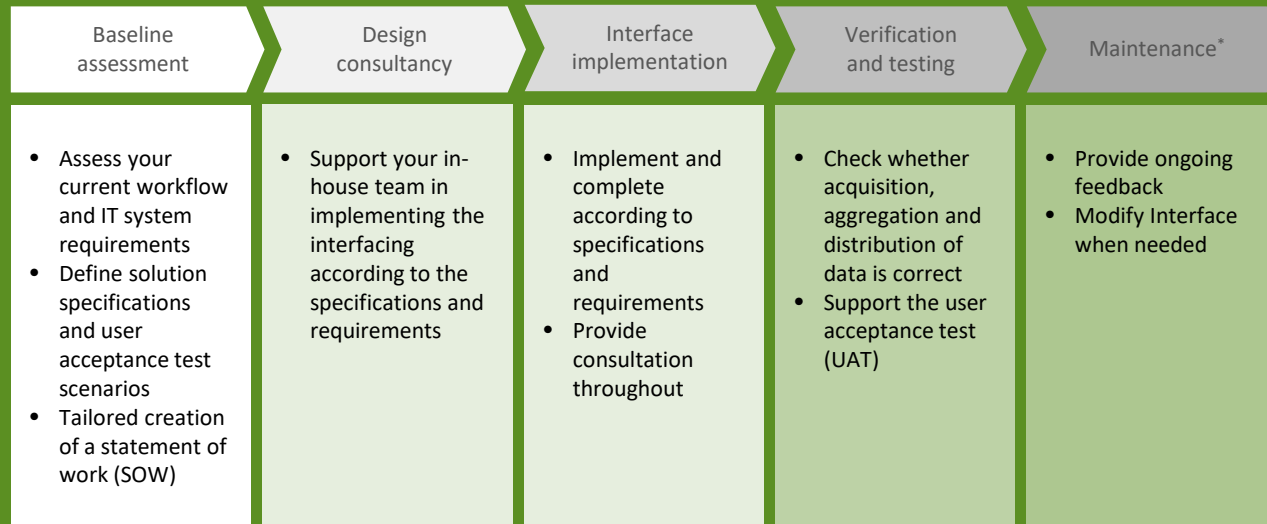
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When you need an interfacing solution from a single source
Customized Interface implementation (via IBE)

How we deliver this service to you:

Baseline assessment	Design consultancy	Interface implementation	Verification and testing	Maintenance*
• Assess your current workflow and IT system requirements • Define solution specifications and user acceptance test scenarios • Tailored creation of a statement of work (SOW)	• Support your in-house team in implementing the interfacing according to the specifications and requirements	• Implement and complete according to specifications and requirements • Provide consultation throughout	• Check whether acquisition, aggregation and distribution of data is correct • Support the user acceptance test (UAT)	• Provide ongoing feedback • Modify Interface when needed

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Interfacing services that make the most of your existing infrastructure

Interface design services using a hospital broker

How we deliver this service to you:

Baseline assessment	Design consultancy	Verification and testing
• Assess your current workflow and IT system requirements • Understand hospital integration engine functionality • Define solution specifications and user acceptance test scenarios • Create a tailored statement of work (SOW)	• Support your in-house team in implementing the interfacing according to the specifications and requirements*	• Check whether acquisition, aggregation and distribution of data is correct • Support the user acceptance test (UAT)*

*The interfacing is implemented using a broker supplied by the hospital.
Philips provides interfacing consultation and support for testing according to the specifications and requirements supplied to Philips by the hospital

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An introduction to interoperability with the Philips Patient Information Center (PIC iX)

PIC iX interoperability: Patient demographics

Reliable interoperability may enhance efficiency and correctness by

- Retrieving patient demographic data during admission at the patient monitor or central station
- Sharing patient demographic data from admission, transfer or discharge at the patient monitoring station

We help you interface – via HL7 or WebService – to make the most of your existing data sources.

PIC iX interoperability: laboratory results, observations (vital signs data), reports, and ECG orders

Reliable interoperability may enhance efficiency of workflows by helping users to

- Check a patient's laboratory results at the patient monitor or central station
- Transfer current and retrospective vital signs data and waveform strips
- Get ECG orders from the HIS / EMR and transfer ECG measurements to the ECG management system

All this can be achieved with IntelliBridge Enterprise interoperability solutions – configured for your healthcare IT environment.

Philips Interoperability Consulting for PIC iX

An overview of the options

Vital signs and observations to your HIS / EMR

Patient demographics to and from your HIS / EMR / regional systems

12-lead ECG orders from your HIS / EMR

Lab results from your LIS / HIS
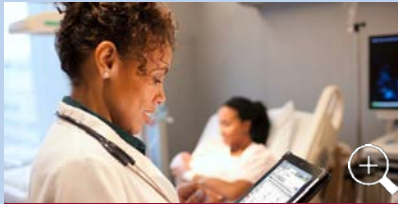
Patient reports to your HIS / EMR

Exchanging data using your HIS WebService*

*Customized quotation according to the HIS WebService specification.

Philips Interoperability Consulting for IntelliBridge Enterprise

An overview of the options

Patient demographics to and from your HIS / EMR / regional systems - ADT HL7 standard interface

- ADT inbound unsolicited interface from HIS / EMR
- ADT inbound solicited interface from HIS / EMR (query interface)
- ADT outbound unsolicited interface to HIS / EMR

Lab results from your LIS / HIS - LAB HL7 standard inbound unsolicited interface from LIS / HIS

Vital signs to your HIS / EMR - observation (device data / patient data) HL7 standard interface

- Observation outbound unsolicited interface to HIS / EMR
- Observation outbound solicited interface to HIS / EMR (query interface)
- Observation inbound unsolicited interface to HIS / EMR
- Observation inbound solicited interface to HIS / EMR (query interface)

Patient reports to your HIS / EMR - document HL7 standard interface

- PIC iX Waveform Strip Export in PDF format to HIS / EMR
- ICCA Document outbound in PDF format to HIS / EMR (file path or embedded)
- ICCA Document inbound in PDF / TEXT / JPG format to HIS / EMR (file path or embedded)

12-lead ECG orders from your HIS / EMR / CPOE – orders HL7 standard interface

- 12-lead ECG order inbound HL7 standard interface

Exchanging (demographics, vital signs, …) using your HIS WebService*

*Customized quotation according to the HIS WebService specification.

Details on the various interfaces for PIC iX

Patient demographics to and from your HIS / EMR / regional systems

ADT HL7 standard interface

- ADT inbound unsolicited interface from HIS / EMR
- ADT inbound solicited interface from HIS / EMR (query interface)
- ADT outbound unsolicited interface to HIS / EMR

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Continual patient demographics
ADT inbound unsolicited interface from HIS / EMR

Understanding needs
Caregivers need to retrieve patient demographic information upon admission at the bedside or central station. Automated retrieval helps them avoid error prone, redundant or inefficient manual work.

Solution design
Our interoperability solution makes demographic information from the HIS available to or via PIC iX. We continually receive patient demographic information in IBE.
Message type: **HL7 ADT**

ADT HL7 (patient demographics)

ADT query

HIS / EMR / clinical system

IntelliBridge Enterprise (IBE)

PIC iX

IntelliVue monitor

IBE database

Patient demographics (ADT)
- First and last name
- ID/SSN
- Gender
- Date of birth

1. The HIS sends the patient demographics to IBE
2. IBE continually receives and stores this data, ready for relay
3. Searching for patient demographics on or via PIC iX triggers a data request to the IBE database (HIF)
4. IBE sends the data to or via PIC iX

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Admission, discharge, and transfer (ADT) at the bedside

Vital signs to your HIS / EMR

Observation (device data / patient data)

HL7 standard interface

- Observation outbound unsolicited interface to HIS / EMR
- Observation outbound solicited interface to HIS / EMR (query interface)

Automating export of observation messages to the HIS or EMR

Observations HL7 outbound unsolicited interface to HIS / EMR (via IBE)

Understanding needs
Users of systems such as HIS or EMR need to receive patient vital signs data.

Solution design
Our interoperability solution enables PIC iX to automatically export observation messages containing vital signs to the HIS or EMR systems on a configured interval timeframe (e.g. every minute). Message type: **HL7 ORU^R01**

IntelliVue monitor

PIC iX

Observation HL7 (ORU)

IntelliBridge Enterprise (IBE)

Observation HL7 (ORU)

HIS / EMR / clinical system

Vitals examples
- HR
- ST-II
- QT
- QTc
- dQTc
- QT-HR
- PVC
- RR
- EctSta
- RhySta

1. The monitor sends the patient vital signs data via PIC iX to IBE
2. IBE periodically transmits the data to the HIS / EMR (for example, once a minute)
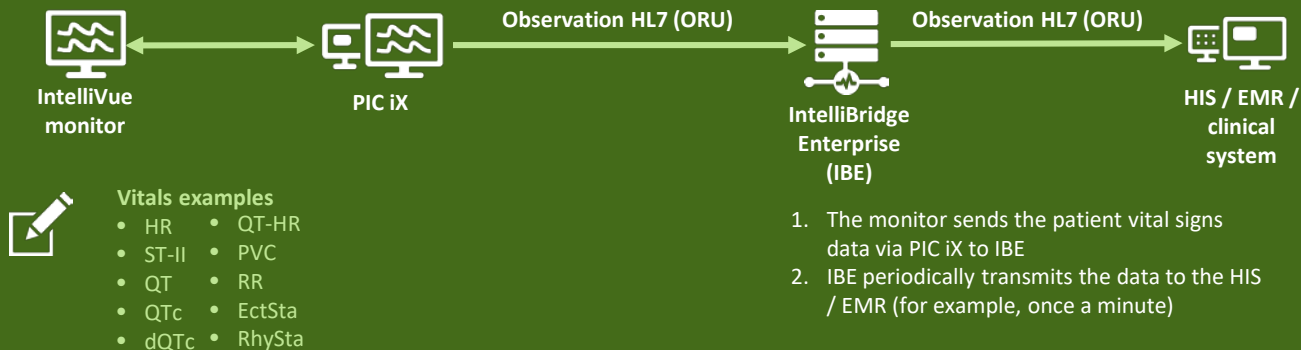
Allowing you to request observation messages on your HIS or EMR

Observations HL7 outbound solicited interface to HIS / EMR (query interface via IBE / HIF)

Understanding needs
Users of systems such as HIS or EMR need patient vital signs data to complete patient records.

Solution design
Our interoperability solution enables PIC iX to make observation messages containing vital signs data accessible to the HIS or EMR when queried. Message type: **HL7 ORU**, **HL7 QRY**

Observation HL7 query (QRY)

HIS / EMR / clinical system

IntelliBridge Enterprise (IBE)

Observation HL7 (ORU)

PIC iX

IntelliVue monitor
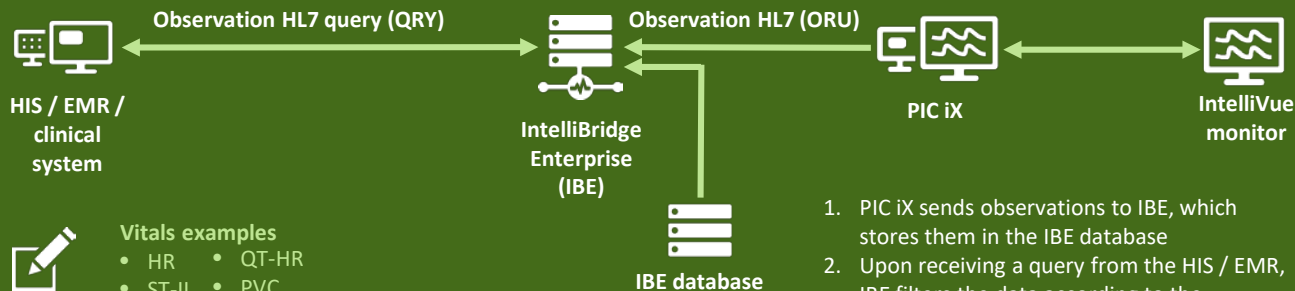
IBE database

Vitals examples
- HR
- ST-II
- QT
- QTc
- dQTc
- QT-HR
- PVC
- RR
- EctSta
- RhySta

1. PIC iX sends observations to IBE, which stores them in the IBE database
2. Upon receiving a query from the HIS / EMR, IBE filters the data according to the parameters of the query (for example, patient identity and time period), and sends the relevant observations to the HIS / EMR

Patient reports to your HIS/EMR

Document HL7 standard interface

- Waveform strip export in PDF format to HIS / EMR (file path)
- Waveform strip export in PDF format to HIS / EMR (embedded)

Exporting waveform strip messages to the HIS or EMR

Waveform strip export format to HIS / EMR – base64 file embedded

Understanding needs
Users of systems such as HIS or EMR need to receive patient waveform strips to have a complete patient record. The waveform is a significant part of the patient record. Users want to see the result immediately in the message received.

Solution design
Our interoperability solution enables PIC iX to export waveform strip messages to HIS or EMR systems. The IBE sends a message with the base64, encrypted, embedded PDF/PNG document to the HIS/EMR.
Message type: **HL7 ORU, HL7 MDM (PDF/PNG embedded)**

IntelliVue monitor → PIC iX → **File + XML file** → PDF file storage → **File + XML file** → IntelliBridge Enterprise (IBE) → **Document export (HL7 ORU or MDM)** → HIS / EMR / clinical system
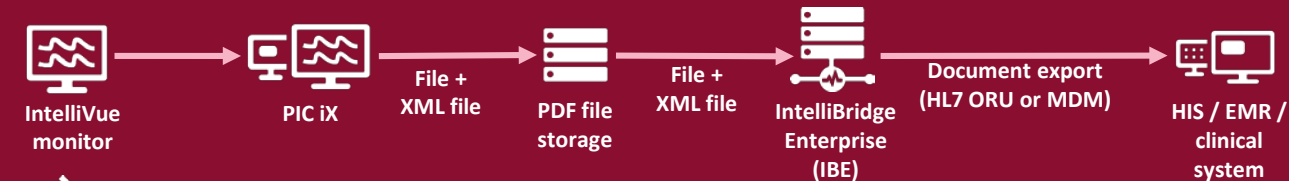
1. The PIC iX saves a report with the patient's waveform strips (such as a PDF or PNG file) to a specified directory
2. IBE sends a message to the HIS / EMR with the document embedded

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EMR wave strip integration

High-resolution
color wave strip

Metadata
results

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Simplified hospital workflow

ECG waveform and document export to the EMR

The old way

| | Send to printer | Cut-n-paste report and waveforms | Clinician signs and files for scanning | Manually send the PDF document to the EMR | EMR |
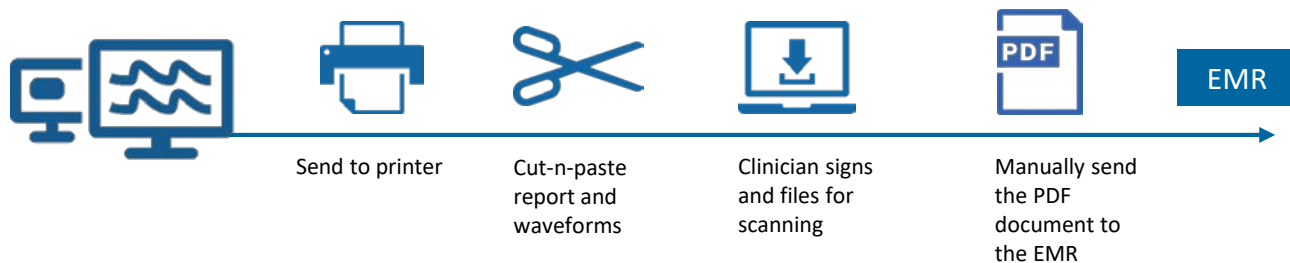
The better way
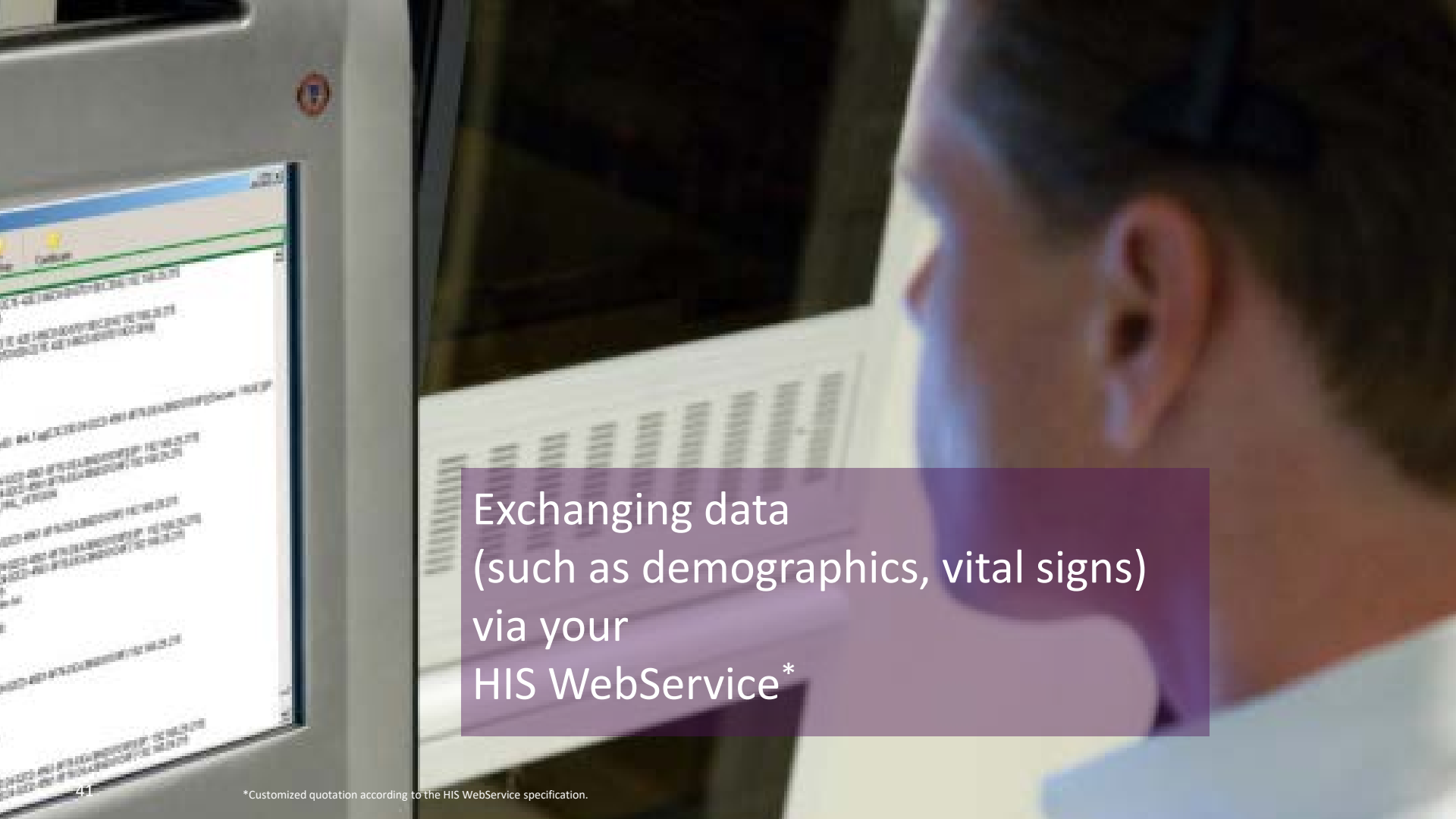
Exchanging data
(such as demographics, vital signs)
via your
HIS WebService*

*Customized quotation according to the HIS WebService specification.

Enabling electronic data interchange via WebService between HIS and PIC iX
Exchanging data via SOAP / XML

Understanding needs
Caregivers need to be aware of patient status. The HIS or EMR only supports the WebService to exchange data (rather than HL7). This can help boost the return on operational infrastructure investments.

Solution design
Our interoperability solution enables the PIC iX and HIS / EMR to communicate via WebService, to send or receive patient demographics and vital signs data.
Communication Protocol: **SOAP / XML**

Patient demographics and / or vital signs

Patient demographics and / or vital signs

IntelliVue monitor

PIC iX

IntelliBridge Enterprise

HIS / EMR / clinical system

IBE database
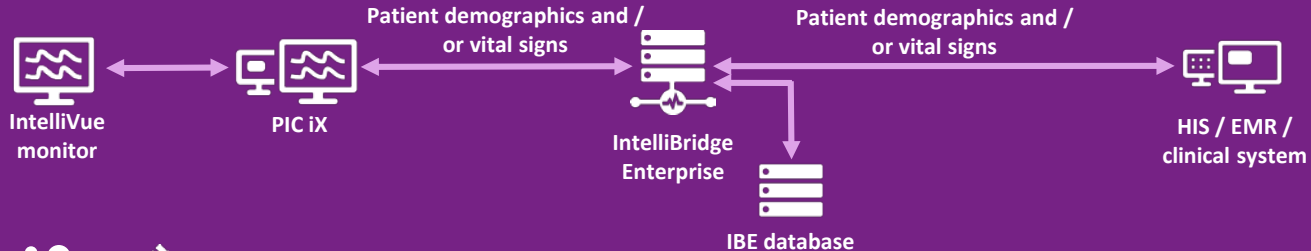
- The search for a patient on PIC iX triggers a demographic data request to the HIS / EMR / regional system via WebService
- Export of vitals signs by PIC iX triggers a transfer to the HIS / EMR / regional system via WebService

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Count on us as your patients count on you

You need:

- Someone who understands your IT and clinical requirements, and sees how important it is that they work together to create value
- Systems that are compliant with the latest standards of communication
- IHE-compliant interfaces that fit your clinical scenarios
- Evidence that a potential supplier can work with you to create the solution you need
- Systems that provide high availability

What Philips can contribute

- Solution architects and specialists with you each step of the way
- Our experts talking to your experts
- Support tailored to match your needs

Solution architects and specialists with you each step of the way

- Proof of concept available as needed
- 24 / 7* support, providing service that is both efficient and high quality
- Consistent team members, for a relationship you can rely on
- A structured approach to solution implementation

① Baseline assessment

Collaborating with your team to perform a baseline assessment of your situation, with extensive consultation to fully understand what you need

② IT consultancy

Guiding and supporting your team during the change and providing advice on IT-relevant questions

③ Verification, testing and training

Conducting testing and potential training during installation to ensure your required specifications are met

④ Deployment

Delivering the tailored deployment package for your environment

* Requires minimum RightFit contract. Conditions apply. Offerings are available in selected countries and for selected products only.

Always there, **always on**

We work as one with your teams to keep your systems running smoothly, seven days a week, if needed.*

- Have confidence in a solution that keeps performing consistently
- Follow a structured approach, for easy implementation and quick access to the applications and systems you need
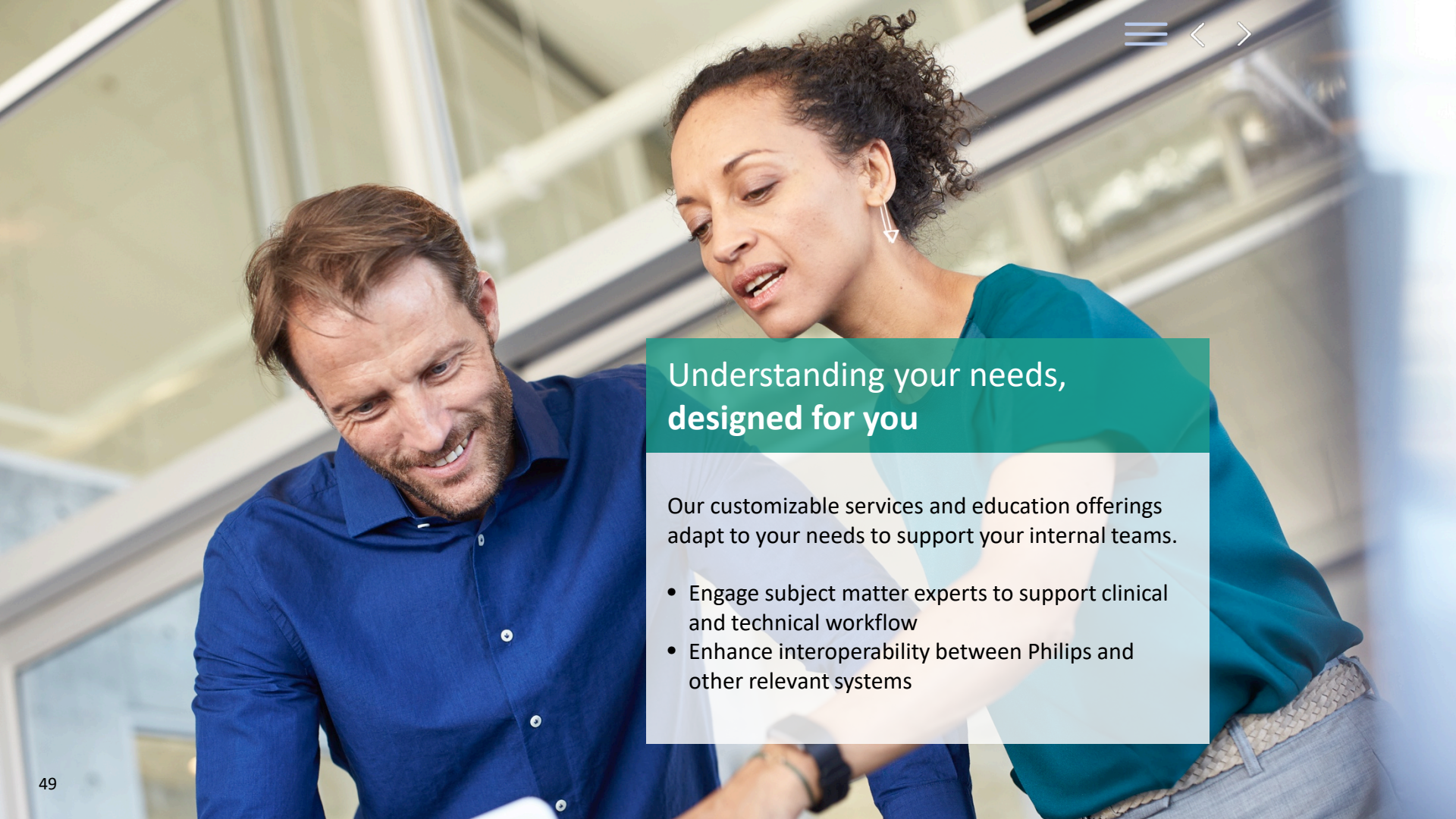
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Experts talking to experts

- More than 50 years of expertise in patient monitoring
- More than 30 years experience in healthcare IT solutions
- Engineers certified to and following IHE standards
- Accredited project and service management methodologies, such as PRINCE2 and ITIL

| **Interfacing delivery** including HL7, DICOM, IHE, CCD, XD5, SAML, FHIR, and many more | More than **2000 interface engagements worldwide** | Our **qualified experts** receive ongoing training and education |

Understanding your needs,
designed for you

Our customizable services and education offerings adapt to your needs to support your internal teams.

- Engage subject matter experts to support clinical and technical workflow
- Enhance interoperability between Philips and other relevant systems
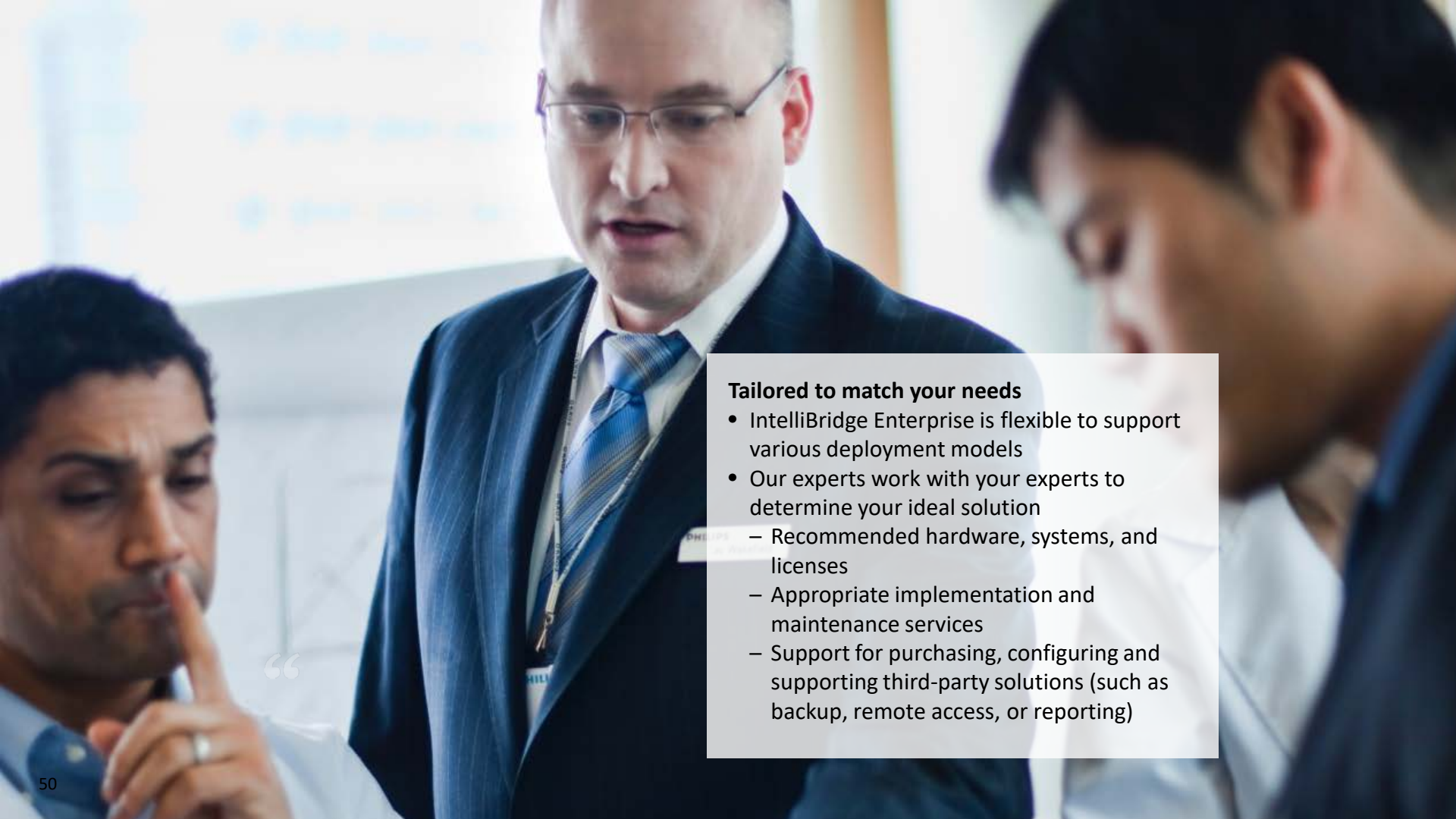
Tailored to match your needs
- IntelliBridge Enterprise is flexible to support various deployment models
- Our experts work with your experts to determine your ideal solution
  – Recommended hardware, systems, and licenses
  – Appropriate implementation and maintenance services
  – Support for purchasing, configuring and supporting third-party solutions (such as backup, remote access, or reporting)

Balancing risk, increasing the return on your investment

We combine decades of experience in patient monitoring and comprehensive IT service knowledge.

Partner with us to maximize utilization and uptime of your systems and ongoing investments.

Support and leverage your infrastructure and investments under the guidance of our experts

Your benefits

Philips Interoperability Consulting

Always there, **always on**	Understanding your needs, **designed for you**	**Sharing risk,** increasing the return on your investment

We work as one with your teams to keep your systems running smoothly, seven days a week, if needed.[*]

- Have confidence in a solution that keeps performing consistently
- Follow a structured approach, for easy implementation and quick access to the applications and systems you need

Our customizable services and education offerings adapt to your needs to support your internal teams.

- Support clinical and technical workflows with experts talking to experts
- Enhance interoperability between systems from Philips and other vendors

Partner with us to maximize utilization and uptime of your systems and ongoing investments.

- Leverage your infrastructure and investments under the guidance of our experts

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The voice of experience

Philips and Health Support Queensland

Whether interoperability or testing is your priority, or you need assistance with interfacing or data-mining services, Philips IT experts make your systems work for you, so you can trust in the solutions which monitor your patients.

Who:
Rob Baisden
Senior Biomedical Engineer and IT Manager
Health Support Queensland (government agency)

Where:
The Princess Alexandra Hospital and the Lady Cilento Children's Hospital

Need:
To interface the patient monitoring solutions with the hospital Infrastructures, and throughout numerous hospital networks within Queensland

Solution:
Philips experts worked with Mr Baisden to provide structured IT services throughout the process, using a phased approach with baseline assessments, consultancy, implementation and verification, training, maintenance, and ongoing support

" Having access to integration specialists when discussing issues has been invaluable – they always understand the root of the problem from a technical perspective"

Rob Baisden, Senior Biomedical Engineer

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Count on us as your patients count on you

Remote services provided to **128 countries/territories** worldwide.

Remote service connections to **100,000+ customer systems.**

7.000 field service engineers worldwide (among the largest in the industry) supporting our customers when and where they need it

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