The Direct Project
Implementers Workgroup:

Implementation Guide for Expressing Context in Direct Messaging

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Luis C. Maas III, MD, PhD
Direct Project Coordinator
CTO, EMR Direct
We’re all quite familiar with Direct Messaging...

The Direct Project specifies a simple, secure, scalable, standards-based *transportation mechanism* that enables participants to send encrypted health information directly to known, trusted recipients over the Internet.

» **Simple.** Connects healthcare stakeholders through universal addressing using simple *push* of information.

» **Secure.** Users can easily verify messages are complete and not tampered with en route.

» **Scalable.** Enables Internet scale with no need for one-off agreements (federated agreements instead), point-to-point connections, or centralized data storage.

» **Standards-based.** Built on well-established Internet standards, commonly used for secure e-mail communication; i.e., SMTP for transport, S/MIME & X.509 certificates for encryption and integrity protection

» **Identity Assurance.** When a use case requires it, Direct is capable of providing this, too.
Motivations for Context IG

Nationwide Direct infrastructure is established
• Over 1.4 million production Direct endpoints are live today

Connected users want to use Direct for more than just TOCs:
• Improved care coordination
• More complete healthcare records
• Automated transaction processing
• Leveraging existing trust framework to authorize transactions beyond the CCDA

Benefits of further enhancing interoperability:
• Predictive analytics, population health, clinical research, telemedicine, and more
Challenges

Some systems only capable of CCDA send/receive

- 2015 Edition certification will expand to include text, PDF, and XDM (at a minimum)
- Messages containing PDFs don’t have a standardized way to include patient context
- Same true for JPGs and many other content types
- XD* not universally supported
- Workflow cannot always be determined from payload type
- Not all CCDAs are for Transitions of Care
Goals of Expressing Context in Direct

» Extending Direct use cases beyond Transitions of Care
» Leveraging Direct Networks to encapsulate HL7 and other transactions
» Explaining why a message is sent & what response is expected
» Ability to tag non-CCDA attachments (PDFs, images) with patient information
» Make Context information accessible even to applications that are not Context IG-aware

Not unlike a modernized cover sheet for a fax, so recipient knows why they are receiving a payload, what to do with it, and what response is expected
What can we do with context?

» Transaction Type
  • to identify the role of the message sender in the transaction sequence
    Appointment request

  type-element = “type:” category “/” action
category = “laboratory”/ “radiology”
  / “pharmacy” / “referral” / “general” / “error”
action = “order”/ “report” / “result” / “request”
  / “response” / “notification”

Example: type: radiology/report
What can we do with context?

» Patient Identifiers
  • to identify the patient identifier in a sender’s local context
  • Recipients echo this information back in responses and optionally add their own patient identifiers

patient-id-element = “patient-id:” pid-instance * (“;” pid-instance)
pid-instance = pid-context “:” local-patient-id
pid-context = <Assigning Authority Domain ID or standardized UUID constructed from Direct address or domain>
local-patient-id = <printable ASCII characters other than whitespace and “;”>

Example:
patient-id: 2.16.840.1.113883.19.999999:123456;
  2.16.840.1.113883.19.888888:75774
What can we do with context?

» Patient Matching Attributes
  • included to facilitate patient matching by the recipient

patient-data-element = “patient:” patient-attribute *(“;” patient-attribute)
patient-attribute = patient-parameter “=” patient-parameter-value
patient-parameter = “givenName” / “surname” / “middleName” / “dateOfBirth” / “gender” / “socialSecurityNumber” / “telephoneNumber” / “streetAddress” / “localityName” / “stateOrProvinceName” / “postalCode” / “country” / “directAddress”
patient-parameter-value = <depends on patient-parameter...>

Example:
patient: givenName=John; surname=Doe; dateOfBirth=1961-12-31
What can we do with context?

» Purpose of Use

- When a message sender requests the disclosure of healthcare information from the recipient, the purpose-element identifies the purpose for which the sender will use the disclosed information.
- Policy engines determine transaction response

```
purpose-element = "purpose:" purpose-name
purpose name = "treatment" / "payment" / "operations"
              / "emergency" / "research"
```

Example: purpose: research
Assembling elements into a complete Context

» Example context attachment
  • Human-readable (if receiving system not context-aware)
  • version refers to IG version
  • Id refers to a transactional identifier established by the original sender, echoed back in responses

version: 1.1
id: 2ba8a9a1-0f59-4688-b818-67930ae26979
patient-id: 2.16.840.1.113883.19.999999:123456
type: radiology/report
patient: givenName=John; middleName=Jacob; surname=Doe;
        dateOfBirth=1961-12-31; gender=M; postalCode=12345
» Example context attachment

Date: Wed, 31 May 2017 18:32:15 -0700 (PDT)
From: test@direct.phimail-dev.com
To: another@direct.example.com
Message-ID: <0000015c-6148-1d24-9687-50a0730f8b21.test@direct.phimail-dev.com>
Subject: Context Example 1
MIME-Version: 1.0
Content-Type: multipart/mixed;
    boundary="----=_Part_14_125690771.1496280735009"
X-Direct-Context: <0000015c-6148-1bc5-960f-cf885d5b8df1@direct.phimail-dev.com>

-------=_Part_14_125690771.1496280735009
Content-Type: text/plain; charset="us-ascii"
Content-Transfer-Encoding: quoted-printable

This is the main message content. A PDF radiology report is attached.
Example context attachment (continued)

```plaintext
version: 1.1
id: 2ba8a9a1-0f59-4688-b818-67930ae26979
patient-id: 2.16.840.1.113883.19.999999:123456
type: radiology/report
patient: givenName=3DJohn; middleName=3DJacob; surname=3DDoe; dateOfBirth=
  =3D1961-12-31; gender=3DM; postalCode=3D12345
```

```plaintext
------=_Part_14_125690771.1496280735009
Content-Type: text/plain; charset="us-ascii"
Content-Transfer-Encoding: quoted-printable
Content-ID: <0000015c-6148-1bc5-960f-cf885d5b8df1@direct.phimail-dev.com>
Content-Disposition: attachment; filename=metadata.txt

------=_Part_14_125690771.1496280735009
```
Example context attachment (continued)

------=_Part_14_125690771.1496280735009
Content-Type: application/pdf
Content-Transfer-Encoding: base64
Content-Disposition: attachment; filename="report.pdf"

JVBERi0xLjUNCiW1tbW1DQoxIDAgb2JqDQo8PC9UeXBlL0NhdtGFsb2cvUGFnZXMiAwFvTGFuZyhIbi1VUykL1N0cnVjdFRyZWVSb290IDggMCBSL01hcmtJbmZvPDwvTWFya2VkIHRydWU+Pj4+[.....bulk of Base64 encoded PDF file redacted for brevity.....]Pj4NCn0YXJ0eHJlZg0KMTQ3MDc4DQoIJUVPRg==

------=_Part_14_125690771.1496280735009--
Where do we go from here?

» Implementation—approximately 4 known prototypes in the field

» Exchanging messages in a test environment

» Connect-a-thon geared toward a specific use case:
  • Radiology report
  • Encapsulated HL7 transactions (HL7 v2 and FHIR)

» Community feedback

» Update from “Draft for Trial Use” status to final IG
Direct + Context = A variety of transaction types enabled via a single HISP connection

PM integration  Routing  ACO integration  Inter-Enterprise Messaging

Billing/Claims  E-Prescribing  Sensor Gateway

Medication Adherence  Patient-Centric  Nurse Call  On-Call Scheduling

Telemedicine  Order Entry  Secure Texting  Pager Replacement

Care Coordination  Patient Engagement  Population Health

Home Health  Referrals  Second Opinions  Remote ICU  Remote Monitoring

Patient Education  Public Health Reporting

Rounding Nurse/Physician  Appointment Scheduling

Secure Messaging

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Direct Project Implementation Guide for Expressing Context in Direct Messaging
Questions?

LCMaas@emrddirect.com
Additional Direct Project References

» Direct Project Wiki
   [http://wiki.directproject.org](http://wiki.directproject.org)

» Direct Project Reference Implementation Workgroup – Java and C# open source software implementations of Direct Project specifications

» *Applicability Statement for Secure Health Transport* – the normative specification defining Direct transport

» *XDR and XDM for Direct Messaging* – the normative specification defining conversion between Direct and IHE XDR (optional for STAs and HISP)
Beyond the Applicability Statement: Useful Implementation Guides

» **XDR and XDM for Direct Messaging v1.0** – defines standard conversions between Direct and IHE XDR, enabling STAs to serve XDR edge clients

» **Implementation Guide for Delivery Notification in Direct v1.0** – defines standard positive and negative delivery notifications, enabling assurance of quality of service

» **Implementation Guide for Direct Project Trust Bundle Distribution v1.0** – provides guidance on the packaging and distribution of trust anchors to facilitate scalable trust between STAs

» **Implementation Guide for Direct Edge Protocols v1.1** – provides guidance for standard mechanisms connecting STAs and edge clients
Sending HISP

Security/Trust Agent

SMTP Server

Direct

(SMTP / SMIME)

Receiving HISP

Security/Trust Agent

SMTP Server

Sending System

Endpoint Communication
(XDR, SMTP, others)

SSL/TLS

Recipient

Endpoint Communication
(XDR, SMTP, others)

SSL/TLS

Supplemental slide: Direct end-to-end