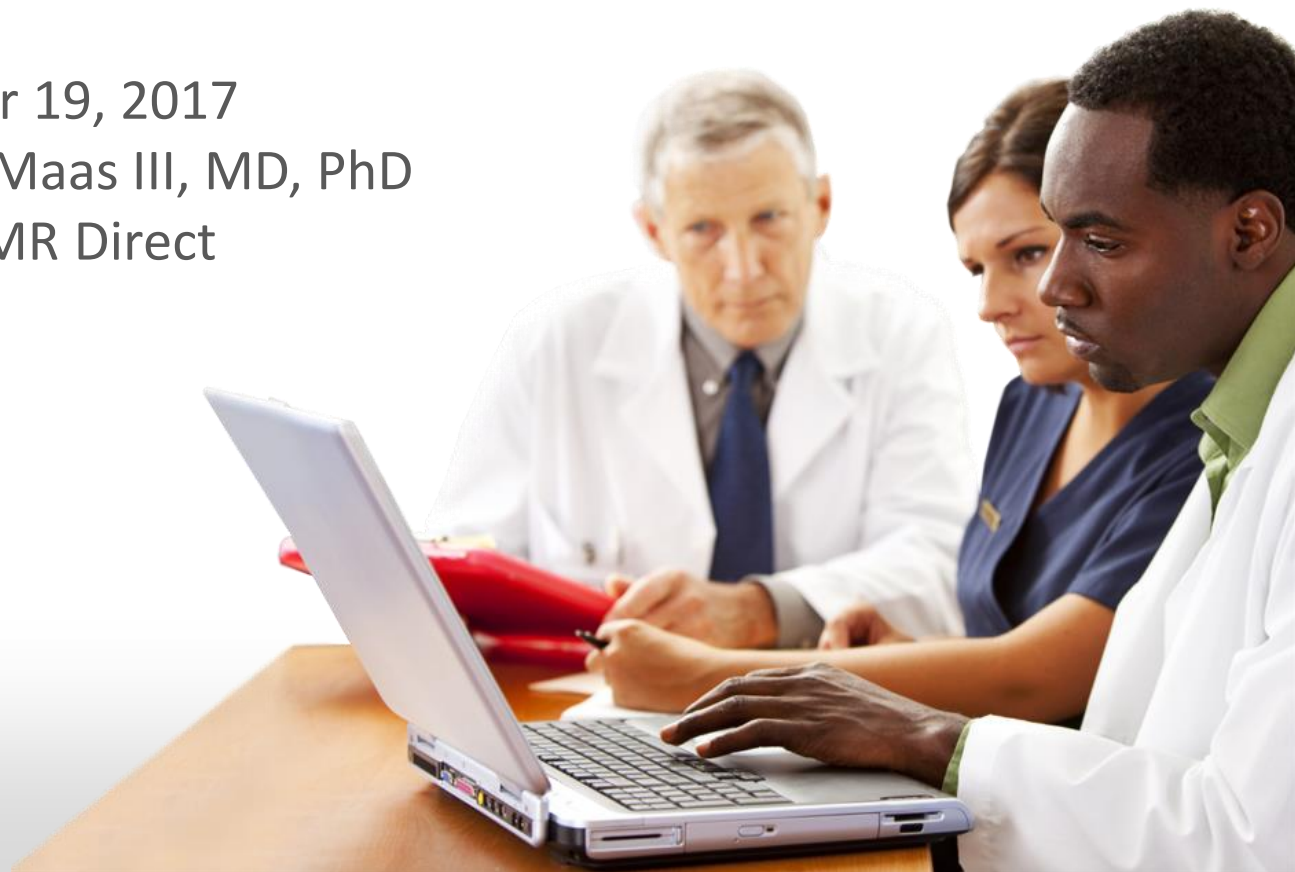


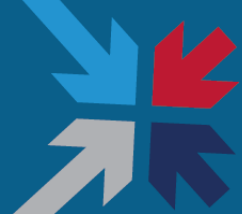
# The Direct Project Implementers Workgroup Connect-a-thon:

## Implementation Guide for Expressing Context in Direct Messaging

October 19, 2017  
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CTO, EMR Direct



# We're all quite familiar with Direct Messaging...



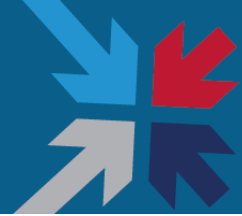
[b.wells@direct.aclinic.org](mailto:b.wells@direct.aclinic.org)

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.



[h.elthie@direct.ahospital.org](mailto:h.elthie@direct.ahospital.org)

- » **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.



## **Nationwide Direct infrastructure is established**

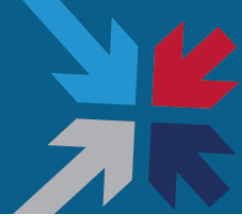
- Over 1.4 million production Direct endpoints are live today

## **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:**

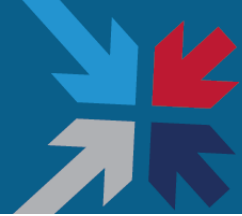
- Predictive analytics, population health, clinical research, telemedicine, and more



## Some systems only capable of CCDA send/receive

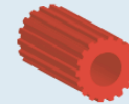
- 2015 Edition certification expanded to include text, PDF, and XDM (at a minimum)
- Messages containing PDFs don't have a standardized way to include patient context
- Same true for JPGs and many other content types
- XD\* not universally supported
- Workflow cannot always be determined from payload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

# Goals of Expressing Context in Direct

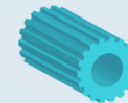


- » **Extending Direct use cases beyond Transitions of Care**
- » **Leveraging Direct Networks to encapsulate HL7 and other transactions**
- » **Explaining why a message is sent & what response is expected**
- » **Ability to tag non-CCDA attachments (PDFs, images) with patient information**
- » **Make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

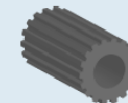
Not unlike a modernized cover sheet for a fax, so recipient knows why they are receiving a payload, what to do with it, and what response is expected



**Services**



**Standards**

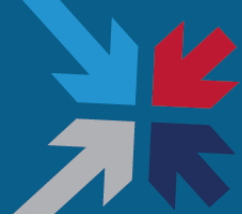


**Policies**



**Trust Fabric**

# 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”

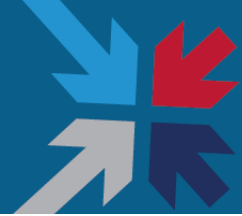
    / “pharmacy” / “referral” / “general”

action = “order”/ “report” / “result” / “query”

    / “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

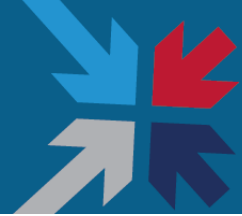
pid-context = <Assigning Authority Domain ID or standardized UUID constructed from Direct addresss or domain>

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” / “postalCode”

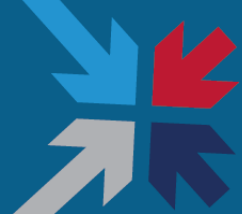
patient-parameter-value = <depends on patient-parameter...>

Example:

patient: givenName=John; surname=Doe; dateOfBirth=1961-12-31



# What can we do with context?



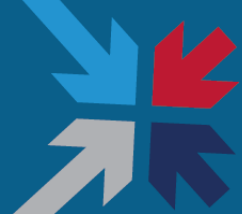
## » Purpose of Use

- 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



## » 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: 1.0

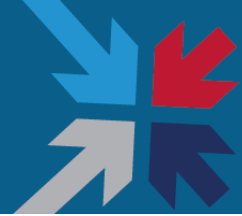
id: 2ba8a9a1-0f59-4688-b818-67930ae26979

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

# Adding Context to a Direct Message (1 of 3)



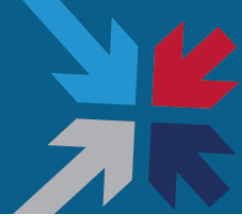
## » Example context attachment

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>](mailto: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.

# Adding Context to a Direct Message (2 of 3)



## » Example context attachment (continued)

```
-----=_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
```

```
version: 1.0  
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
```

```
-----=_Part_14_125690771.1496280735009
```



## » Example context attachment (continued)

-----=\_Part\_14\_125690771.1496280735009

Content-Type: application/pdf

Content-Transfer-Encoding: base64

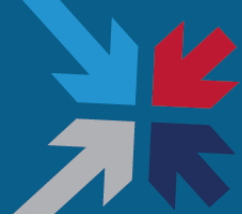
Content-Disposition: attachment; filename="report.pdf"

JVBERi0xLjUNCiW1tbW1DQoxIDAgb2JqDQo8PC9UeXBIL0NhdGFsb2cvUGFnZXMgMiAwIFlvTGFu  
Zyhlbi1VUykgL1N0cnVjdFRyZWVSb290IDggMCBSL01hcmtJbmZvPDwvTWfya2VklHRydWU+Pj4+  
[.....bulk of Base64 encoded PDF file redacted for brevity.....]

Pj4NCnNOYXJ0eHJlZg0KMTQ3MDc4DQoIJUVPRg==

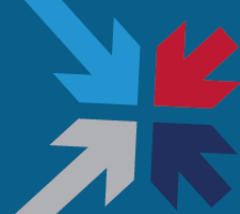
-----=\_Part\_14\_125690771.1496280735009--

# 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 cases:
  - Unstructured Radiology report (e.g. PDF)
  - ?? 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

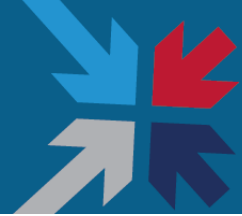
**Care Coordination** Patient Engagement Population Health

Home Health Referrals Second Opinions Remote ICU Remote Monitoring

Patient Education **Public Health Reporting**

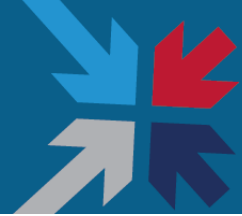
Rounding Nurse/Physician Appointment Scheduling

**Secure Messaging**



- » Direct Project Implementation Guide for Expressing Context in Direct  
<http://wiki.directproject.org/file/detail/Implementation+Guide+for+Expressing+Context+in+Direct+Messaging+v1.0-DRAFT-2016122901.docx>
- » Context Examples  
<http://wiki.directproject.org/file/detail/Implementation+Guide+for+Expressing+Context+in+Direct+Messaging+v1.0-EXAMPLES-2017060201.docx>

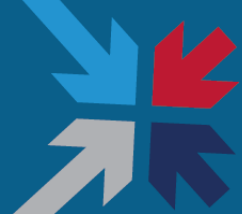




# Questions?

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# Additional Direct Project References



- » Direct Project Wiki  
<http://wiki.directproject.org>
- » Direct Project Reference Implementation Workgroup – Java and C# open source software implementations of Direct Project specifications  
<http://wiki.directproject.org/Reference+Implementation+Workgroup>
- » *Applicability Statement for Secure Health Transport* – the normative specification defining Direct transport  
<http://wiki.directproject.org/Applicability+Statement+for+Secure+Health+Transport>
- » *XDR and XDM for Direct Messaging* – the normative specification defining conversion between Direct and IHE XDR (optional for STAs and HISPs)  
<http://wiki.directproject.org/XDR+and+XDM+for+Direct+Messaging>

# 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  
<http://wiki.directproject.org/XDR+and+XDM+for+Direct+Messaging>
- » *Implementation Guide for Delivery Notification in Direct v1.0* – defines standard positive and negative delivery notifications, enabling assurance of quality of service  
<http://wiki.directproject.org/file/view/Implementation+Guide+for+Delivery+Notification+in+Direct+v1.0.pdf>
- » *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  
<http://wiki.directproject.org/file/view/Implementation+Guide+for+Direct+Project+Trust+Bundle+Distribution+v1.0.pdf>
- » *Implementation Guide for Direct Edge Protocols v1.1* – provides guidance for standard mechanisms connecting STAs and edge clients  
<http://wiki.directproject.org/file/view/Implementation+Guide+for+Direct+Edge+Protocols+v1.1.pdf>