



HL7 FHIR DevDays 2017



FHIR Workflow

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Amsterdam, 15-17 November | [@fhir_furore](#) | [#fhirdevdays17](#) | [www.fhirdevdays.com](#)

Who am I?

- Name: Lloyd McKenzie
- Company: Gevity
- Background:
 - One of FHIR's 3 initial editors
 - Co-chair FMG & FHIR Infrastructure
 - Co-chair HL7 Modeling & Methodology
 - Heavily involved in HL7 and healthcare exchange for last 17 years (v2, v3, CDA, etc.)
 - Lead for the FHIR Workflow project
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Workflow project started after R2 publication

- Order & OrderResponse resources were confusing & badly named
- Inconsistencies in similar resources, particularly various “Request” resources
- No way to represent “please suspend” or other types of requests
- Need to support asking for partial fulfillment
- Problems managing proposal/plan/order
- 7-8 other issues

What is “Workflow”?

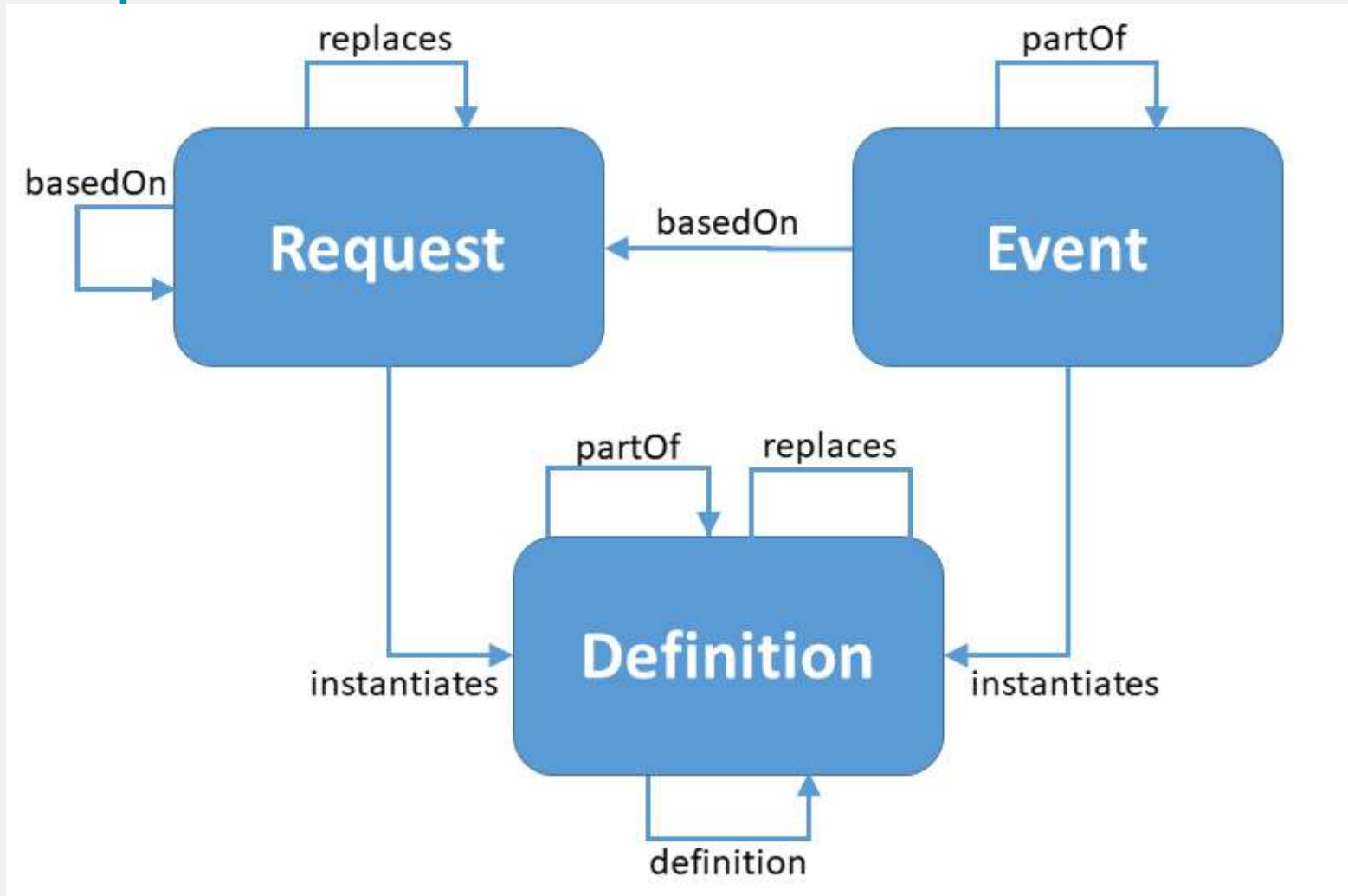
- We used the banner “workflow” to represent the effort to solve all of these issues
- Our use of the term may be broader than what you’re used to
 - Doesn’t necessarily involve tracking of status/progress

Process

- Bi-weekly calls for over two years
- New section in the specification for “Workflow”
 - Resource patterns (Definition, Request and Event)
 - Workflow execution
 - How do we say “please do” and manage tracking?
 - Workflow definition
 - Design of protocols and other workflow templates

Patterns

Workflow pattern



Workflow resources

Definitions

Resources that define something that can potentially happen in a patient and time-independent manner

- ActivityDefinition
- Measure
- OperationDefinition
- PlanDefinition
- Questionnaire

Requests

Resources that ask for or express a desire/intention for something to be done

- Appointment*
- AppointmentResponse*
- CarePlan
- Claim
- CommunicationRequest
- Contract
- DeviceRequest
- EligibilityRequest
- EnrollmentRequest
- ImmunizationRecommendation
- MedicationRequest
- NutritionOrder
- ServiceRequest
- ProcessRequest[†]
- Task[‡]
- SupplyRequest
- VisionPrescription

Events

Resources that express that something has been done and which can potentially be done because of a request

- ChargeItem
- ClaimResponse
- ClinicalImpression
- Communication
- Composition
- Condition (aka Problem)
- Consent
- Coverage
- DeviceUseStatement
- DiagnosticReport
- DocumentManifest
- DocumentReference
- EligibilityResponse
- Encounter
- EnrollmentResponse
- EpisodeOfCare
- ExplanationOfBenefit
- FamilyMemberHistory
- GuidanceResponse
- ImagingStudy
- Immunization
- MeasureReport
- Media
- MedicationAdministration
- MedicationDispense
- MedicationStatement
- Observation
- PaymentNotice
- PaymentReconciliation
- Procedure
- ProcessResponse[†]
- QuestionnaireResponse
- RiskAssessment
- SupplyDelivery
- Task[‡]

Definition

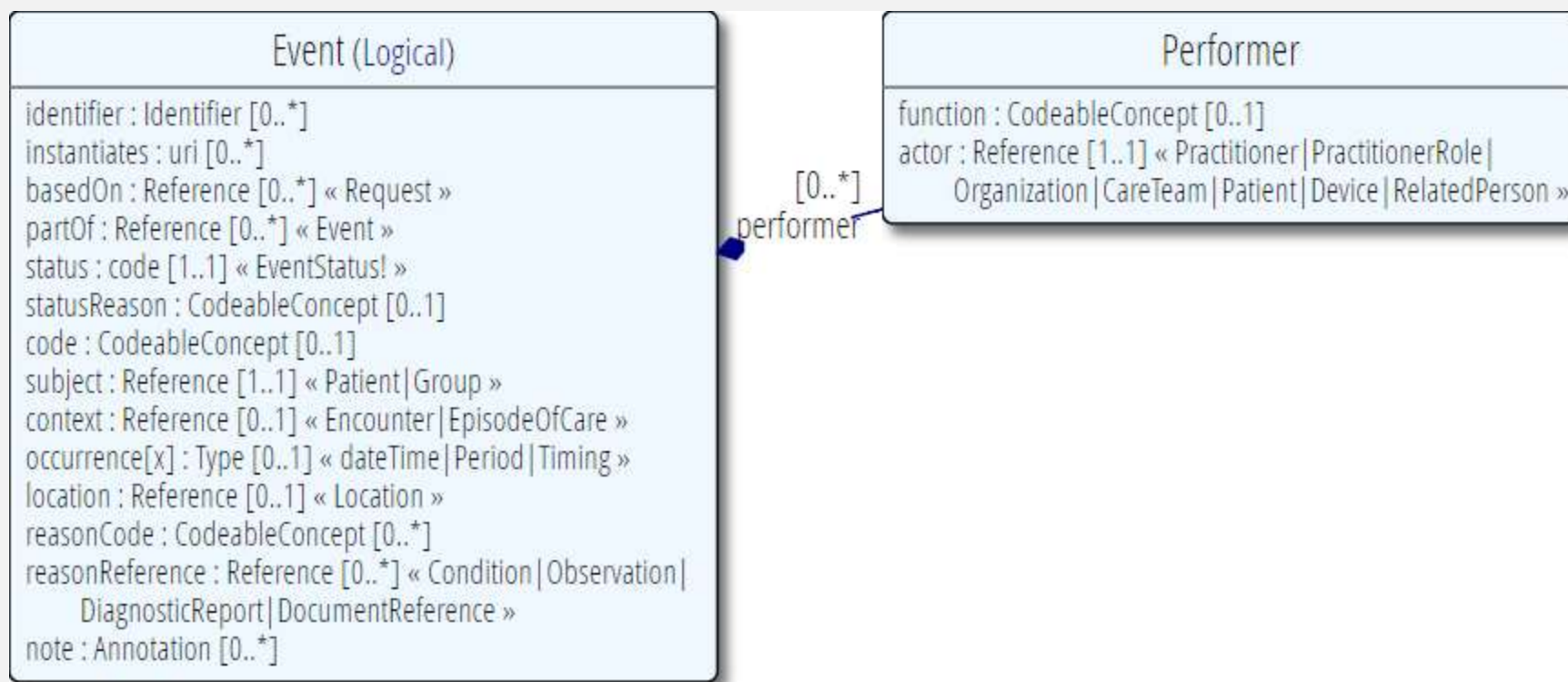
Definition (Logical)
url : uri [0..1]
identifier : Identifier [0..1]
version : string [0..1]
title : string [0..1]
derivedFrom : uri [0..*]
partOf : Reference [0..*] « Definition »
replaces : Reference [0..*] « Definition »
status : code [1..1] « PublicationStatus! »
experimental : boolean [0..1]
subject[x] : Type [0..1] « CodeableConcept Reference(Group) »
date : dateTime [0..1]
publisher : Reference [0..1] « Practitioner PractitionerRole Organization »
contact : ContactDetail [0..*]
useContext : UsageContext [0..*]
jurisdiction : CodeableConcept [0..*] « Jurisdiction ValueSet+ »
description : markdown [0..1]
purpose : markdown [0..1]
copyright : markdown [0..1]
approvalDate : date [0..1]
lastReviewDate : date [0..1]
effectivePeriod : Period [0..1]
performerType : CodeableConcept [0..1]

Request

Request (Logical)

```
identifier : Identifier [0..*]
instantiates : uri [0..*]
basedOn : Reference [0..*] « Request »
replaces : Reference [0..*] « Request »
groupIdentifier : Identifier [0..1]
status : code [1..1] « RequestStatus! »
statusReason : CodeableConcept [0..1]
intent : code [1..1] « RequestIntent! »
priority : code [0..1] « RequestPriority! »
doNotPerform : boolean [0..1]
code : CodeableConcept [0..1]
subject : Reference [1..1] « Patient | Group »
context : Reference [0..1] « Encounter | EpisodeOfCare »
occurrence[x] : Type [0..1] « dateTime | Period | Timing »
authoredOn : dateTime [0..1]
requester : Reference [0..1] « Practitioner | PractitionerRole |
  Organization | Patient | RelatedPerson | Device »
performerType : CodeableConcept [0..1]
performer : Reference [0..1] « Practitioner | PractitionerRole |
  Organization | CareTeam | HealthcareService | Patient | Device |
  RelatedPerson »
reasonCode : CodeableConcept [0..*]
reasonReference : Reference [0..*] « Condition | Observation |
  DiagnosticReport | DocumentReference »
insurance : Reference [0..*] « Coverage | ClaimResponse »
supportingInfo : Reference [0..*] « Any »
note : Annotation [0..*]
relevantHistory : Reference [0..*] « Provenance »
```

Event



Adherence to patterns

- Patterns are patterns, not rules
 - Some elements may not be relevant in all resources
 - Some elements may be “extensions” for some resources
 - Some elements may use domain-specific names
 - Some elements may constrain data types, cardinalities or simplify structures
- Focus is keeping simple things simple
- Look for alignment where we don't have reason to be distinct

Future of patterns

- Right now, we ask workgroups to “try” to follow patterns and to include hand-wavy mappings
 - Now have a report showing where misalignment exists
- In the future, may:
 - make mappings more formal
 - expose patterns in reference implementations (interfaces)

Getting stuff done

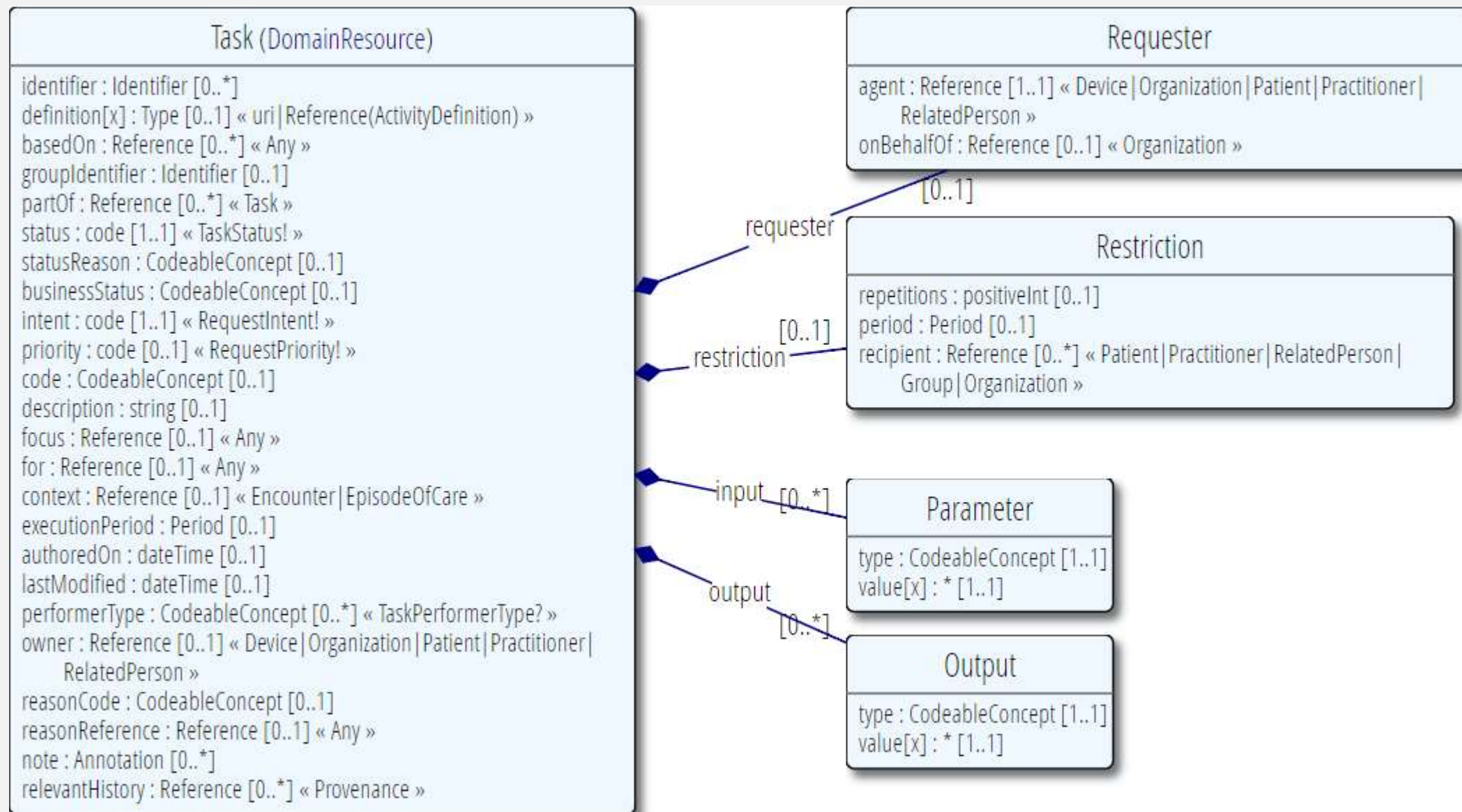
Scenario

- Pharmacy is sent two prescriptions
 - Both are active
 - Both are for a patient that uses the pharmacy
 - Both are digitally signed
 - One is “to be filled”
 - One is “for your information”
 - Use in drug-drug interaction checking
- How do we distinguish desired behavior?

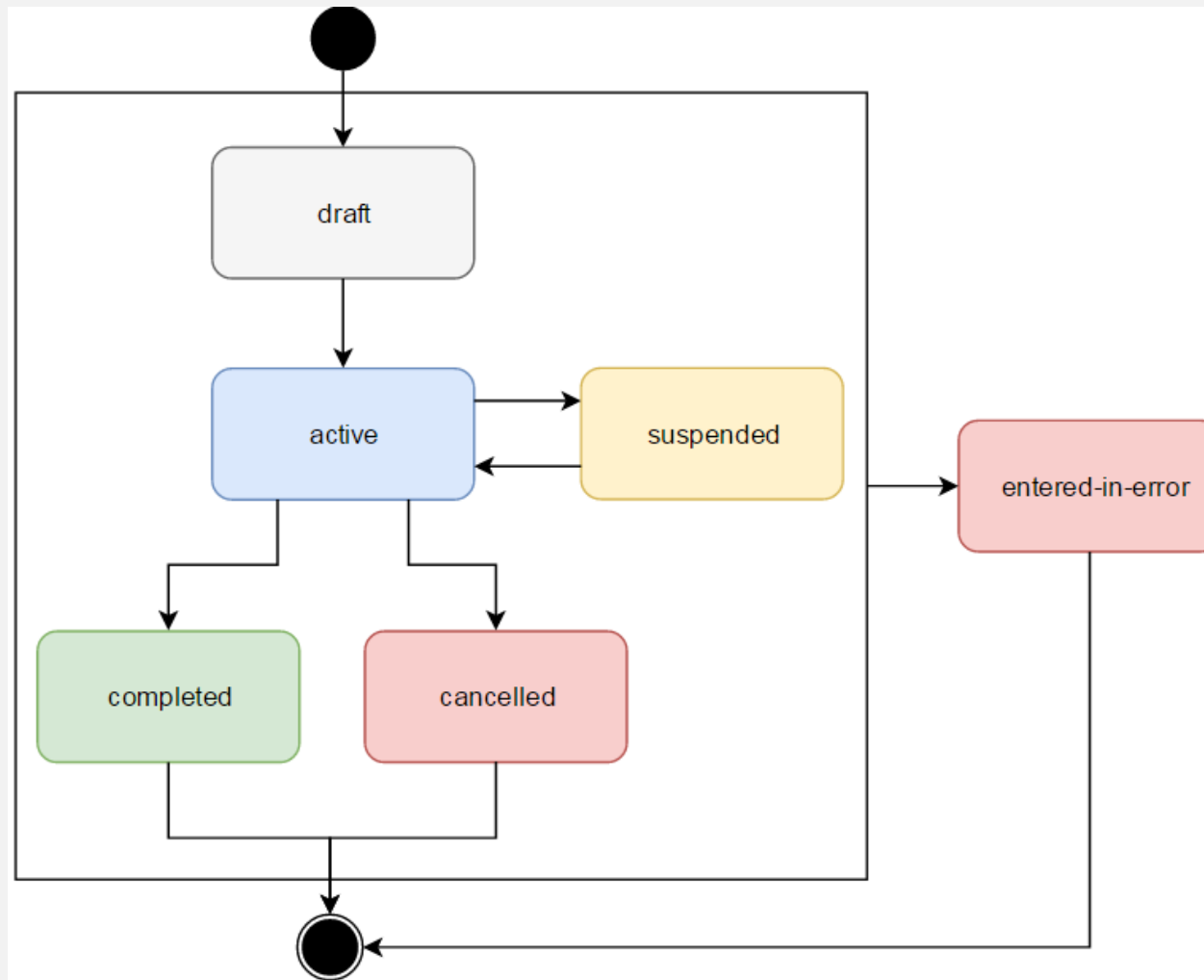
Request vs. Task

- Request represents intention/authorization
- Request does not (by itself) represent “request to act”
 - i.e. Everyone who sees a MedicationRequest doesn’t start counting pills/injecting the patient
 - Even if the request “has your name on it”
- Task lets you say “please do X”
 - Please fulfill; Please change status; Please tell me current progress; etc.

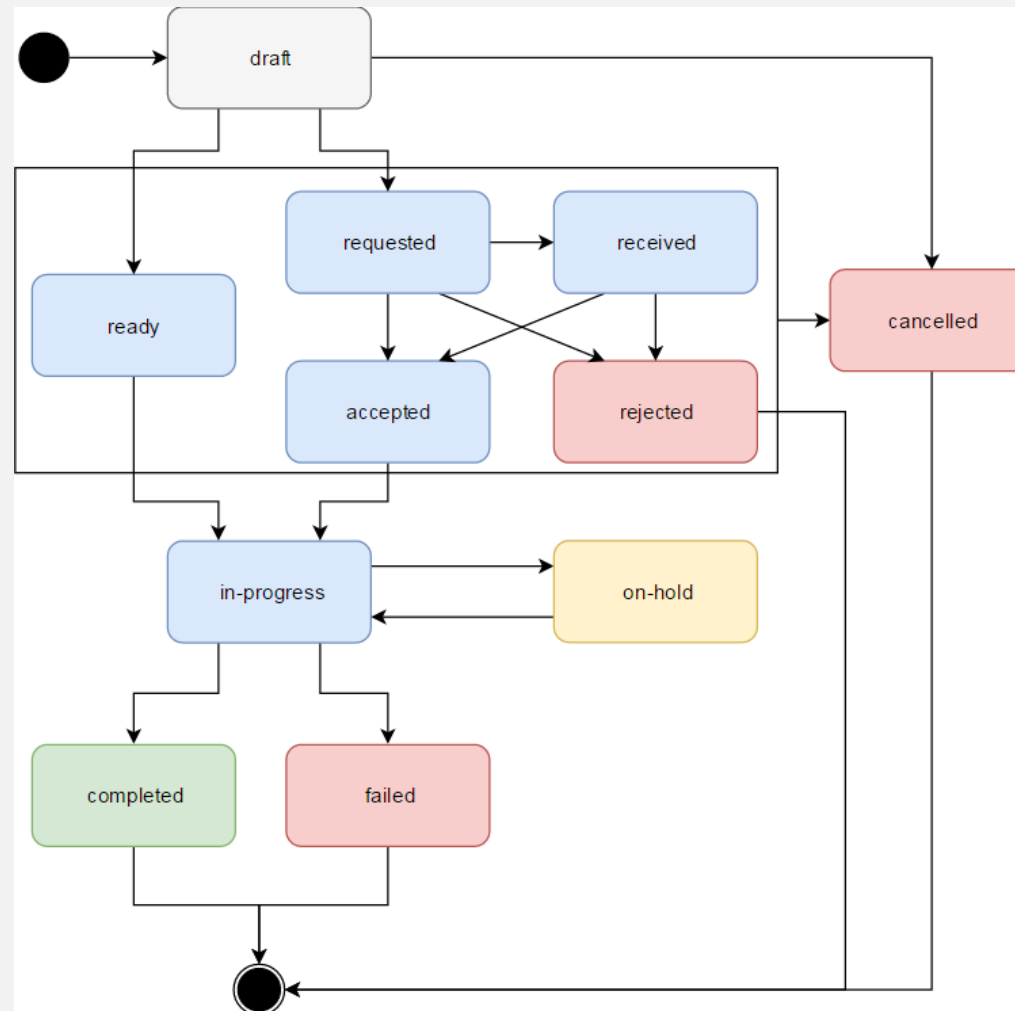
Task



Request state machine



Task state machine



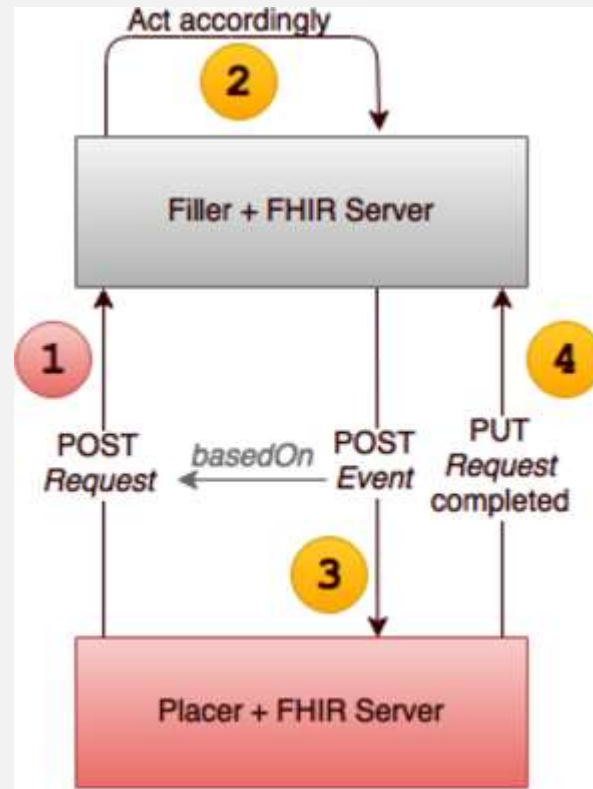
Varying needs for Workflow

- Keep the simple things simple
- Allow 'filler' to say "yes" or "no"?
- Allow 'filler' to negotiate?
- Allow 'placer' to see progress?
- Allow 'placer' to change/revoke authorization?
- Allow 'placer' to receive "results" as linked to initial request?

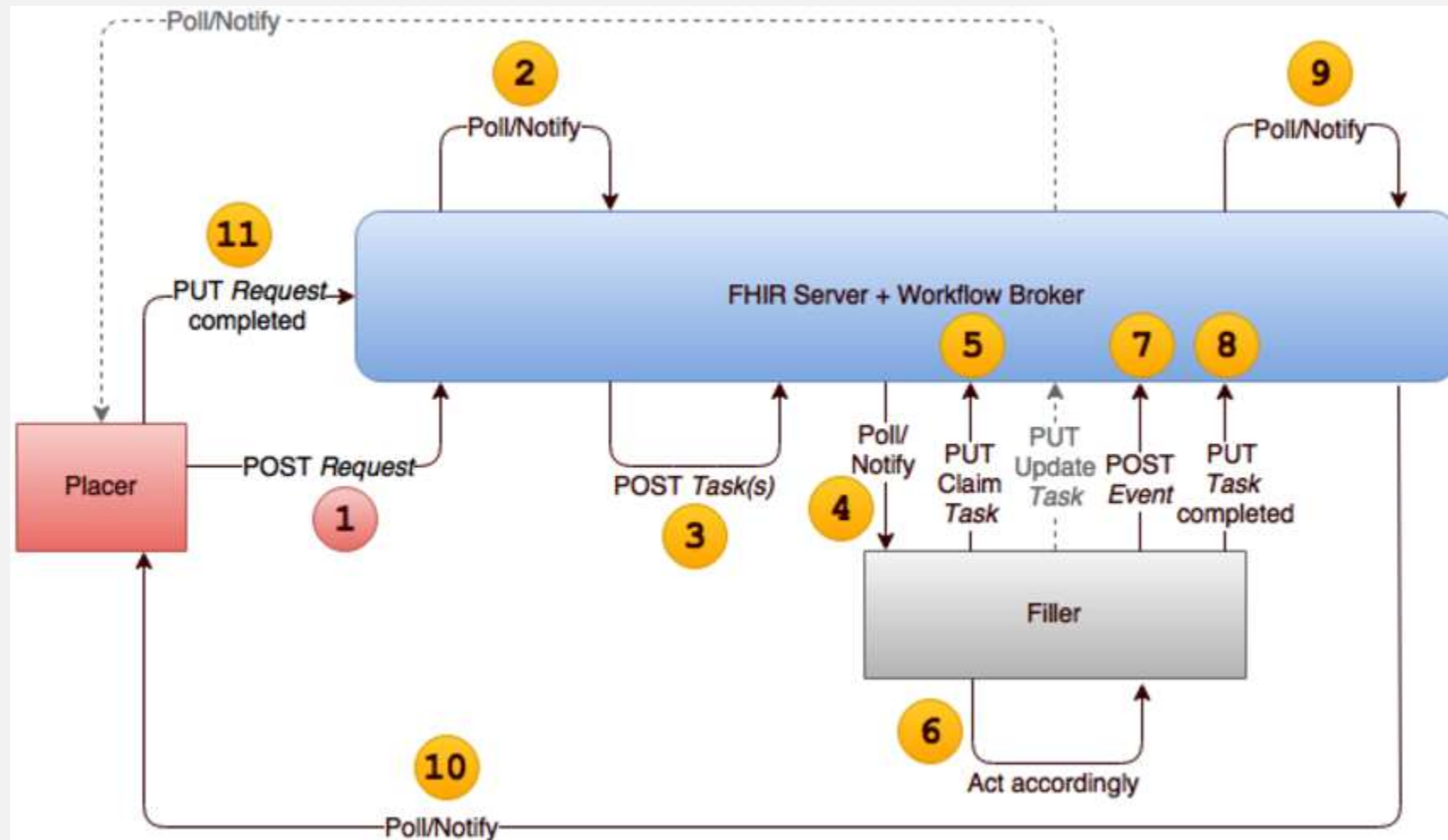
Workflow patterns

- Exemplary, not exhaustive
- Each pattern contains:
 - What are the steps of the pattern
 - What benefits does the pattern provide
 - What are the limitations
 - Recommendations for use of this pattern

B: Direct post to filler



H: Workflow broker



Workflow Updates

- Revamped patterns based on feedback
 - Use PractitionerRole instead of “onBehalfOf” pattern
 - Improved some names
 - “partOf” rather than “parent”, “instantiates” rather than “definition”
 - Added Event.location
 - Made Event.notDone into a status, added statusReason in place of notDoneReason
 - Add additional resources to choices (e.g. CareTeam to performer)

Current state

Workflow Updates

- Introduced a new ExampleScenario resource
 - Allows describing a full workflow
 - Example:
 - <http://zeora.net/blog/mma/examplescenario-mma1-scenario.html>
- Developed reports to identify misalignment with workflow patterns
- Continued to work through example scenarios with lab

What's next?

- Try to get all artifacts aligned by publication of R4
- Support publishing ExampleScenarios in both the main publication and implementation guides
- Try to have at least one ExampleScenario for each FHIR focal area
 - Eventually try to have a few for each workflow pattern
- Continue to exercise at connectathons
 - Are you doing something workflow related at DevDays? Come talk to me 😊
- Continue to improve/clarify documentation
 - Suggestions/volunteers welcome

Questions?

<http://hl7.org/fhir/workflow.html>

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