



NxtGate Enterprise Connector

Product Brochure

Connect Data; Connect Workflow; Connect to Industry Standards

Introduction

The *NxtGate Enterprise Connector* is your first step towards transforming your existing proprietary Information System to the world of medical industry standards – thereby preserving or prolonging your current investment!

The *NxtGate Enterprise Connector* provides the bridge between your existing Hospital Information System (HIS) - or any Information Systems - and standards-based systems in the healthcare IT landscape. The *NxtGate Enterprise Connector* transforms data in the repositories to workflow-based data, hence enabling to interface existing systems to the IHE / HL7 / DICOM conformance systems. These repositories can be common technologies such as the following:

- ✓ *Microsoft MS SQL Database*
- ✓ *Oracle Database*
- ✓ *MySQL Database*
- ✓ *ODBC-compatible Databases*
- ✓ *Microsoft Access*
- ✓ *XML files*
- ✓ *Text files*
- ✓ *Web services*
- ✓ *Proprietary formats*
- ✓ *others ...*

The data content is transformed to standards-based information – depending on the use cases defined. The outcome is to achieve system connectivity via the following industry standards:

- ✓ *HL7*
- ✓ *DICOM*

The support for the above standards enables feasibilities for the existing Information Systems to interface in the IHE landscape – thereby participating in standards-based operating outcome. The Information System is instantly transformed from proprietary and isolation to standards-based information provider and consumer. It is essential to implement open standards to promote functional scalability, hence preserving current investment.

While newer generation of Information Systems offer standards-based system interface capabilities, the same may not hold true for earlier generation of Information Systems. There are also real-world scenarios that locally deployed Information Systems may not support standards-based system interfacing.

A key objective of *NxtGate Enterprise Connector* is to avoid the costly re-investment in Information System. The resulted lower cost barrier enables investment protection of existing (proprietary) Information System, while opening broad range of possibilities to gain alignment with ever-evolving connectivity requirements as well as offering wider use cases and enriched patient experiences.

The NxtGate Enterprise Connector is offered as part of *NxtGate* suite of product and can be ordered as "vmware-only" package. Hardware components already existing at the customer site can be used provided they meet the minimum requirements.



Stay at Forefront of the Trend; Protect Your Investment; Enable Standards-based Workflow

With the fast-paced technology innovations and changing operating environment, current deployment and operations of Information System can be quickly outpaced. With the evolvement of industry technologies and ever-changing operating landscape, the need to acquire best-of-breed solution is fast becoming a necessity. The challenge remains on the ability to provide an integral IT landscape to interface or integrate various IT modules. The *Nxtgate Connector* overcomes the challenges with its elegant broker module to provide the seamless transformation from proprietary to standards-compliant communication in bi-directional format. Coupled with workflow know-how and professional services of the implementation team, the data content can be meaningfully transformed to fulfill workflow requirements as well as adapted to the overall IHE landscape.

Challenges in Today's Environment

Non-Standards based Connectivity – While existing Information System may provide the operational requirement, it remains as an island of information – and at most an island of efficiency. The data is not well communicated to external Information Systems. As a result, data content cannot be communicated for better coordinated services between departments. The desired outcome of quality patient services may not be optimally achieved as such.

Isolated Workflow – The constraints of data extend its impact to the overall workflow of the enterprise. As information cannot be freely communicated, workflow and collaboration between departments within the enterprise may not happen in a effective and efficient manner.

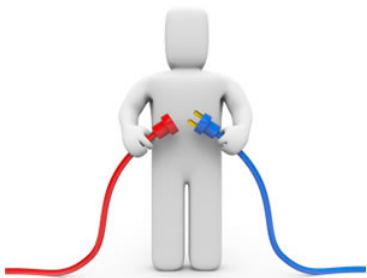
Functional Limitations – Data isolation also creates functional limitations. Without appropriate, meaningful and accurate data, the data cannot be act upon by software applications effectively. In other words, the investment in external software applications or solution cannot be maximized.

Solutions for Today's Challenges

Data Transformation – The *Nxtgate Connector* serves as an adaptor, connecting and transforming the native data repository via its built-in communication mechanism to standards-compliant system interfaces or even other proprietary formats. The process is instant: As soon as new data or modification of data is detected, the transformation kickstarts and the workflow can be initiated with the external systems using the transformed data.

Enabling Workflow – Data – as defined in the appropriate workflow messages – is communicated for the proper purpose timely. Co-ordination of communication and workflow among Information Systems occur meaningfully. Data flow leads to workflow.

Data-driven applications – With the flow of appropriate data between Information Systems, the software applications would be able to maximize the rich content to operate to its full potential.



Wide Range of Use-Cases

The power of *NxtGate Enterprise Connector* goes beyond its capabilities to transform proprietary Information Systems to standards-compliant investment. The outcome of the transformation demonstrates the true values of the connector – the ability to address real-world issues and deliver operational requirements.

Transforming Database to HL7 Communications

It is common to encounter Information System that lacks healthcare-specific communication standards such as HL7. Apart from technical limitations, the lack of domain knowledge of existing (local) vendor posts great challenges to enable meaningful data content to be communicated.

Blended with domain and workflow knowledge from the Professional Services team, NxtGate Enterprise Connector solves the problems with its ability to transform the data content to industry-standard messaging.

Overcome Double-Byte Language Challenges

Local languages are always a great challenge in the world of system interfaces. Substantial effort is often required to perform encoding and decoding of languages for proper communication between systems. Such effort typically requires multiple parties' involvement. The outcome is normally undesirable or incomplete due to the technical complexity involved.

NxtGate Enterprise Connector can process the raw nature of the *database fields* to reduce such difficulties. Subject to the language involved, language translation can also be performed to further communicate the data content to English-based Information Systems.

The Broker between Web Services and HL7

Web Services are common in today's IT world. The *NxtGate Enterprise Connector* facilitates the transformation of data content from the web services to HL7. Of course, the data is always transformed with relevance to workflow or data use-cases in mind.

Transform HL7 ORU to DICOM Structured Report

In a complex system architecture landscape, there can be multiple Information Systems co-existing. Each could require information in specific formats. Diagnostic reports generated from the Radiology Information System (RIS) may be consumed by the Picture Archival and Communication System (PACS) for enriched reading and reporting purposes.

Customized Data Transformation

Seamless data transformation from one proprietary format to another, ensuring system compatibility while maintaining data accuracy and integrity. It offers customizable data mapping to meet specific business requirements without the need for extensive development. By automating the transformation process, it significantly improves efficiency, reducing manual effort and saving time. Additionally, it is designed to handle large volumes of data, making it a scalable solution for businesses with growing data integration needs.

The delivery capabilities of *NxtGate Enterprise Connector* is endless. There is always another real-world issue that can be resolved.



Automate Information Provisioning; Eliminate Error

Hospitals and other medical facilities typically use many different types of Information System Solutions to track and record everything from patient examinations and schedules to report information. In order for these various systems to communicate with each other, they must use a standard and robust interface. *NxtGate* supports both industry's standard interfaces – HL7 and DICOM – enabling you to share information seamlessly with other standards-conformant medical systems. Sharing information eliminates the need to enter the same data multiple times, saving you time while reducing the incidence of data entry errors.

What interface do I need?

It depends on your facility. No two interface projects are identical. That's why we work with you on an individual basis to provide the best possible solution. Our field staffs are trained in managing complex interface deployments. They consult with you to identify your unique interface needs, then assist with project management – from initial specification through testing and go-live – in order to deliver a complete solution.

What is *NxtGate Connect*

NxtGate Connect finds its niche within the Radiology department, enabling the information communication between various HL7 Information Systems with the DICOM devices such as modalities and Picture Archival and Communication System (PACS).

As a system-interface-connecting-hub, *NxtGate Connect* improves workflow and accuracy. It eliminates time consuming manual tasks of data entry at the modality console. It also eliminates data entry errors as a result. It enables imaging systems such as CT, MR, CR, ultrasound or PACS to receive patient demographics and examination data from scheduling applications electronically using a DICOM Worklist service.

NxtGate Connect communicates using industry-standard (HL7 and DICOM) interfaces, providing a robust platform of information communication within the radiology department.

Beyond Boundaries

Through the valuable and practical field experiences gained throughout the years, *NxtGate Connect* is the next generation of cost-effective solution to bridge the information gaps within radiology department.

NxtGate Connect addresses the technical challenges existing with the Information Systems or the modalities.

File-Based Communication

Apart from supporting standard MLLP communication, *NxtGate Connect* also supports file-based communication. Text files can be used as alternatives to communicate HL7 information from the Information Systems.

Practical Business Continuity

NxtGate Connect enables pragmatic business continuity. To ensure business continuity, the configuration is backup for quick restoration during hardware failure. The backup copy can be quickly deployed to provide continual operation of the solution. The approach avoids Windows Clustering solution, hence achieving cost effectiveness.



Radiology KPI Dashboard

Do you know how your department is performing currently? Would you like to know the operational status of your department at your fingertips?

The *NxtGate Connect Dashboard* provides beyond backend system interface. It provides an overview on key performance indicators (KPI) on the operational statuses of your department.

Web-based Dashboard

From any standard workstation within the hospital, you would be able to get up-to-date information on the examinations running through the department. With HTML5 technology, the information can even be presented on your mobile devices such as iPad etc. The information can be made available anywhere, anytime.

Datamine your Throughput

An elegant web-based Graphical User Interface is available to allow easy and quick access to the information residing in the application. Essential information such as status of examination etc can be quickly accessed from any standard PC and web browser application. Datamining function provides ease of extracting data out of the system for further analysis.

NO. EXAMS BY MODALITIES EXAM STATUS BY MODALITIES NO. EXAMS BY ROOMS EXAM STATUS BY ROOM NO. OF PATIENTS INTEGRATED REPORT											
EXAM ROOM: CT ROOM 1											
EXAM ROOM	PATIENT ID	PATIENT NAME	ACCESSION NUMBER	EXAM START DATE	EXAM START TIME	MODALITY	EXAM DESCRIPTION	WAITING TIME	EXAM STATUS		
CT ROOM 1	P001	Test Patient 1	2019001110001	2019001	1000	CT	CT SCAN	100	COMPLETED		
	P002	Test Patient 2	2019001110002	2019001	1010	CT	CT SCAN	110	SCHEDULED		
	P003	Test Patient 3	2019001110003	2019001	1020	CT	CT SCAN	120	SCHEDULED		
	P004	Test Patient 4	2019001110004	2019001	1030	CT	CT SCAN	130	SCHEDULED		
	P005	Test Patient 5	2019001110005	2019001	1040	CT	CT SCAN	140	SCHEDULED		
	P006	Test Patient 6	2019001110006	2019001	1050	CT	CT SCAN	150	SCHEDULED		
	P007	Test Patient 7	2019001110007	2019001	1100	CT	CT SCAN	160	SCHEDULED		
	P008	Test Patient 8	2019001110008	2019001	1110	CT	CT SCAN	170	SCHEDULED		
	P009	Test Patient 9	2019001110009	2019001	1120	CT	CT SCAN	180	SCHEDULED		
	P010	Test Patient 10	2019001110010	2019001	1130	CT	CT SCAN	190	SCHEDULED		
Summary for EXAM ROOM CT ROOM 1 - 1000-1100											
EXAM ROOM: MR 2											
PATIENT ID	PATIENT NAME	ACCESSION NUMBER	EXAM START DATE	EXAM START TIME	MODALITY	EXAM DESCRIPTION	WAITING TIME	EXAM STATUS			
MR 2	P011	Test Patient 11	2019001110011	2019001	1200	CT	CT SCAN	370	COMPLETED		
	P012	Test Patient 12	2019001110012	2019001	1210	CT	CT SCAN	380	SCHEDULED		
	P013	Test Patient 13	2019001110013	2019001	1220	CT	CT SCAN	390	SCHEDULED		
	P014	Test Patient 14	2019001110014	2019001	1230	CT	CT SCAN	400	SCHEDULED		
	P015	Test Patient 15	2019001110015	2019001	1240	CT	CT SCAN	410	SCHEDULED		
	P016	Test Patient 16	2019001110016	2019001	1250	CT	CT SCAN	420	SCHEDULED		
	P017	Test Patient 17	2019001110017	2019001	1300	CT	CT SCAN	430	SCHEDULED		
	P018	Test Patient 18	2019001110018	2019001	1310	CT	CT SCAN	440	SCHEDULED		
	P019	Test Patient 19	2019001110019	2019001	1320	CT	CT SCAN	450	SCHEDULED		
	P020	Test Patient 20	2019001110020	2019001	1330	CT	CT SCAN	460	SCHEDULED		
Summary for EXAM ROOM MR 2 - 1200-1300											
EXAM ROOM: MR 3											
PATIENT ID	PATIENT NAME	ACCESSION NUMBER	EXAM START DATE	EXAM START TIME	MODALITY	EXAM DESCRIPTION	WAITING TIME	EXAM STATUS			
MR 3	P021	Test Patient 21	2019001110021	2019001	1400	MR	MR CT SCAN	570	SCHEDULED		
	P022	Test Patient 22	2019001110022	2019001	1410	MR	MR CT SCAN	580	SCHEDULED		
	P023	Test Patient 23	2019001110023	2019001	1420	MR	MR CT SCAN	590	SCHEDULED		
	P024	Test Patient 24	2019001110024	2019001	1430	MR	MR CT SCAN	600	SCHEDULED		
	P025	Test Patient 25	2019001110025	2019001	1440	MR	MR CT SCAN	610	SCHEDULED		
	P026	Test Patient 26	2019001110026	2019001	1450	MR	MR CT SCAN	620	SCHEDULED		
	P027	Test Patient 27	2019001110027	2019001	1500	MR	MR CT SCAN	630	SCHEDULED		
	P028	Test Patient 28	2019001110028	2019001	1510	MR	MR CT SCAN	640	SCHEDULED		
	P029	Test Patient 29	2019001110029	2019001	1520	MR	MR CT SCAN	650	SCHEDULED		
	P030	Test Patient 30	2019001110030	2019001	1530	MR	MR CT SCAN	660	SCHEDULED		
Summary for EXAM ROOM MR 3 - 1400-1500											
EXAM ROOM: XRAY ROOM 1											
PATIENT ID	PATIENT NAME	ACCESSION NUMBER	EXAM START DATE	EXAM START TIME	MODALITY	EXAM DESCRIPTION	WAITING TIME	EXAM STATUS			
XRAY ROOM 1	P031	Test Patient 31	2019001110031	2019001	1600	DX	DX	AF	AF	SCHEDULED	
	P032	Test Patient 32	2019001110032	2019001	1610	DX	DX	AF	AF	SCHEDULED	
	P033	Test Patient 33	2019001110033	2019001	1620	DX	DX	AF	AF	SCHEDULED	
	P034	Test Patient 34	2019001110034	2019001	1630	DX	DX	AF	AF	SCHEDULED	
	P035	Test Patient 35	2019001110035	2019001	1640	DX	DX	AF	AF	SCHEDULED	
	P036	Test Patient 36	2019001110036	2019001	1650	DX	DX	AF	AF	SCHEDULED	
	P037	Test Patient 37	2019001110037	2019001	1700	DX	DX	AF	AF	SCHEDULED	
	P038	Test Patient 38	2019001110038	2019001	1710	DX	DX	AF	AF	SCHEDULED	
	P039	Test Patient 39	2019001110039	2019001	1720	DX	DX	AF	AF	SCHEDULED	
	P040	Test Patient 40	2019001110040	2019001	1730	DX	DX	AF	AF	SCHEDULED	
Summary for EXAM ROOM XRAY ROOM 1 - 1600-1700											
EXAM ROOM: XRAY ROOM 2											
PATIENT ID	PATIENT NAME	ACCESSION NUMBER	EXAM START DATE	EXAM START TIME	MODALITY	EXAM DESCRIPTION	WAITING TIME	EXAM STATUS			
XRAY ROOM 2	P041	Test Patient 41	2019001110041	2019001	1800	DX	DX	AF	AF	SCHEDULED	
	P042	Test Patient 42	2019001110042	2019001	1810	DX	DX	AF	AF	SCHEDULED	
	P043	Test Patient 43	2019001110043	2019001	1820	DX	DX	AF	AF	SCHEDULED	
	P044	Test Patient 44	2019001110044	2019001	1830	DX	DX	AF	AF	SCHEDULED	
	P045	Test Patient 45	2019001110045	2019001	1840	DX	DX	AF	AF	SCHEDULED	
	P046	Test Patient 46	2019001110046	2019001	1850	DX	DX	AF	AF	SCHEDULED	
	P047	Test Patient 47	2019001110047	2019001	1900	DX	DX	AF	AF	SCHEDULED	
	P048	Test Patient 48	2019001110048	2019001	1910	DX	DX	AF	AF	SCHEDULED	
	P049	Test Patient 49	2019001110049	2019001	1920	DX	DX	AF	AF	SCHEDULED	
	P050	Test Patient 50	2019001110050	2019001	1930	DX	DX	AF	AF	SCHEDULED	
Summary for EXAM ROOM XRAY ROOM 2 - 1800-1900											
EXAM ROOM: XRAY ROOM 3											
PATIENT ID	PATIENT NAME	ACCESSION NUMBER	EXAM START DATE	EXAM START TIME	MODALITY	EXAM DESCRIPTION	WAITING TIME	EXAM STATUS			
XRAY ROOM 3	P051	Test Patient 51	2019001110051	2019001	2000	DX	DX	AF	AF	SCHEDULED	
	P052	Test Patient 52	2019001110052	2019001	2010	DX	DX	AF	AF	SCHEDULED	
	P053	Test Patient 53	2019001110053	2019001	2020	DX	DX	AF	AF	SCHEDULED	
	P054	Test Patient 54	2019001110054	2019001	2030	DX	DX	AF	AF	SCHEDULED	
	P055	Test Patient 55	2019001110055	2019001	2040	DX	DX	AF	AF	SCHEDULED	
	P056	Test Patient 56	2019001110056	2019001	2050	DX	DX	AF	AF	SCHEDULED	
	P057	Test Patient 57	2019001110057	2019001	2100	DX	DX	AF	AF	SCHEDULED	
	P058	Test Patient 58	2019001110058	2019001	2110	DX	DX	AF	AF	SCHEDULED	
	P059	Test Patient 59	2019001110059	2019001	2120	DX	DX	AF	AF	SCHEDULED	
	P060	Test Patient 60	2019001110060	2019001	2130	DX	DX	AF	AF	SCHEDULED	
Summary for EXAM ROOM XRAY ROOM 3 - 2000-2100											
EXAM ROOM: XRAY ROOM 4											
PATIENT ID	PATIENT NAME	ACCESSION NUMBER	EXAM START DATE	EXAM START TIME	MODALITY	EXAM DESCRIPTION	WAITING TIME	EXAM STATUS			
XRAY ROOM 4	P061	Test Patient 61	2019001110061	2019001	2200	DX	DX	AF	AF	SCHEDULED	
	P062	Test Patient 62	2019001110062	2019001	2210	DX	DX	AF	AF	SCHEDULED	
	P063	Test Patient 63	2019001110063	2019001	2220	DX	DX	AF	AF	SCHEDULED	
	P064	Test Patient 64	2019001110064	2019001	2230	DX	DX	AF	AF	SCHEDULED	
	P065	Test Patient 65	2019001110065	2019001	2240	DX	DX	AF	AF	SCHEDULED	
	P066	Test Patient 66	2019001110066	2019001	2250	DX	DX	AF	AF	SCHEDULED	
	P067	Test Patient 67	2019001110067	2019001	2300	DX	DX	AF	AF	SCHEDULED	
	P068	Test Patient 68	2019001110068	2019001	2310	DX	DX	AF	AF	SCHEDULED	
	P069	Test Patient 69	2019001110069	2019001	2320	DX	DX	AF	AF	SCHEDULED	
	P070	Test Patient 70	2019001110070	2019001	2330	DX	DX	AF	AF	SCHEDULED	
Summary for EXAM ROOM XRAY ROOM 4 - 2200-2300											
EXAM ROOM: XRAY ROOM 5											
PATIENT ID	PATIENT NAME	ACCESSION NUMBER	EXAM START DATE	EXAM START TIME	MODALITY	EXAM DESCRIPTION	WAITING TIME	EXAM STATUS			
XRAY ROOM 5	P071	Test Patient 71	2019001110071	2019001	2400	DX	DX	AF	AF	SCHEDULED	
	P072	Test Patient 72	2019001110072	2019001	2410	DX	DX	AF	AF	SCHEDULED	
	P073	Test Patient 73	2019001110073	2019001	2420	DX	DX	AF	AF	SCHEDULED	
	P074	Test Patient 74	2019001110074	2019001	2430	DX	DX	AF	AF	SCHEDULED	
	P075	Test Patient 75	2019001110075	2019001	2440	DX	DX	AF	AF	SCHEDULED	
	P076	Test Patient 76	2019001110076	2019001	2450	DX	DX	AF	AF	SCHEDULED	
	P077	Test Patient 77	2019001110077	2019001	2500	DX	DX	AF	AF	SCHEDULED	
	P078	Test Patient 78	2019001110078	2019001	2510	DX	DX	AF	AF	SCHEDULED	
	P079	Test Patient 79	2019001110079	2019001	2520	DX	DX	AF	AF	SCHEDULED	
	P080	Test Patient 80	2019001110080	2019001	2530	DX	DX	AF	AF	SCHEDULED	
Summary for EXAM ROOM XRAY ROOM 5 - 2400-2500											

Common Issues Addressed

HIS / RIS cannot support MLLP protocol communication

- ✓ *NxtGate Connect* supports file-based communication to overcome the technical challenge.

Specific information needs to be provided to the modalities, but HIS/RIS cannot send the information according to defined specification

- ✓ *NxtGate Connect* provides library of data-mapping ensuring that workflow objectives are met.

Can I filter information to be received by modalities or PACS

- ✓ *NxtGate Connect* provides inbound and outbound message customization capabilities. Queries from modalities can be fine-tuned, while outgoing messages can also be customized to address DICOM compatibility issues at the modalities.

What is the advantage of having a VMWare approach?

- ✓ The deployment is made much easier. In addition, the finalized VMWare session can be saved as an offline copy. In the event that the server hardware fails, the offline copy can be quickly deployed to facilitate business continuity.

How can project schedule be enhanced with the solution?

The HIS/RIS supplier can provide HL7 text messages to our interface specialist even when the server hardware is not yet ready. Our interface specialists would be able to start working on validating the HL7 messages offsite. Hence, the project schedule can be enhanced without causing bottleneck to the project schedule.

Technical Recommendations

Standard use configuration

Processor: 1 x Quadcore CPU

RAM: 16 GB

Hard Disk (Operating System): 300 GB

Hard Disk (Data): 300 GB

Intensive use configuration (multiple modalities, 24/7 use)

Processor: 2 x Quadcore CPU

RAM: 32 GB

Hard Disk (Operating System): 2 x 300 GB RAID1

Hard Disk (Data): 2 x 300 GB RAID1



A Singapore Quality Company