SIEMENS

syngo.plaza
VB10A

SY

HL7 Conformance Statement

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1 Introduction

1.1 Purpose

This document gives a compact view to the HL7 interface provided by *syngo*.plaza. The HL7 interface of *syngo*.plaza is based on the requirements and suggestions of the IHE Framework [1], in regards to supported message types.

Hint: Messages, which do not 100% comply with the definition of IHE, but contain the minimum required information as per definition of *syngo*.plaza, will nevertheless be processed.

1.2 Audience

This document is intended for hospital IT staff and health system integrators, software designers or implementers. It is assumed that the reader has some basic understanding of HL7 and IHE.

1.3 Definitions, Terms and Abbreviations

1.3.1 Abbreviations

ADT	**A**dmission, **D**iscarge, **T**ransfer
DICOM	**D**igital **I**maging & **Com**munication in Medicine
HL7	**H**ealth **L**evel **Seven**
HIS	**H**ospital **I**nformation **S**ystem
IHE	**I**ntegrating the **H**ealthcare **E**nterprise
ISO	**I**nternational **S**tandards **O**rganization
IS	**I**nformation **S**ystem
ISR	**I**maging **S**ervice **R**equest
NHS	**N**ational **H**ealth **S**ervice
OEM	**O**riginal **E**quipment **M**anufacturer
ORM	**O**rder **R**equest **M**essage
OSI	**O**pen **S**ystems **I**nterconnection
PACS	**P**icture **A**rchiving and **C**ommunication **S**ystem
PID	**P**atient **Id**entifier- segment within ADT and ORM
PPS	**P**erformed **P**rocedure **S**tep
RIS	**R**adiology **I**nformation **S**ystem
RP	**R**equested **P**rocedure
SPS	**S**cheduled **P**rocedure **S**tep
TCO	**T**otal **C**ost of **O**wnership
XML	**E**xtensible **M**ark-up **L**anguage

1.3.2 Definition and Terms

ADT **A**dmission, **D**ischarge, **T**ransfer. A record type used by the HL7 standard for communication of admission of patients into the hospital, discharges from hospital or internally transfer of patients in the hospital.

EVN The **EV**e**N**t segment is a part of a HL7 message. Its purpose is to message the pragmatic intention (called "event") of the message. Example: a transfer of a patient to a different location will have an event code "A02" which means in HL7 a "transfer".

HL7 HL7 is a standard for information exchange between medical applications. It is an abbreviation of "**H**ealth **L**evel **Seven**" which stands for the 7th OSI layer protocol for the health environment. The HL7 protocol defines the format and the content of the messages that applications have to pass to one another under various conditions.
Example: a message is send from a central information system to a subsystem that a patient has been admitted in a hospital.

IHE **I**ntegrating the **H**ealthcare **E**nterprise is an initiative designed to stimulate the integration of the information systems that support modern healthcare institutions.

IP **I**nternet **P**rotocol (IP) is a wide spread network protocol and base of the internet. It defines the routing of the data communication from one computer through the network to another computer. It is working in the "network layer" which is level 3 of the ISO / OSI model.

ISR An **I**maging **S**ervice **R**equest includes pertinent specific and general information. Each instance of an Imaging Service Request carries the information common to one or more Requested Procedures requested at the same moment. For further information please refer to [3].

MRG The **M**e**RG**e segment is a part of an HL7 merge message. In this segment a second patient will be referenced which is to be merged with the first patient referenced in the PID segment. The patient from PID segment will inherit all information from the other patient while the patient from MRG segment will become obsolete.

MLP MLP stands for **M**inimal **L**ayer **P**rotocol. See chapter 4.2.1 for details.

MSH The **M**e**s**sage **H**eader segment is the starting part of each HL7 message.

OBR The **ob**servation **r**equest segment is a part of an HL7 order message.

OEM An **O**riginal **E**quipment **M**anufacturer is a company that produces a component that is used and resold by another company (a so called "retailer").

ORC The common order segment or sometimes called **or**der **c**ontrol is a part of an HL7 order message.

ORM An HL7 **Or**der **M**essage. It will also be referred to as an "Order" or "HL7 Order" in this document.

OSI OSI is the abbreviation for the **O**pen **S**ystems **I**nterconnection Reference Model, which is a model to describe communication in a network. Communication will be abstracted in seven logical layers. Each layer has a description on its usage and purpose.

PV1 The **P**atient **V**isit **1** segment is a part of an HL7 patient related message.

RP A **R**equested **P**rocedure is an instance of a Procedure of a given Procedure Type. An instance of a Requested Procedure includes all of the items of

information that are specified by an instance of a Procedure Plan that is selected for the Requested Procedure by the imaging service provider. For further information please refer to [3].

SPS   A Modality **S**cheduled **P**rocedure **S**tep is an arbitrarily defined scheduled unit of service, which is specified by the Procedure Plan for a Requested Procedure. A Modality Scheduled Procedure Step prescribes the Protocol which may be identified by one or more protocol codes. A Modality Scheduled Procedure Step involves equipment (e.g. imaging Modality equipment, anesthesia equipment, surgical equipment, and transportation equipment), human resources, consumable supplies, location, and time (e.g. start time, stop time, duration). For further information please refer to [3].

TCO   **T**otal **C**ost of **O**wnership is a financial estimate whose purpose is to help consumers and enterprise managers determine direct and indirect costs of a product or system. TCO not only includes the cost of the initial purchase but same all costs of later use like energy, management, maintenance, training and costs of removal and final disposal of the system.

TCP   **T**ransmission **C**ontrol **P**rotocol TCP provides reliable, ordered delivery of a stream of bytes from a program on one computer to another program on another computer. It is working on the "transport layer" which is level 4 of the layers of the ISO/OSI model (see above).

ZDS   Is a SIEMENS specific HL7 segment. All segments starting with letter "**Z**" are vendor specific and not a part of the official standard. DS stands for "**D**ICOM **S**egment".

ZSC   Is a SIEMENS specific HL7 segment. All segments starting with letter "**Z**" are vendor specific and not a part of the official standard. SC stands for "**S**ervice **C**ommon".

1.4 References

[1] IHE Radiology Framework, Vol. I – IV

[2] HL7 Messaging Standard, Version 2.3.1;
especially: chapter 2 Control / Query,
chapter 3 Patient Administration,
chapter 4 Order Entry,
chapter 7 Observation Reporting.
Available at http://www.hl7.org/implement/standards/product_section.cfm?section=3

[3] DICOM - NEMA PS3 / ISO 12052, Digital Imaging and Communications in Medicine (DICOM) Standard, National Electrical Manufacturers Association, Rosslyn, VA, USA
Available at http://medical.nema.org/

2 General information

Siemens offers modalities and advanced HIS, RIS, PACS, and Processing features for all imaging needs in radiology and cardiology:

- *syngo* Workflow drives the radiological workflow from order entry to image and report distribution.

- *syngo* Dynamics is a multi-modality, dynamic image review, diagnosis and archiving system for cardiology, general imaging and obstetrics/gynecology.

- *syngo*.via enables advanced visualization for routine reading, combines modalities while reading and stays ahead with lowest TCO.

- *syngo*.plaza is a modular, scalable PACS solution for highest customer demands with focus on workflow, speed and usability.

*syngo.*plaza, which is in focus of this Conformance Statement, provides a set of interfaces for tight integration with radiology information systems.

- The user interfaces of the RIS and the PACS can run on the same workplace. While the physician is reporting the images both systems should display the same patient context. An OEM interface can be used to realize this workplace frontend integration. The user will see RIS and PACS programs as one program which is tightly interacting with the other part.
  If the user is working in the RIS on a patient exam list then the RIS can tell the *syngo*.plaza via the *syngo*.plaza OEM interface to opens the images for these exams. When the user is working in *syngo*.plaza and opening exams then it can tell the RIS via RIS' OEM interface to open more information about the same patient.

- For backend communication there is a bi-directional interface via HL7 messages available. An external information system can inform *syngo*.plaza on changes of patient demographics, scheduled exams and reports. *syngo*.plaza can send notification on new arrived images to external systems.

- *syngo*.plaza can use a DICOM Basic Worklist Management Services[1] to request planed exams from an information system (that is: HIS, RIS).

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[1] For detailed description of "DICOM Basic Worklist Management Services" see [3] PS3.4 Annex K

3 Overview

*syngo.*plaza supports the following features and messages in regards to the HL7 communication:

- Patient Update   messages: ADT^A02, ADT^A08, ADT^A40
- Patient Merge   messages: ADT^A40 or ADT^A18
- Planned examinations   messages: ORM^O01
- Image Notifications   messages: ORU^R01

For the definition of these interfaces, IHE was used as a basis, therefore *syngo.*plaza expects the Patient Update or Merge messages from the Information System to be compliant to IHE semantics.

For an overview about all supported IHE actors/profiles, please have a look at the IHE Integration Statement published at www.siemens.com/ihe.

3.1 Supported Messages

The table below provides an overview about all HL7 messages, which are supported by *syngo.*plaza.

Message	Description	Segment Decomposition
Supported inbound messages		
ADT^A02	Patient Transfer	MSH, EVN, PID, PV1
ADT^A08	Patient Update	MSH, EVN, PID, [PV1]
ADT^A40	Merge Patient – patient ID list	MSH, EVN, PID, MRG
ADT^A18	Merge Patient Information (message retained for backward compatibility)	MSH, EVN, PID, MRG
ORM^O01	General Order Message	MSH, EVN, PID, [PV1], ORC, OBR, ZDS
Supported outbound messages		
ORU^R01	Unsolicited Transmission of an observation	MSH, PID, ORC, OBR, ZSC

Table 1: Overview of supported messages

Table above shows minimum required (and used) segments.

Additional segments will be ignored.

3.2 Acknowledgment behavior

If a message is sent to *syngo.*plaza which is not supported (e.g. messages for financial management from HL7 chapter 6) or a mandatory attribute in a message is missing (e.g. Patient ID), *syngo.*plaza will nevertheless reply with an HL7 ACK (ACK=acknowledge) in order to avoid blocking the connection queue. The unsupported message will be stored within the backlog of the HL7 communication gateway.

4 Implementation Details

4.1 HL7 Version

Generally *syngo.*plaza will expect HL7 version 2.3.1 as this version is required by IHE Radiology Framework. But messages based on version 2.4 and 2.5 will also be processed.

4.2 Configuration

4.2.1 Minimal Layer Protocol

The *syngo.*plaza HL7 interface uses HL7's Minimal Layer Protocol (MLP) protocol over TCP/IP to receive and send messages. Briefly, message body is encoded using transaction framing starting with `0xB` (hexadecimal characters) and ending with `0x1C+0xD` (hexadecimal characters).

Transmission Start	**Transmission Body**										**Transmission End**	
0xB	A	B	C	D	E	…					0x1C	0xD

Figure 1: Encoding message using MLP

Such encoded transactions are then sent to (or received from) a TCP/IP port at the *syngo.*plaza HL7 interface.

4.2.2 Sending HL7 Messages to *syngo*.plaza

MLP encoded HL7 messages have to be sent to the port[2] number `2200` at the *syngo.*plaza HL7 interface. Note that the TCP connection is permanent and the interface port is blocked as long as the IS is connected to it (dedicated connection).
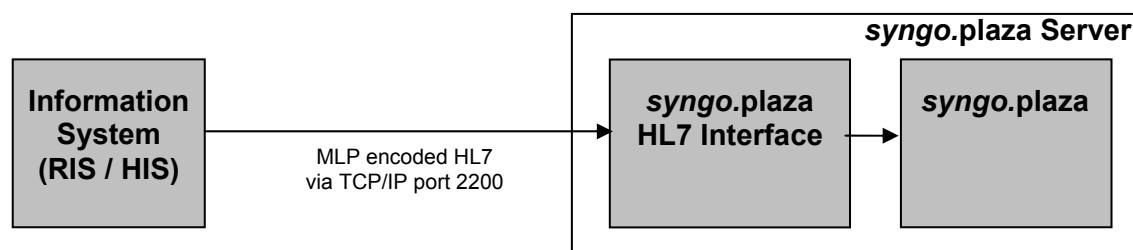
Figure 2: Sending incoming HL7 messages from information system to syngo.plaza

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[2] *syngo.*plaza can be customized to have a different port than 2200 for incoming messages

4.2.3 Sending HL7 Messages out of *syngo*.plaza

MLP encoded HL7 messages are sent to a receiving port of the information system.

The IP-address and the TCP port of the receiving system have to be defined by the manufacturer / implementer of the other system. Both have to be configured in the *syngo*.plaza HL7 interface.

Note that the TCP connection is permanent and the interface port is blocked as long as the IS is connected to it (dedicated connection).
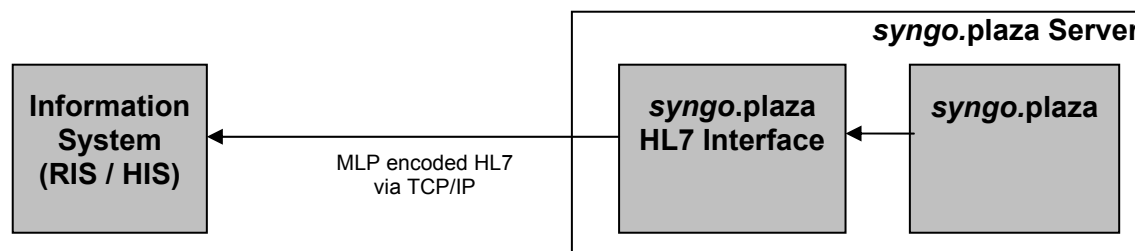
Figure 3: Sending outgoing HL7 messages from syngo.plaza to external Information System

4.2.4 General message syntax

Segment terminator

All HL7 messages consist of a sequence of segments. As usual in HL7 communication *syngo*.plaza will expect a single "carriage return" character (that is ASCII character 13 in decimal, 0x0D in hex) to be the delimiter of segments.

Computers running Microsoft operating systems will have "carriage return (CR)" + "line feed (LF) (that is ASCII 13+10 / 0x0d0a) as separator of lines in text files.

Messages containing CR+LF as delimiters of segments (like in text-files) are invalid according to HL7 definition (see table cited from HL7-standard, below).

Note: Messages containing CR+LF will be skipped/ignored by *syngo*.plaza!

Further separators
The delimiters of fields and components are defined in the message header field 1.

syngo.plaza will expect the following delimiters:

Delimiter	Suggested Value	Encoding Character Position	Usage
Segment Terminator	<cr> hex 0D	-	Terminates a segment record. This value cannot be changed by implementors.
Field Separator			-	Separates two adjacent data fields within a segment. It also separates the segment ID from the first data field in each segment.
Component Separator	^	1	Separates adjacent components of data fields where allowed.
Subcomponent Separator	&	4	Separates adjacent subcomponents of data fields where allowed. If there are no subcomponents, this character may be omitted.
Repetition Separator	~	2	Separates multiple occurrences of a field where allowed.
Escape Character	\	3	Escape character for use with any field represented by an ST, TX or FT data type, or for use with the data (fourth) component of the ED data type If no escape characters are used in a message, this character may be omitted. However, it must be present if subcomponents are used in the message.

Table 2: Delimiter values (cited from [2], chapter 2, figure 2-1)

Note:
Please note the column "encoding character position".
A typical message should start "`MSH|^~\&|`…".

However, *syngo*.plaza will have the suggested values implemented as fixed values.
Changing these to different delimiters will not be supported.

Handling of examples in this document

Consider this example message:

```
MSH|^~\&|RIS|RIS|PACS|PACS|20120205224440||ADT^A02|Nos81uQgoJ4wVJ9nuOgoUw|P|2.3.1
EVN|A02|201202171139
PID|1||RAD001234||Långstrump^Pippilotta Viktualia Rullgardina Krusmynta …
Efraimsdotter||19670511|M|||Henkestr. 127^^91056^Erlangen^D
PV1|1|E|ONKO-C3|||||||||||||||||||||001234/2012|||||||||||||||||||||||||||||||||||||||V
```

Line breaks will be treated as segment terminators inside example messages of this
document. For some examples the segment might be too long to fit on one document line.
If a segment breaks up to two lines then the line will end with "…" at the breaking position.
The PID segment above (marked in bold letters) is an example of a segment spreading on
two lines.

4.3 Restrictions

- Exactly one information system can connect to the HL7 interface provided by
  standard *syngo*.plaza.

- *syngo*.plaza does not support multiple assigning authorities.

4.4 Uniqueness of Patient ID

In healthcare facilities (hospitals, practices etc.) the identification of patients is based on
identifiers attached to a patient. These identifiers are called "patient identifier" or "Patient ID"
or sometimes "Medical Record Number". They can be alphanumeric or just an ascending
number. The institution that creates such an identifier is called "Assigning Authority".

A patient identifier is considered "unique" if:

- For each patient identifier there is maximal one patient in real life.

- Each patient in real life shall have maximal one patient identifier.

In a heterogeneous system environment of multiple information systems and interchange
with other hospitals and/or healthcare providers there are multiple sources for identifiers.

These sources (assigners) of identifiers can be:

- Hospital Information System (HIS) of the own institution

- Departmental systems like Radiology Information System[3] (RIS) of the own institution

- External Information Systems (HIS / RIS) of other providers, in case

  - the patient brings in foreign images on CD

  - foreign images get sent via teleradiology

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[3] Institution can have multiple RIS and/or other departmental information systems

- Modalities, in case of manual registration of the patient at a modality

Each information system will assign its own identifiers. The range of identifiers from one system can overlap with the identifiers by a second system. This especially will happen if the identifiers are just an ascending number starting with number "1" for the first patient.

This means that there is a risk that the identifiers will **not** be unique and an identifier will reference two different patients (from/at different source systems). If information (e.g. images) is identified only by the patient identifier then it may happen that the images are stored under the wrong patient record.

Warning

This risk has to be mitigated by either:

- Setting up policies for importing foreign data (e.g. reconciliation of data) and manual registration at modalities (e.g. use a prefix for patient identifier) to ensure the uniqueness of the patient identifier, or

- Using additional attributes for patient identification (e.g. patient identifier together with patient-name)

Note

Siemens strongly advises to use the patient identifier plus the patient name to address a patient. See also next chapter.

4.5 Patient Identification

If patient records are either created or updated at the RIS, *syngo.*plaza tries to find a matching existing patient. If it finds either of that, it performs an update rather than creating a new patient record.

To match a patient record, the search mechanism can be configured to one of these two options:

- **Patient ID plus patient name matching (SIEMENS suggested setting)**
  The patient ID from HL7 field PID-3 together with the patient name from field PID-5 will be used to find the patient record.

- **Patient ID only matching**
  The patient ID from HL7 field PID-3 will be used to search for a patient record.
  This scenario is only possible if the patient ID is considered to be unique.

4.6 Supported character-sets

Characters from different languages outside English can use different encodings to transmit the same character from a foreign alphabet.

Example: The Russian character "Ю" (capital "JU") can be transmitted with the following encodings:

Unicode	8859-5	CP1251	MacCyr	KOI8
0x042E (2 Byte)	0xCE	0xDE	0x9E	0xE0

The ISO OSI model defines character encoding to be in level 6. HL7 works on ISO OSI model level 7 (HL7). Strictly seen HL7 does not give a standard on character encoding. So it is open for all character encodings that exist.

Syngo.plaza has been carefully tested with some highly used character sets.

Currently below listed character-sets are tested and will be supported for *syngo*.plaza's HL7 communication. Some other not listed character-sets may work too but they were not explicitly tested. If needed in your project, please contact Siemens local sales representative or Siemens Healthcare Headquarter, Conectivity Center (CCC).

Language	HL7 message character encoding	ISO equivalent	DICOM equivalent	Remark
Western Latin (Nordic languages, German, Spanish, French, etc.)	cp1252	iso-8859-1	ISO_IR 100	
	UTF-8		ISO_IR196	
Russian / Cyrillic	cp1251	iso-8859-5	ISO_IR 144	
	KOI-8		(does not exist)	
	UTF-8		ISO_IR 196	
Greek	cp1253	iso-8859-7	ISO_IR 126	
Hebrew	cp1255	iso-8859-8	ISO_IR 138	(1)
Turkish	cp1254	iso-8859-9 (Latin-5)	ISO_IR 148	
Arabic	cp1256	iso-8859-6	ISO_IR 127	
Chinese	GB18030		GB18030	
Japanese (Hiragana, Katakana, Kanji)	ISO-2022-jp		ISO 2022 IR 87	
Korean (Hangul, Hanja)	ISO-2022-kr		ISO 2022 IR 149	
Indian languages (e.g. Tamil, Hindi)	UTF-8		ISO_IR 196	
Thai	28605	iso-8859-11	ISO_IR 166	

Remarks:

(1) Hebrew on code-page 1255 (ISO IR 138) does not support vowel-characters like in Hebrew word "דָּנִיֵּאל". This is not needed because in common writing vowels will be omitted and "דניאל" will be written instead.

Please use UTF-8 encoding if Hebrew vowel-characters are explicitely used in your installation.

5 Inbound messages RIS to PACS

5.1 Patient Update / Merge

The Patient Information Update and Patient Merge messages trigger changes to patient information, including patient demographics, patient identification, patient location/class changes, and patient data record merges. These changes may occur at any time on any patient record. These messages are used for both inpatients (i.e., those who are assigned a bed at the facility) and outpatients (i.e., those who are not assigned to a bed at the facility). *syngo*.plaza will modify the patient meta database of images on all patient update and merge messages mentioned in this document. If there are currently no studies and images of this patient stored in the database then the message will be ignored.

5.1.1 Transfer a patient (ADT^A02)

If a patient changes his physical location (that is for example: moved to another ward) then an A02 Message should be send.

Syntax / Semantics
The table below indicates the message semantics of the ADT^A02 message.
For syntax details please refer to [2].

ADT^A02	Patient Administration Message	Chapter in HL7 v2.3.1
MSH	Message Header	2
EVN	Event Type	3
PID	Patient Identification	3
PV1	Patient Visit	3

Table 3: Message semantics of ADT^A02

The following fields will be used in the *syngo*.plaza interfaces:

Field	Element-Name	Required R=required O=optional		Remarks	DICOM attribute
		HL7	plaza		
MSH-1	Field separator	R	R	Constant "|" (Pipe-sign)	
MSH-2	Encoding Characters	R	R	Constant "^~\&"	
MSH-7	Date/Time Of Message	O	R[4]		
MSH-9	Message type	R	R	Constant "ADT^A02"	
MSH-10	Message Control ID	R	O[5]		

[4] O / R: The field is optional in HL7 standard but required by *syngo*.plaza.
The message will be skipped by the interface if the field is empty.

[5] R / O: The field is required in HL7 standard but is allowed to be empty or missing in *syngo*.plaza.
The message will be successfully processed even if this field is empty.

MSH-11	Processing ID	R	O	Constant "P" (=Production)	
MSH-12	Version ID	R	R		
EVN-1	Event Type Code	O	R	Constant "A02"	
EVN-2	Recorded Date/Time	R	O		
PID-1	Set ID	O	O		
PID-3	Patient Identifier List	R	R		(0010,0020)
PID-4	Alternate Patient ID	O	O	Ignored by *syngo*.plaza	
PID-5	Patient Name	R	R	DICOM Name format A02 message will not modify the field "patient-name". Send an additional A08 or A40 instead.	(0010,0010)
PID-7	Date/Time of Birth	O	O	A02 message will not modify the field "date of birth". Send an additional A08 instead.	(0010,0030)
PID-8	Sex	O	O	A02 message will not modify the field "sex". Send an additional A08 instead.	(0010,0040)
PID-10	Race	O	O	Ignored by *syngo*.plaza	
PID-11	Patient Address	O	O	Ignored by *syngo*.plaza	
PID-13	Phone Number Home	O	O	Ignored by *syngo*.plaza	
PID-14	Phone Number Buiss.	O	O	Ignored by *syngo*.plaza	
PID-16	Martial Status	O	O	Ignored by *syngo*.plaza	
PID-18	Patient Account Number	O	O	Ignored by *syngo*.plaza	
PID-19	SSN Number - Patient	O	O	Ignored by *syngo*.plaza	
PV1-1	Set ID	O	O		
PV1-2	Patient Class	O	R[6]	Supported values[7] are: E Emergency I Inpatient O Outpatient P Preadmit R Recurring Patient B Obstetrics	
PV1-3	Assigned Patient Location	O	O	Free text	
PV1-7	Attending Doctor	O	O	Ignored by *syngo*.plaza	

[6] The field is required if the PV1 segment is part of the message.

[7] Accepted values are as of HL7 chapter 3, suggested values from user defined table 0004.

PV1-8	Referring Doctor	O	O	Ignored by *syngo*.plaza	
PV1-9	Consulting Doctor	O	O	Ignored by *syngo*.plaza	
PV1-10	Hospital Service	O	O	Ignored by *syngo*.plaza	
PV1-15	Ambulatory Status	O	O	Ignored by *syngo*.plaza	
PV1-17	Admitting Doctor	O	O	Ignored by *syngo*.plaza	
PV1-18	Patient Type	O	O	Ignored by *syngo*.plaza	
PV1-19	Visit Number	O	O	Ignored by *syngo*.plaza	
PV1-20	Financial Class	O	O	Ignored by *syngo*.plaza	
PV1-36	Discharge Disposition	O	O	Ignored by *syngo*.plaza	
PV1-39	Servicing Facility	O	O	Ignored by *syngo*.plaza	
PV1-44	Admit Date/Time	O	O	Ignored by *syngo*.plaza	
PV1-45	Discharge Date/Time	O	O	Ignored by *syngo*.plaza	

Table 4: Fields used in interface for A02 messages

Pragmatics

On an A02 message, *syngo*.plaza will only modify the field "patient location" (from PV1-3).

All other fields remain unchanged. For changing these other fields send an A08 message instead.

Example of an HL7 A02 message that is accepted by *syngo*.plaza

```
MSH|^~\&|RIS|RIS|PACS|PACS|20120205224440||ADT^A02|Nos81uQgoJ4wVJ9nuOgoUw|P|2.3.1
EVN|A02|201202171139
PID|1||RAD001234||Test^Name||19670511|M|||Henkestr. 127^^91056^Erlangen^D
PV1|1|I|ONKO-C3|||||||||||||||001234/2012|||||||||||||||||||||||||||||||||||||V
```

5.1.2 Patient Information Update (ADT^A08)

Changes to patient demographics and account information (e.g. change in patient name, patient address, etc.) shall trigger an ADT^A08 Update Patient message.

Syntax / Semantics
The table below indicates the message semantics of the ADT^A08 message.
For syntax please refer to [2].

ADT^A08	Patient Administration Message	Chapter in HL7 v2.3.1
MSH	Message Header	2
EVN	Event Type	3
PID	Patient Identification	3
[PV1]	Patient Visit	3
[{OBX}]	Observation/results	7
[{AL1}]	Allergy	3

Table 5: Message semantics of ADT^A08

The following fields will be used in the *syngo*.plaza interfaces:

Field	Element-Name	Required R=required O=optional HL7	plaza	Remarks	DICOM attribute
MSH-1	Field separator	R	R	Constant "|" (Pipe-sign)	
MSH-2	Encoding Characters	R	R	Constant "^~\&"	
MSH-7	Date/Time Of Message	O	R[8]	See footnote	
MSH-9	Message type	R	R	Constant "ADT^A08"	
MSH-10	Message Control ID	R	O[9]		
MSH-11	Processing ID	R	O	Constant "P" (=Production)	
MSH-12	Version ID	R	R		
EVN-1	Event Type Code	O	R	Constant "A08"	
EVN-2	Recorded Date/Time	R	O		
PID-1	Set ID	O	O		
PID-3	Patient Identifier List	R	R		(0010,0020)
PID-4	Alternate Patient ID	O	O	Ignored by *syngo*.plaza	
PID-5	Patient Name	R	R	DICOM Name format	(0010,0010)
PID-7	Date/Time of Birth	O	R	See footnote [10]	(0010,0030)
PID-8	Sex	O	R	Values "M" / "F" / "O"	(0010,0040)
PID-10	Race	O	O	Ignored by *syngo*.plaza	
PID-11	Patient Address	O	O	Ignored by *syngo*.plaza	
PID-13	Phone Number Home	O	O	Ignored by *syngo*.plaza	
PID-14	Phone Number Buiss.	O	O	Ignored by *syngo*.plaza	
PID-16	Martial Status	O	O	Ignored by *syngo*.plaza	
PID-18	Patient Account Number	O	O	Ignored by *syngo*.plaza	
PID-19	SSN Number - Patient	O	O	Ignored by *syngo*.plaza	
PV1-1	Set ID	O	O		
PV1-2	Patient Class	R	R[11]		
PV1-3	Assigned Patient Location	O	O	An A08 message will not modify the field "patient location". Send	

---

[8] O / R: The field is optional in HL7 standard but required by *syngo*.plaza.
     The message will be skipped by the interface if the field is empty.

[9] R / O: The field is required in HL7 standard but is allowed to be empty or missing in *syngo*.plaza.
    The message will be successfully processed even if this field is empty.

[10] D.O.B should be a valid date in format YYYYMMDD. Time of Birth will be ignored.

[11] The field is required if the PV1 segment is part of the message.

				an A02 instead.	
PV1-7	Attending Doctor	O	O	Ignored by *syngo*.plaza	
PV1-8	Referring Doctor	O	O	Ignored by *syngo*.plaza	
PV1-9	Consulting Doctor	O	O	Ignored by *syngo*.plaza	
PV1-10	Hospital Service	O	O	Ignored by *syngo*.plaza	
PV1-15	Ambulatory Status	O	O	Ignored by *syngo*.plaza	
PV1-17	Admitting Doctor	O	O	Ignored by *syngo*.plaza	
PV1-18	Patient Type	O	O	Ignored by *syngo*.plaza	
PV1-19	Visit Number	O	O	Ignored by *syngo*.plaza	
PV1-20	Financial Class	O	O	Ignored by *syngo*.plaza	
PV1-36	Discharge Disposition	O	O	Ignored by *syngo*.plaza	
PV1-39	Servicing Facility	O	O	Ignored by *syngo*.plaza	
PV1-44	Admit Date/Time	O	O	Ignored by *syngo*.plaza	
PV1-45	Discharge Date/Time	O	O	Ignored by *syngo*.plaza	

Table 6: Fields used in interface for A08 messages

Pragmatics

*syngo.*plaza will behave on A08 messages like this:

- Check if all required fields are presented. If not the message will be ignored.

- It will try to find the patient, based on the key attributes. This can be either fields

    a) PID-3 (Patient Identifier List); that is called a "patient ID only scenario"

    or

    b) PID-3 (Patient Identifier List) together with PID-5 (Patient name).

- If patient name is not part of the key-fields this is a unique patient ID scenario.
  If there is more than one patient found using the patient ID then these patients will be merged into one.

- All non key fields specified in table above and whose values are not empty will be updated.

- All additional fields and segments will be ignored.

Note:

- This patient update message can be used to update only non-key attributes.

- To change a key attribute, a "Patient Merge – ADT^A40" message has to be issued by the sending application.

Examples of HL7 A08 messages that are accepted by *syngo*.plaza
```
MSH|^~\&|RIS|RIS|PACS|PACS|20120205224440||ADT^A08|Nos81uQgoJ4wVJ9nuOgoUw|P|2.3.1
EVN|A08|201202171139
PID|1||RAD001234||Test^Name||19670511|M|||Henkestr. 127^^91056^Erlangen^D
```

```
MSH|^~\&|RIS|RIS|PACS|PACS|20120205224440||ADT^A08|Nos81uQgoJ4wVJ9nuOgoUw|P|2.3.1
EVN|A08|201202171139
PID|1||RAD001234||Test^Name||19670511|M||Henkestr. 127^^91056^Erlangen^D
PV1|1|E|ONKO-C3||||||||||||||||001234/2012||||||||||||||||||||||||||||||||||V
```

5.1.3 Patient Merge (ADT^A40)

In clinical workflow it can happen one person in real world is multiple registered as a patient in an information system. If such a duplicate patient is found then it must be possible to merge both patient records to a single patient record. For a PACS the resulting patient record should have all studies and images the former separate patient records had.

A Patient Merge triggered by an ADT^A40 message indicates that a merge has been done at the internal identifier level. That is, PID-3-patient ID identifier has been merged with MRG-1 Patient ID.

Syntax / Semantics

Note: Be aware that the RIS has to send all the attributes which are configured in syngo.plaza to identify a patient in order to merge the patient.

The table below indicates the message semantics of the ADT^A40 message:

ADT^A40	Patient Administration Message	Chapter in HL7 v2.3.1
MSH	Message Header	2
EVN	Event Type	3
PID	Patient Identification	3
MRG	Merge Information	3
[PV1]	Patient Visit	3

Table 7: Message semantics of ADT^A40

The following fields will be used in the *syngo*.plaza interfaces:

Field	Element-Name	Required R=required O=optional HL7	plaza	Remarks	DICOM attribute
MSH-1	Field separator	R	R	Constant "|" (Pipe-sign)	
MSH-2	Encoding Characters	R	R	Constant "^~\&"	
MSH-7	Date/Time Of Message	O	R[12]		
MSH-9	Message type	R	R	Constant "ADT^A40"	
MSH-10	Message Control ID	R	O[13]		

---

[12] O / R: The field is optional in HL7 standard but required by *syngo*.plaza. The message will be skipped by the interface if the field is empty.

[13] R / O: The field is required in HL7 standard but is allowed to be empty or missing in *syngo*.plaza. The message will be successfully processed even if this field is empty.

MSH-11	Processing ID	R	O	Constant "P" (=Production)	
MSH-12	Version ID	R	R		
EVN-1	Event Type Code	O	R	Constant "A40"	
EVN-2	Recorded Date/Time	R	O		
PID-1	Set ID	O	O		
PID-3	Patient Identifier List	R	R		(0010,0020)
PID-4	Alternate Patient ID	O	O	Ignored by *syngo*.plaza	
PID-5	Patient Name	R	R	DICOM Name format	(0010,0010)
PID-7	Date/Time of Birth	O	R	D.O.B should be a valid date in format YYYYMMDD. Time of Birth will be ignored.	(0010,0030)
PID-8	Sex	O	R	Values "M" / "F" / "O"	(0010,0040)
PID-10	Race	O	O	Ignored by *syngo*.plaza	
PID-11	Patient Address	O	O	Ignored by *syngo*.plaza	
PID-13	Phone Number Home	O	O	Ignored by *syngo*.plaza	
PID-14	Phone Number Buiss.	O	O	Ignored by *syngo*.plaza	
PID-16	Martial Status	O	O	Ignored by *syngo*.plaza	
PID-18	Patient Account Number	O	O	Ignored by *syngo*.plaza	
PID-19	SSN Number - Patient	O	O	Ignored by *syngo*.plaza	
MRG-1	Prior Patient Identifier List	R	R		
MRG-2	Prior Alternate Patient ID	O	O	Ignored by *syngo*.plaza	
MRG-4	Prior Patient ID	O	R	Field must have same value as field MRG-1	
MRG-7	Prior Patient Name	R	R (O)	Required by HL7 standard. If patient-name is not part of key attributes then the field can be empty for *syngo*.plaza	

Table 8: Fields used in interface for A40 messages

Pragmatics

*syngo.*plaza will behave on A40 messages like this:

- Check if all required fields are presented. If not the message will be ignored.

- It will try to find the target patient(s) represented by the PID-segment, based on the key attributes. This can be either fields

    a) PID-3 (Patient Identifier List), that called a "patient-ID-only scenario"

    or

    b) PID-3 (Patient Identifier List) together with PID-5 (Patient-Name).

- If Patient-Name is not part of the key-fields it is called a "unique-patient-ID scenario". If there is more than one patient found using the Patient-ID from PID-3 then these patients will first be merged into one. This will give maximum of one unique target patient at this step.

- It will try to find the source patient(s) represented by the MRG segment, based on the key attributes. This can be either fields

    c) MRG-1 (Prior Patient Identifier List), that called a "patient-ID-only scenario"

    or

    d) MRG-1 (Prior Patient Identifier List), together with MRG-7 (Prior Patient Name).

- There are four use cases for the patient merge message:

	Patient found by PID	Any Patient not found by PID
Patient found by MRG	Merge all patients found (1)	Change MRG-patient to have PID key attributes (2)
Any patient found by MRG	Update the PID patient like an A08 message (3)	Skip the message

1) **Merging patients**
   In this case the PID and MRG segments represent at least two existing patients in the database.
   All studies and images from the patients found are moved to the target patient.
   The target patient will get the key attributes from the fields PID-3 (Patient Identifier List) and PID-5 (Patient-Name).
   After that some further attributes are updated as given from the remaining PID-fields.

2) **Change patient's key attributes**
   In this case the target patient (PID segment) is not found. Only the merge patient (MRG segment) exists.
   A new patient data record is created with the attributes from PID segment.
   All studies and images from the patients found by MRG segment are moved to the new target patient.

3) **Update patient**
   In this case only the target patient specified by the PID segment can be found.
   The patient-data will be updated with the data from the PID segment.

Example of an HL7 A40 message that is accepted by *syngo*.plaza

```
MSH|^~\&|RIS|RIS|PACS|PACS|20120205224440||ADT^A40|Nos81uQgoJ4wVJ9nuOgoUw|P|2.3.1
EVN|A40|201202171139
PID|1||RAD001234||Name^to be kept||19670511|M|||Henkestr. 127^^91056^Erlangen^D
MRG|RAD009876|||RAD009876|||Name^to be dropped
```

5.1.4 Merge Patient Information (ADT^A18)

Although IHE specifies, that the ADT^A40 message shall be used for Patient Merge messages, several older systems still use the ADT^A18 ("Merge patient information") message for this purpose. If possible prefer to use A40 messages. Support for A18 messages may be discontinued by *syngo*.plaza in future versions.

syngo.plaza will treat the ADT^A18 messages internally in exactly the same way as the ADT^A40 messages.

Differences between A18 and A40 messages are:

Field	Element-Name	Required R=required O=optional		Remarks	DICOM attribute
		HL7	plaza		
MSH-9	Message type	R	R	Constant "ADT^A18"	
EVN-1	Event Type Code	O	R[14]	Constant "A18"	

Table 9: Fields used in interface for A18 messages

---

[14] HL7 chapter 3, figure 3-2 says „optional", but message will be skipped if the field is empty.

5.2 Order Messages

5.2.1 General order message (ORM^O01)

A RIS / HIS system can inform *syngo*.plaza PACS on planned / scheduled examinations. *syngo*.plaza can use this information to prepare for images to be received and to be reported. For instance a prefetch of older examinations can be done.

An ORM^O01 message should be sent from HIS / RIS for that purpose.

Syntax / Semantics

The table below indicates the message semantics of the ORM^O01 message:

ORM^O01	Patient Administration Message	Chapter in HL7 v2.3.1
MSH	Message Header	2
PID	Patient Identification	3
[PV1]	Patient Visit	3
ORC	Order Common	4
OBR	Orders Detail	4
ZDS	DICOM Segment	specific

Table 10: Message semantics of ORM^O01

Field	Element-Name	Required R=required O=optional HL7	plaza	Remarks	DICOM attribute
MSH-1	Field separator	R	R	Constant "|" (Pipe-sign)	
MSH-2	Encoding Characters	R	R	Constant "^~\&"	
MSH-7	Date/Time Of Message	O	R[15]		
MSH-9	Message type	R	R	Constant "ORM^O01"	
MSH-10	Message Control ID	R	O[16]		
MSH-11	Processing ID	R	O	Constant "P" (=Production)	
MSH-12	Version ID	R	R		
PID-3	Patient Identifier List	R	R		(0010,0020)
PID-5	Patient Name	R	R	DICOM Name format	(0010,0010)
PID-7	Date/Time of Birth	O	R	D.O.B should be a valid	(0010,0030)

---

[15] O / R: The field is optional in HL7 standard but required by *syngo*.plaza. The message will be skipped by the interface if the field is empty.

[16] R / O: The field is required in HL7 standard but is allowed to be missing in *syngo*.plaza. The message will be successfully processed even if this field is empty.

				date in format YYYYMMDD. Time of Birth will be ignored.	
PID-8	Sex	O	R	Values "M" / "F" / "O"	(0010,0040)
ORC-1	Order Control	R	R	Constant [17] "NW" = "new order" "XO" = "change order" "SC" = "status change"	
ORC-2	Placer Order Number	O	O	Ignored by *syngo*.plaza	
ORC-3	Filler Order Number	O	O	Ignored by *syngo*.plaza	
ORC-5	Order Status	O	O		
ORC-7	Quantity/Timing	O	O	Ignored by *syngo*.plaza	
ORC-10	Entered By	O	O	Ignored by *syngo*.plaza	
ORC-13	Enterer's Location	O	O	Ignored by *syngo*.plaza	
ORC-17	Entering Organization	O	O	Ignored by *syngo*.plaza	
OBR-2	Placer Order Number	O	O		
OBR-3	Filler Order Number	O	O		
OBR-4	Universal Service ID	R	R		
OBR-4.2	Universal Service ID	R	R	Used for Requested Procedure Description	(0032,1060)
OBR-7	Observation Date/Time	O	O		
OBR-10	Collector Identifier	O	O		
OBR-13	Relevant Clinical Info.	O	O		
OBR-15	Specimen Source	O	O		
OBR-18	Placer Field 1	O	O	Used for: DICOM accession number	(0008,0050)
OBR-19	Placer Field 2	O	O	Used for: DICOM requested procedure ID	(0040,1001)
OBR-21	Filler Field 2	O	O	Preformed Procedure ID	
OBR-24	Diagnostic Service Section ID	O	O	Used for: DICOM modality	(0008,0060)
OBR-25	Result Status	O	O		
OBR-27	Quantity/Timing	O	O		
OBR-30	Transportation Mode	O	O		
OBR-31	Reason for Study	O	O		
OBR-32	Principal Result	O	O	Reporting physician	

---

[17] Be sure to always send "NW" (new order), "XO" (change order) or "SC" (status change). Other possible codes from HL7, chapter 4, table 0119 like "RO" (replacement order) will not be spotted and message will be ignored.

	Interpreter				
OBR-44	Ordering Facility Name	O	O	Ignored by *syngo*.plaza	
OBR-46	Ordering Facility Address	O	O	Ignored by *syngo*.plaza	
OBR-47	Ordering Facility Phone	O	O	Ignored by *syngo*.plaza	
ZDS-1.1	Study instance UID	O	O	Used for: DICOM study instance UID	(0020,000D)

Table 11: Fields used in interface for ORM^O01 messages

Pragmatics

New Order (ORC-1 = "NW")

If an order message with order control "new order" (field ORC-1 has value "NW") is received, then *syngo*.plaza will prefetch older examinations for this patient from an archive. Rules for dearchivation must be configured inside *syngo*.plaza for this purpose.

Change Order (ORC-1 = "XO")

An order with order control "change order" (field ORC-1 has value "XO") will update the fields from segment ORC and OBR in the table above.

Status Change (ORC-1 = "SC")

An order with order control "status change" (field ORC-1 has value "SC") will change the order status and report status and then update the fields from segment ORC and OBR in the table above.

The following values from HL7, chapter 4, table 0038 are supported for the order status in field ORC-5:

Possible interpretation by RIS	ORC-5 Result status	HL7 description of value	Interpretation by syngo.plaza
Exam scheduled	SC	In process, scheduled	SC
Exam has started / waiting for exam	HD	Order is on hold	HD
Exam is currently running	A	some, but not all, results available	A
Exam is currently running	IP	In process, unspecified	IP
Exam is finished	CM	Order is completed	CM
Exam was changed	RP	Order has been replaced	RP

Please note that all other values from HL7, chapter 4, table 0038 will be supported.
Values like "C (Order was cancelled) will have no special processing inside *syngo*.plaza.

The following values from HL7, chapter 4, table 0123 are supported for the result status in field OBR-25:

Possible interpretation by RIS	OBR-25 Result status	HL7 description of value	Interpretation by syngo.plaza
Exam is finished and dictated	A	some, but not all, results available	Exam is reported
Exam is finished and report is written	R	Results stored; not yet verified	Exam is reported
Exam is finished and report is preliminary signed	P	Preliminary: A verified early result is available, final results not yet obtained	Exam is reported
Exam is finished and report is validated/signed	F	Final results; results stored and verified. Can only be changed with a corrected result.	Report is validated/signed in RIS
Exam is finished and report is validated/signed	CM[18]	(see footnote)	Report is validated/signed in RIS

Please note that other values from HL7, chapter 4, table 0123 like "C" (Correction to results) will not be spotted and message will be ignored.

Example of a "new order" message accepted by *syngo*.plaza

```
MSH|^~\&|RIS|RIS|ANY PACS|PACS|20120417085709||ORM^O01|pJJwwsRps0dGc+LrCs9LwA|P|2.4
PID|1||RAD00123456 ||Test^HL7-Prefetch||19620427|M|||Henkestr. 127^^91052^Erlangen^D
ORC|NW||||IP
OBR||||^ABDOMEN|||||||||||||||PLA4567000579566|8720252|PLA4567000579566||||CT|||||||Lorem …
ipsum dolor sit amet, consectetuer adipiscing elit.|Schmidt, Dr. Christian, Oberarzt
ZDS|1.3.12.2.1107.5.8.3.807665.525354.55565748.2012041211525786^^APPLICATION^DICOM
```

5.2.2 Unsolicited Observation Message (ORU^R01)

If the result (report) status of an examination changes in the RIS then this change should be communicated to PACS. This can be done either by:

a) Send an order message (ORM^O01) from RIS to PACS
    with control-code (ORC-1) value "SC" = "Status change"
    → see previous chapter

b) Send a ORU^R01 message from RIS to PACS
    → this chapter

Syngo.plaza does support both ways.

---

[18] Value "CM" does not exist in HL7, chapter 4, table 0123.
This value is supported to archive compatibility to SIEMENS own legacy product systems.

Syntax / Semantics

The table below indicates the message semantics of the ORU^R01 message:

ORM^O01	Patient Administration Message	Chapter in HL7 v2.3.1
MSH	Message Header	2
PID[19]	Patient Identification	3
PV1[20]	Patient Visit	3
[ORC]	Order Common	4
OBR	Orders Detail	7, (4)
[[ZDS]	[ZSC]]	DICOM Segment	specific

Table 12: Message semantics of ORM^O01

Field	Element-Name	Required R=required O=optional HL7	plaza	Remarks	DICOM attribute
MSH-1	Field separator	R	R	Constant "|" (Pipe-sign)	
MSH-2	Encoding Characters	R	R	Constant "^~\&"	
MSH-7	Date/Time Of Message	O	R[21]		
MSH-9	Message type	R	R	Constant "ORM^O01"	
MSH-10	Message Control ID	R	O[22]		
MSH-11	Processing ID	R	O	Constant "P" (=Production)	
MSH-12	Version ID	R	R		
PID-3	Patient Identifier List	R	R	Field used in cross-check	(0010,0020)
PID-5	Patient Name	R	R	DICOM Name format Field used in cross-check if name is part of patient-identifier	(0010,0010)
PID-7	Date/Time of Birth	O	O	D.O.B should be a valid date in format YYYYMMDD. Time of Birth will be ignored.	(0010,0030)
PID-8	Sex	O	O	Values "M" / "F" / "O"	(0010,0040)

---

[19] Segment PID is optional in HL7 standard 2.4, chapter 7.3.1 but required by syngo.plaza

[20] Segment PV1 is optional in HL7 standard 2.4, chapter 7.3.1 but required by syngo.plaza

[21] O / R: The field is optional in HL7 standard but required by *syngo*.plaza. The message will be skipped by the interface if the field is empty.

[22] R / O: The field is required in HL7 standard but is allowed to be missing in *syngo*.plaza. The message will be successfully processed even if this field is empty.

PV1-1	Set ID	O	O		
PV1-2	Patient Class	R	R[23]	An ORU^R01 message will not modify the field "patient class". Send an A06 / A07 instead.	
PV1-3	Assigned Patient Location	O	O	An ORU^R01 message will not modify the field "patient location". Send an A02 instead.	
ORC-1	Order Control	R	R	Constant [24] "SC" = "status change"	
ORC-2	Placer Order Number	O	O	Ignored by *syngo*.plaza	
ORC-3	Filler Order Number	O	O	Ignored by *syngo*.plaza	
ORC-5	Order Status	O	O		
ORC-7	Quantity/Timing	O	O	Ignored by *syngo*.plaza	
ORC-10	Entered By	O	O	Ignored by *syngo*.plaza	
ORC-13	Enterer's Location	O	O	Ignored by *syngo*.plaza	
ORC-17	Entering Organization	O	O	Ignored by *syngo*.plaza	
OBR-2	Placer Order Number	O	O	Ignored by *syngo*.plaza	
OBR-3	Filler Order Number	O	R	DICOM Study-instance-UID; used to identify the study	(0020,000D)
OBR-4	Universal Service ID	R	R		
OBR-4.2	Universal Service ID	R	R	Used for Requested Procedure Description	(0032,1060)
OBR-7	Observation Date/Time	O	O	Ignored by *syngo*.plaza	
OBR-10	Collector Identifier	O	O	Ignored by *syngo*.plaza	
OBR-13	Relevant Clinical Info.	O	O	An ORU^R01 message will not modify the field "clinical info". Send an ORM^O01 instead.	
OBR-15	Specimen Source	O	O	An ORU^R01 message will not modify the field "spec source". Send an ORM^O01 instead.	
OBR-16	Ordering Physician	O	O	An ORU^R01 message will not modify the field "ordering phys.". Send an ORM^O01 instead.	
OBR-18	Placer Field 1	O	O	Used for: DICOM	(0008,0050)

---

[23] The field is required if the PV1 segment is part of the message.

[24] If ORC segment is present then always send "SC" (status change).

				accession number	
OBR-19	Placer Field 2	O	O	Used for: DICOM requested procedure ID	(0040,1001)
OBR-21	Filler Field 2	O	O	Preformed Procedure ID	
OBR-24	Diagnostic Service Section ID	O	O	Used for: DICOM modality	(0008,0060)
OBR-25	Result Status	O	O	Used for report status	
OBR-27	Quantity/Timing	O	O	Ignored by *syngo*.plaza	
OBR-30	Transportation Mode	O	O	An ORU^R01 message will not modify the field "transp. mode". Send an ORM^O01 instead.	
OBR-31	Reason for Study	O	O	An ORU^R01 message will not modify the field "reason". Send an ORM^O01 instead.	
OBR-32	Principal Result Interpreter	O	O	Reporting physician	(0008,1060)
OBR-44	Ordering Facility Name	O	O	Ignored by *syngo*.plaza	
OBR-46	Ordering Facility Address	O	O	Ignored by *syngo*.plaza	
OBR-47	Ordering Facility Phone	O	O	Ignored by *syngo*.plaza	
ZDS-1.1	Study instance UID	O	O	Used for: DICOM study instance UID	(0020,000D)
ZSC-1.1	Study instance UID	O	O	Used for: DICOM study instance UID	(0020,000D)

Table 13: Fields used in interface for ORM^O01 messages

Pragmatics

- If ZDS-1 field is filled then use this field as study-instance-UID to identify the study.

- Else if ZSC-1 field is filled then use this field as study-instance-UID to identify the study.

- Else if OBR-3 field is filled then use this field as study-instance-UID to identify the study.

- Else skip the message

- Update the report status and procedure attributes of the study found.

- The report itself will not be stored in *syngo*.plaza.
  For report communication see

The following values from HL7, chapter 4, table 0038 are supported for the order status in field ORC-5:

Possible interpretation by RIS	ORC-5 Result status	HL7 description of value	Interpretation by syngo.plaza
Exam scheduled	SC	In process, scheduled	SC
Exam has started / waiting for exam	HD	Order is on hold	HD
Exam is currently running	A	some, but not all, results available	A
Exam is currently running	IP	In process, unspecified	IP
Exam is finished	CM	Order is completed	CM
Exam was changed	RP	Order has been replaced	RP

Please note that all other values from HL7, chapter 4, table 0038 will be supported.
Values like "C (Order was cancelled) will have no special processing inside *syngo*.plaza.

The following values from HL7, chapter 4, table 0123 are supported for the result status in field OBR-25:

Possible interpretation by RIS	OBR-25 Result status	HL7 description of value	Interpretation by syngo.plaza
Exam is finished and dictated	A	some, but not all, results available	Exam is reported
Exam is finished and report is written	R	Results stored; not yet verified	Exam is reported
Exam is finished and report is preliminary signed	P	Preliminary: A verified early result is available, final results not yet obtained	Exam is reported
Exam is finished and report is validated/signed	F	Final results; results stored and verified. Can only be changed with a corrected result.	Report is validated/signed in RIS
Exam is finished and report is validated/signed	CM[25]	(see footnote)	Report is validated/signed in RIS

Please note that other values from HL7, chapter 4, table 0123 like "C" (Correction to results) will not be spotted and message will be ignored.

---

[25] Value "CM" does not exist in HL7, chapter 4, table 0123.
This value is supported to archive compatibility to SIEMENS own legacy product systems.

Example of a "new order" message accepted by *syngo*.plaza

```
MSH|^~\&|RIS|RIS|ANY PACS|PACS|20120417085709||ORU^R01|pJJwwsRps0dGc+LrCs9LwA|P|2.4
PID|1||RAD00123456 ||Test^HL7-Prefetch||19620427|M|||Henkestr. 127^^91052^Erlangen^D
OBR||||^ABDOMEN|||||||||||||PLA4567000579566|8720252|PLA4567000579566||||CT|||||||Lorem …
ipsum dolor sit amet, consectetuer adipiscing elit.|Schmidt, Dr. Christian, Oberarzt
ZDS|1.3.12.2.1107.5.8.3.807665.525354.55565748.2012041211525786^^APPLICATION^DICOM
```

5.3 Order Administration Messages (proprietary)

In clinical routine it can happen that a planned exam was scheduled or performed for the wrong patient. This happens in following conditions:

- An exam was scheduled for a patient called "John Miller". The exam was performed and shows up in the exam history of "John Miller".
  Later the physician detects that correct patient name spelling is "John Muller". There is already a exam history for "John Muller" but this is of cause missing the current exam.

- An exam was scheduled for "Henry Smith". However "Paul Adams" was examined.

In all these situations it is about two persons in real life. Therefore they already have separate patient records. A patient merge is not possible in this case because it would merge both patient records to one patient record.

For legal reasons the exam cannot be canceled and repeated[26]. If the exam has already be done then it must be stored and documented on the right person.

In these cases a single order or examination should "moved" from one patient to another patient. Most RIS do have methods to do so.

HL7 standard does not have appropriate HL7 messages to move an examination from one patient to a different patient. Thus *syngo*.plaza defines proprietary messages using Z-segments.

5.3.1 Order Level Correction Message

The message ZPA^I05 described in this chapter can be used to move a study which is identified by an accession-number[27] from one patient to a different patient. In addition the accession-numner can also be changed using this message.

This is a SIEMENS proprietary message as HL7 standard does not have messages defined for that purpose.

Syntax / Semantics

The table below indicates the message semantics of the ZPA^I05 message:

ZPA^I05	Order Level Correction Message	Chapter in HL7 v2.3.1
MSH	Message Header	2
EVN	Event Type	3
PID	Patient Identification	3
[MRG]	Merge Information (optional cross-check)	3
[ZSP]	Merge Information (optional cross-check)	proprietary
ZPA	Study Identification	proprietary

---

[26] German law on X-ray ("Röntgenverordnung") outlaws performing unnecessary examinations with X-ray exposure. Thus repeating the same exam for administrative reasons is considered to be a malicious injury and may face legal consequences.

[27] Accession-number is DICOM tag (0008,0050)

Table 14: Message semantics of ZPA^I05

Field	Element-Name	Required R=required O=optional		Remarks	DICOM attribute
		HL7	plaza		
MSH-1	Field separator	R	R	Constant "|" (Pipe-sign)	
MSH-2	Encoding Characters	R	R	Constant "^~\&"	
MSH-7	Date/Time Of Message	O	R[28]		
MSH-9	Message type	R	R	Constant "ZPA^S05"	
MSH-10	Message Control ID	R	O[29]		
MSH-11	Processing ID	R	O	Constant "P" (=Production)	
MSH-12	Version ID	R	R		
PID-3	Patient Identifier List	R	R		(0010,0020)
PID-5	Patient Name	R	O	DICOM Name format	(0010,0010)
PID-7	Date/Time of Birth	O	R	D.O.B should be a valid date in format YYYYMMDD. Time of Birth will be ignored.	(0010,0030)
PID-8	Sex	O	R	Values "M" / "F" / "O"	(0010,0040)
MRG-4	Prior Patient ID	O	R	Cross-check	
MRG-7	Prior Patient Name	O	R	Cross-check	
ZSP-3	Prior Patient ID	n.a.	R	Cross-check (works same as MRG-4)	
ZSP-5	Prior Patient Name	n.a.	R	Cross-check (works same as MRG-7)	
ZPA-2-1	Source Accession Number	n.a.	R	Used to identify the studies to be moved	(0008,0050)
ZPA-2-2	Target Accession Number	n.a.	O	New Accession-Number (if to be changed else empty)	(0008,0050)

Table 15: Fields used in interface for ZPA^I05 messages

Pragmatics

*syngo.*plaza will behave on ZPA^I05 messages like this:

- Check if all required fields are presented. If not the message will be ignored.

---

[28] O / R: The field is optional in HL7 standard but required by *syngo.*plaza. The message will be skipped by the interface if the field is empty.

[29] R / O: The field is required in HL7 standard but is allowed to be missing in *syngo.*plaza. The message will be successfully processed even if this field is empty.

- It will try to find the source patient/studies which are identified by source accession-number (ZPA-2, 1st subfield). The accession-number must not be empty.
  If any examination is found then the message will be skipped.
  If more than one patient is found that has the accession-number then the message will be skipped.

- If an MRG-segment is present then Prior Patient ID (MRG-4) and Prior Patient-Name (MRG-7) must not be empty and will be cross-checked against the patient-data of the study found. If check fails the message will be skipped.

- If a ZPA-segment is present then Prior Patient ID (ZSP-3) and Prior Patient-Name (ZSP-3) must not be empty and will be cross-checked against the patient-data of the studies found. If check fails the message will be skipped.

- It will try to find the target patient represented by the PID-segment, based on the key attributes. Depending on identification scheme this can be either field Patient ID (PID-3) or fields Patient ID (PID-3) and Patient Name (PID-5).

- If the target patient does not exist then it will be created. Patient ID (PID-3), Patient Name (PID-5), D.o.B. (PID-7) and sex-code (PID-8) will be used in this case.

- After this the studies found will be moved to the target patient (existing or new created). This is a MOVE, not a COPY action.

- If the field "Target Accession Number" (ZPA-2, 2nd subcomponent) is filled then the accession-number of the studies found will be changed to that number.

Examples of "move order" messages accepted by *syngo*.plaza

1) Move studies (identified by accession-number) from one patient to another patient

```
MSH|^~\&|RIS|RIS|ANY PACS|PACS|20120417085709||ZPA^S05|1234567|P|2.4
PID|1||RAD001001||Testname^Target||19620427|M|
MRG||||RAD001000|||Testname^Source|
ZPA||049S0700729815
```

Use case: Correction of a patient transposition error

2) Move studies to a (new) patient, change the accession-number

```
MSH|^~\&|RIS|RIS|ANY PACS|PACS|20120417085711||ZPA^S05|1234569|P|2.4
PID|1||RAD009876||Smith^John||19431208|M|
MRG||||CT-50174-2013-02-18-05:34:24.1342 CET|||Emergency^|
ZPA||CT50175.8461^049S0700728256
```

Use case: Correction of a study that was hand-entered at a modality

3) Change the accession-number

```
MSH|^~\&|RIS|RIS|ANY PACS|PACS|20120417085710||ZPA^S05|1234568|P|2.4
PID|1||RAD001234||Testname^Unchanged||||
MRG||||RAD001234|||Testname^Unchanged|
ZPA||049S0700729384^049S0700728952
```

Use case: Link two studies to run under same accession-number

5.3.2 Study Level Correction Message

The message ZPA^S05 described in this chapter can be used to move a study which is identified by study-instance-UID from one patient to a different patient. In addition the accession-numner can also be changed using this message.

This is a SIEMENS proprietary message as HL7 standard does not have messages defined for that purpose.

Syntax / Semantics

The table below indicates the message semantics of the ZPA^S05 message:

ZPA^S05	Study Level Correction Message	Chapter in HL7 v2.3.1
MSH	Message Header	2
EVN	Event Type	3
PID	Patient Identification	3
[MRG]	Merge Information (optional cross-check)	3
[ZSP]	Merge Information (optional cross-check)	proprietary
ZPA	Study Identification	proprietary

Table 16: Message semantics of ZPA^S05

Field	Element-Name	Required R=required O=optional HL7	plaza	Remarks	DICOM attribute
MSH-1	Field separator	R	R	Constant "|" (Pipe-sign)	
MSH-2	Encoding Characters	R	R	Constant "^~\&"	
MSH-7	Date/Time Of Message	O	R[30]		
MSH-9	Message type	R	R	Constant "ZPA^S05"	
MSH-10	Message Control ID	R	O[31]		
MSH-11	Processing ID	R	O	Constant "P" (=Production)	
MSH-12	Version ID	R	R		
PID-3	Patient Identifier List	R	R		(0010,0020)
PID-4	Alternate Patient ID	O	O	Ignored by *syngo*.plaza	
PID-5	Patient Name	R	O	DICOM Name format	(0010,0010)
PID-7	Date/Time of Birth	O	R	D.O.B should be a valid date in format YYYYMMDD. Time of Birth will be ignored.	(0010,0030)
PID-8	Sex	O	R	Values "M" / "F" / "O"	(0010,0040)
MRG-4	Prior Patient ID	O	R	Cross-check	
MRG-7	Prior Patient Name	O	R	Cross-check	

[30] O / R: The field is optional in HL7 standard but required by *syngo*.plaza. The message will be skipped by the interface if the field is empty.

[31] R / O: The field is required in HL7 standard but is allowed to be missing in *syngo*.plaza. The message will be successfully processed even if this field is empty.

ZSP-3	Prior Patient ID	n.a.	R	Cross-check (works same as MRG-4)	
ZSP-5	Prior Patient Name	n.a.	R	Cross-check (works same as MRG-7)	
ZPA-1-1	Source Study Instance UID	n.a.	R	Used to identify the study to be moved	(0020,000D)
ZPA-1-2	Target Study Instance UID	n.a.	O	New Study-Instance-UID (if to be changed) else empty	(0020,000D)
ZPA-2-2	Target Accession Number	n.a.	O	New Accession-Number (if to be changed else empty)	(0008,0050)

Table 17: Fields used in interface for ZPA^S05 messages

Pragmatics

*syngo.*plaza will behave on ZPA^S05 messages like this:

- Check if all required fields are presented. If not the message will be ignored.

- It will try to find the source patient/examination which is identified by source study-instance-UID (ZPA-1, 1st subfield). If this is not found then the message will be skipped.

- If an MRG-segment is present then Prior Patient ID (MRG-4) and Prior Patient-Name (MRG-7) must not be empty and will be cross-checked against the patient-data of the study found. If check fails the message will be skipped.

- If a ZPA-segment is present then Prior Patient ID (ZSP-3) and Prior Patient-Name (ZSP-3) must not be empty and will be cross-checked against the patient-data of the study found. If check fails the message will be skipped.

- It will try to find the target patient represented by the PID-segment, based on the key attributes. Depending on identification scheme this can be either field Patient ID (PID-3) or fields Patient ID (PID-3) and Patient Name (PID-5).

- If the target patient does not exist then it will be created. Patient ID (PID-3), Patient Name (PID-5), D.o.B. (PID-7) and sex-code (PID-8) will be used in this case.

- After this the study found will be moved to the target patient (existing or new created). This is a MOVE, not a COPY action.

- If the field Target Study Instance UID (ZPA-1, 2nd subcomponent) is filled and is not equal to Source Study Instance UID (ZPA-1, 1st subcomponent) then the study-instance-UID of the study found will be changed.

- If the field "Target Accession Number" (ZPA-2, 2nd subcomponent) is filled then the accession-number of the study found will be changed to that number.

Examples of "move study" messages accepted by *syngo*.plaza

1) Move a study (identified by instance-UID) from one patient to another patient

```
MSH|^~\&|RIS|RIS|ANY PACS|PACS|20120417085709||ZPA^S05|1234567|P|2.4
PID|1||RAD001001||Testname^Target||19620427|M|
MRG||||RAD001000|||Testname^Source|
ZPA|1.3.12.2.1107.5.8.3.9999.727655.908065.2012041211525786
```

Use case: Correction of a patient transposition error

2) Move a study to a (new) patient, change the study-instance-UID and accession-number

```
MSH|^~\&|RIS|RIS|ANY_PACS|PACS|20120417085711||ZPA^S05|1234569|P|2.4
PID|1||RAD009876||Smith^John||19431208|M|
MRG||||CT-50174-2013-02-18-05:34:24.1342 CET|||Emergency^|
ZPA|1.2.840.113619.2.1.1.318791001.532.737296081.502^…
1.3.12.2.1107.5.8.3.9999.727655.908065.834853.2013041211582572|^93269
```

Use case: Correction of a study that was hand-entered at a modality

3) Change the study-instance-UID

```
MSH|^~\&|RIS|RIS|ANY_PACS|PACS|20120417085710||ZPA^S05|1234568|P|2.4
PID|1||RAD001234||Testname^Unchanged||||
MRG||||RAD001234|||Testname^Unchanged|
ZPA|1.2.840.113619.2.1.1.318791001.532.737296081.502^…
1.3.12.2.1107.5.8.3.9999.727655.908065.834853.2013041211525786
```

Use case: Merge of two studies

6 Outbound messages PACS to RIS

6.1 Report Export

The ORU message is used for transmitting observation results to other systems. Using the OBX and the OBR segments, one can construct almost any clinical report as a three-level hierarchy, with the Patient Context within the PID segment at the upper level, an order record within the OBR segment at the next level and one or more observation records within the OBX at the bottom.

6.1.1 Unsolicited Observation Message (ORU^R01)

ORU^R01	Unsolicited Observation Message	Segment used within *syngo*.plaza ORU message	Chapter in HL7 standard
MSH	Message Header	Yes	2
{ [PID	Patient Identification	Yes	3
[PD1]	Additional Demographics	No	3
[{NK1}]	Next of Kin/Associated Parties	No	3
[{NTE}]	Notes and Comments	No	2
[PV1	Patient Visit	No	3
[PV2]]]	Patient Visit - Additional Info	No	3
{[ORC]	Order common	Yes	4
OBR	Observations Report ID	Yes	7
{[NTE]}	Notes and comments	No	2
[CTD]	Contact Data	No	11
{ [OBX]	Observation/Result	No	7
{[NTE]}}	Notes and comments	No	2
[{FT1}]	Financial Transaction	No	6
{[CTI]}}}	Clinical Trial Identification	No	7
[DSC]	Continuation Pointer	No	2
ZSC	Z-Segment for Study-Details	Yes	-

Table 18: Message semantics of ORU^R01

Syntax / Semantics
The table below indicates the message semantics of the ORU^R01 message.
For syntax details please refer to [2].

Field	Element-Name	Required by HL7	Remarks	DICOM ID
MSH-1	Field separator	Required	Constant "|" (Pipe-sign)	

MSH-2	Encoding Characters	Required	Constant "^~\&"	
MSH-3	Sending Application	Optional	Constant "ARIcom"	
MSH-4	Sending Facility	Optional	empty	
MSH-5	Receiving Application	Optional	Constant "ANY PACS"	
MSH-6	Receiving Facility	Optional	Constant "PACS"	
MSH-7	Date/Time Of Message	Optional		
MSH-9	Message type	Required	Constant "ORU^R01"	
MSH-10	Message Control ID	Optional	Will be filled with Identifier	
MSH-11	Processing ID	Optional	Constant "P" (=Production)	
MSH-12	Version ID	Optional	Constant "2.4"	
MSH-12	Character Set	Optional	Constant "UNICODE"	
PID-1	Set ID	Optional	Constant "1"	
PID-2	Patient Identifier	Required	Will be filled with patient ID	(0010,0020)
PID-3	Patient ID List	Required	Unused by *syngo*.plaza	
PID-5	Patient Name	Required	Patient name in DICOM Name Format	(0010,0010)
PID-5.1	- Lastname	Required		
PID-5.2	- Firstname	Optional		
PID-7	Date/Time of Birth	Required	Empty values for D.o.B. are allowed in *syngo*.plaza	(0010,0030)
PID-8	Sex	Required	Values "M" / "F" / "O"	(0010,0040)
ORC-1	Order Control		Constant SC=Status Changed	
ORC-2	Filler Order Number		Used for: Requested Procedure ID	(0040,1001)
OBR-7	Observation Date/Time		Used for: DICOM study date / DICOM study time	(0008,0020) (0008,0030)
OBR-18	Placer Field 1	Required	Used for: DICOM accession number	(0008,0050)
OBR-19	Placer Field 2	Required	Used for: DICOM study ID	(0020,0010)
OBR-21	Filler Field 2	Optional	Used for: DICOM Requested Procedure ID (if available) or Preformed Procedure ID	(0040,1001) or (0040,0253)
OBR-24	Diagnostic Service Section ID	Optional	Used for: DICOM modality-code	(0008,0060)
OBR-31	Reason for study	Optional	Used for: DICOM reason of requested procedure	(0040,1002)
ZSC-1.1	Study-Instance-UID of examination (study-component)	Required	Used for: DICOM study instance UID	(0020,000D)
ZSC-1.2	Plaza Version	Required	Constant containing version	

			number	
ZSC-1.3		Required	Constant "APPLICATION"	
ZSC-1.4		Required	Constant "DICOM"	
ZSC-2	Receive Status	Required	**COMPLETED** = All images received from Modality **MOVED** = All images have been moved to archive **DELETED** = Images have been deleted from online and archive **UPDATED** = Single images were deleted	
ZSC-3	Study description		Used for: DICOM Study Description	(0008,1030)
ZSC-4	Station Name		Used for: DICOM Station Name (that is: machine that produced the images)	(0008,1010)
ZSC-5	Node-Name		Used for: DICOM Retrieve AET Title (that is: AET of PACS)	(0008,0054)
ZSC-7	Archive Status		Used for: DICOM Instance Availability, with values: ONLINE = available in online area of archive NEARLINE = images available in archive only now DELETED = Images have been deleted from online and archive	(0008,0056)
ZSC-9	Number of images (study-component)	Required	Used for: DICOM number of images in acquisition	(0020,1002)

Table 19: Fields used in interface for ORU^R01 messages

**Pragmatics on "new images" or "further images"**

*syngo.*plaza will send an ORU^R01 "image notification" message for every examination (study-component) received into the system.

After the DICOM association was closed *syngo.*plaza will wait for a configurable time[32]. If further images are sent for the same study (identified by study-instance-UID) they will be notified as one event having the total number of images received by now.
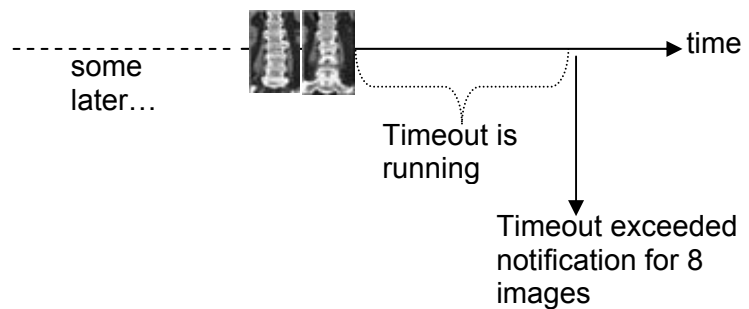
For some examinations the modality will send a bunch of images and then after let's say 30 minutes it will send some more images (so called "late images"). If this "second bunch" is after the time-out then *syngo.*plaza will send out a second image-notification for the same study. This will have the total number of all images received by now.

---

[32] Parameter is called „Timeout for image completion" in *syngo.*plaza administration.

a) First notification

Images
received

Timeout is
running

Timeout Exceeded
notification for 6
images

time
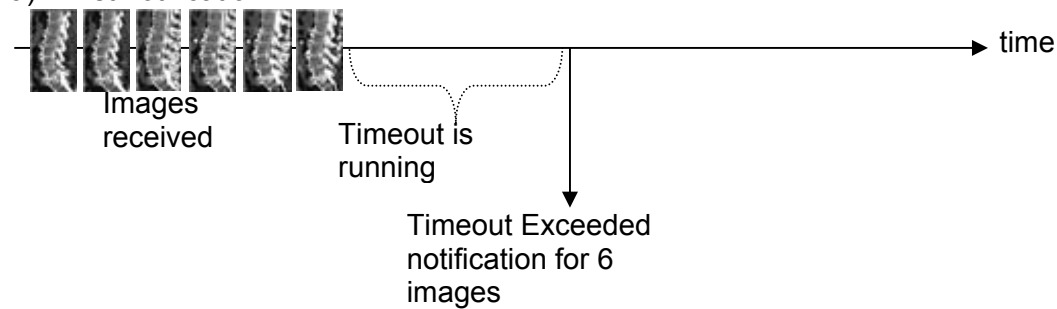
b) Second notification (for more images on same study)

some
later…

Timeout is
running

Timeout exceeded
notification for 8
images

time

Pragmatics on other actions

Syngo.plaza will send immediate send notifications when examinations are moved to archive
or images have been deleted. The notification will be send directly after the action in the
storage completed.

Example of an image notification exported by *syngo*.plaza
(see chapter 7.2 for more examples):

```
MSH|^~\&|ARIcom||ANY PACS|PACS|20120413093841||ORU^R01|18233|P|2.4||||||UNICODE
PID|1|123456|||Müller^Manfred^^^~^^^^~^^^^||19621231|M
ORC|SC||217185
OBR| ||||||201204121530|||||||||||PLA4567000579565|8720251||217185|||CT||||||| Lorem ipsum …
dolor sit amet, consectetuer adipiscing elit. Nulla gravida, lacus ac nonummy pretium, arcu …
urna tincidunt quam, ac ultricies eros velit at neque. Mauris ornare sodales eros. Etiam …
faucibus mauris ac orci. Morbi dui. Integer a nisi vel augue egestas tristique. …

||||||||||||||||Sensation 4
ZSC|1.3.12.2.1107.5.8.3.807665.525354.55565748.2012041211525786^SHC_PLAZA_VB10A^APPLICATION^DI
COM|COMPLETED|Abdomen^08_Abd_KM_biphasisch|8720251|SYNGO_PLAZA||ONLINE||421
```

7 Appendix: Examples for HL7 messages

7.1 ADT messages from RIS to *syngo*.plaza

7.1.1 Change of patient's demographic data

```
MSH|^~\&|RIS|RIS|PACS|PACS|20120205224440||ADT^A08|Nos81uQgoJ4wVJ9nuOgoUw|P|2.3.1
EVN|A08|201202171139
PID|1||RAD001234||Test^Name||19670511|M|||Henkestr. 127^^91056^Erlangen^D
```

Remark: The patient with this patient ID should exist. If not, the message will be skipped.

7.1.2 Change of patient name

An A08 or an A40 message can be used to change the patient name.

If the patient ID together with the patient-name is search key criteria (see chapter "4.5 Patient") an A40 has to be send.
If patient ID only is the search key criteria an A08 or A40 message may be sent.

Examples:

Change patient name for patient with ID "RAD001234" from "Test^Name" to "Test^Name-changed"

```
MSH|^~\&|RIS|RIS|PACS|PACS|20120205224440||ADT^A08|Nos81uQgoJ4wVJ9nuOgoUw|P|2.3.1
EVN|A08|201202171139
PID|1||RAD001234||Test^Name-Changed||19670510|M|||Henkestr. 127^^91056^Erlangen^D
MRG|RAD001234|||RAD001234|||Test^Name
```

```
MSH|^~\&|RIS|RIS|PACS|PACS|20120205224440||ADT^A40|Nos81uQgoJ4wVJ9nuOgoUw|P|2.3.1
EVN|A40|201202171139
PID|1||RAD001234||Test^Name-Changed||19670510|M|||Henkestr. 127^^91056^Erlangen^D
MRG|RAD001234|||RAD001234|||Test^Name
```

7.1.3 Change of a patient ID

A change of a patient ID can be initiated via sending an A40 message. If the target patient ID from field PID-3 does already exist, then the two patients identified by PID-3 (Patient-ID List and MRG-4 (Prior Patient ID) will be merged together.

Examples:

Changing Patient ID "RAD001234" to "RAD002345"

```
MSH|^~\&|RIS|RIS|PACS|PACS|20120205224440||ADT^A40|Nos81uQgoJ4wVJ9nuOgoUw|P|2.3.1
EVN|A40|201202171139
PID|1||RAD002345||Test^Name||19670510|M|||Henkestr. 127^^91056^Erlangen^D
MRG|RAD001234|||RAD001234|||Test^Name
```

7.1.4 Merge of two patients

An A40 message will be used to merge two patient records into one patient record.

Alternatively an A18 message can be used.

Examples:

Merge Patient with ID "RAD001234" and "RAD002345" together. Resulting patient shall have ID "RAD001234" and name "Test^Name A".

a) With A40 message

```
MSH|^~\&|RIS|RIS|PACS|PACS|20120205224440||ADT^A40|Nos81uQgoJ4wVJ9nuOgoUw|P|2.3.1
EVN|A40|201202171139
PID|1||RAD001234||Test^Name A||19670510|M|||Henkestr. 127^^91056^Erlangen^D
MRG|RAD002345|||RAD002345|||Test^Name B
```

b) analogous with an A18 message (retired message)

```
MSH|^~\&|RIS|RIS|PACS|PACS|20120205224440||ADT^A18|Nos81uQgoJ4wVJ9nuOgoUw|P|2.3.1
EVN|A18|201202171139
PID|1||RAD001234||Test^Name A||19670510|M|||Henkestr. 127^^91056^Erlangen^D
MRG|RAD002345|||RAD002345|||Test^Name B
```

Remarks:

- If the patient with target ID from PID-3 (here: "RAD001234") does not exist then existing patients with MRG-4 (Prior patient ID) (here: "RAD002345") will have the ID changed to the target ID (here: "RAD001234").

- Currently we support the A18 message format which is being retained in the HL7 standard for backward compatibility. If possible, please prefer to send an A40 message instead. A18 messages may be unsupported in future versions.

7.2 ORU messages from *syngo*.plaza to RIS

ORU messages will be used to inform RIS/HIS on changes of the image-DB.

Examples:

New images received in online DB
```
MSH|^~\&|ARIcom||ANY PACS|PACS|20120507150958||ORU^R01|18467|P|2.4||||||UNICODE
PID|1|RAD00123456|||Test^HL7^^^~^^^^~^^^^||20081001|O
ORC|SC||88
OBR||||||200809300818|||||||||||||TH022_TH||88|||CR|||||||||||||||||||||||||SIEMENS FD-X
ZSC|1.3.12.2.1107.5.8.2.0027.20125715840150338949950338.635680241^SHC_PLAZA_VB10A^APPLICATION…
^DICOM|COMPLETED|CR DX Chest CAD||DEERLN1TSK10SRV||ONLINE||5
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Some images have been deleted
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MSH|^~\&|ARIcom||ANY PACS|PACS|20120507153041||ORU^R01|11478|P|2.4||||||UNICODE
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ORC|SC||TH022_TH
OBR||||||200809300818|||||||||||||TH022_TH||TH022_TH|||CR|||||||||||||||||||||||||SIEMENS FD-X
ZSC|1.3.12.2.1107.5.99.3.30000008100113093635900010061^SHC_PLAZA_VB10A^APPLICATION^DICOM|…
UPDATED|CR DX Chest CAD||DEERLN1TSK10SRV||ONLINE||2
```

Images have been migrated to archive

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MSH|^~\&|ARIcom||ANY PACS|PACS|20120507151036||ORU^R01|6334|P|2.4||||||UNICODE
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ORC|SC||88
OBR||||||200809300818|||||||||||||TH022_TH||88|||CR|||||||||||||||||||||||SIEMENS FD-X
ZSC|1.3.12.2.1107.5.8.2.0027.201257158401503389499950338.635680241^SHC_PLAZA_VB10A^APPLICATION…
^DICOM|MOVED|CR DX Chest CAD||DEERLN1TSK10SRV||NEARLINE||2
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All images were deleted in archive

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MSH|^~\&|ARIcom||ANY PACS|PACS|20120507152358||ORU^R01|26500|P|2.4||||||UNICODE
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ORC|CA||88
OBR||||||200809300818|||||||||||||TH022_TH||88|||CR|||||||||||||||||||||||SIEMENS FD-X
ZSC|1.3.12.2.1107.5.8.2.0027.201257158401503389499950338.635680241^SHC_PLAZA_VB10A^APPLICATION…
^DICOM|DELETED|CR DX Chest CAD||DEERLN1TSK10SRV||DELETED||2
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