10/17/19 – Directory Tiger Team

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Scaling Solution

3 potential scaling models:

1. Centralized intermediary – includes centralized components such as MPI, RLS, consent registry, FHIR resource directory
	* Most effective and straightforward approach, but unlikely to be implemented in the US
	* Requirements include:
		+ Patient matching across care settings, payers, community organizations, etc., esp. when we have disparate demographics at different endpoints
		+ Relationships between patients and care settings are known (record locator service or relationship management system)
		+ Availability of a care setting/payer to respond to a specific type of request
		+ Availability of data to be returned from a specific request (and whether the intermediary would help create efficiencies)
	* Easier to scale from a technical perspective, but harder from a governance/legal perspective

Bob – essentially the centralized intermediary is a single national HIE?

* Brandon – Yes. Probably not where the industry is going, but organizations like Change Healthcare, CommonWell, etc. are similar. Need to have these components to scale FHIR
* Bob – This is more than scaling FHIR, it’s scaling the discovery of patients. Isn’t that a different problem?
* Brandon – FHIR today is point-to-point. Let’s say I have a FHIR directory and know that two hospitals share a patient. Without knowing the patient’s demographics on either end or knowing the relationship at hospital 2. Have to set up point-to-point interfaces or query everybody for every patient. How can we scale efficiently to limit the number of calls in a particular region? Patient demographics are “messy” across multiple systems, which makes the network chattier
1. Multiple intermediaries – centralized components/services are replicated across intermediaries
	* Effective way to regionalize or scale based on specific characteristics (e.g. geographic region, care setting); similar to national networks like Carequality
	* Replication of RLS is most important to ensure timely responses from other intermediaries

Brandon – do we care about knowing a patient’s identity across multiple entities and where they have been?

1. Federated - National FHIR directory that includes everybody’s endpoint information. Also a relationship management component that provides info about a patient’s relationships with other entities (to reduce amount of unnecessary queries).

Tony – would you hit every hospital that has a past relationship with the patient?

* Brandon – yes, and Subscription resource can reduce need for RLS and help manage updates to records
* Geimer – subscription work is being done under Argonaut. Currently Subscription is topic-based; each EHR list topics that you may subscribe to (e.g. new patient conditions). Doesn’t necessarily provide the full record. If you want all data, you should consider using bulk data
* Bob – subscription implies that everybody who cares must subscribe to every place where the patient could be seen. Potentially 80k EHRs subscribing to each other. Don’t know how you could do that

Brandon – what does scale mean? Not going to implement a national RLS or FHIR directory. Are we just trying to make endpoints more available?

* Bob – Our original problem was to look reducing the need to connect to each EHR endpoint individually. Is there a role for one or more intermediaries that do what clearinghouses do today (i.e. route things, maintain agreements, perform functions like version management, etc.)? Will likely have a combination of point-to-point and intermediaries in the near-term. Thus, need to figure out what do the intermediaries need to do, especially as we move from document-based exchange to more real-time transactions. To do real-time transactions, intermediaries will need to have new capabilities (e.g. maintain state, perform transactions within a predictable time, etc). How do I scale the technical components involved, as opposed to solving a particular problem like patient record discovery
* Brandon - agree that we will have multiple intermediaries. A hospital/payer wants to know what FHIR servers are available, and which ones have relevant patient data. Trying to create an approach that reduces the number of calls to a FHIR endpoint which don’t return data. An intermediary would provide information about each endpoint that has data about a particular patient, and the user would query each endpoint directly
* Geimer – Because bulk data is asynchronous, an intermediary can pull data from multiple sources, harmonize/de-duplicate, and exchange everything they know about a patient with another intermediary. An asynchronous, “give me some time to get everything and I’ll let you know when it’s ready” approach might be a realistic near-term solution
* Alix – Once it becomes a business model, organizations would become dependent on it and it’s no longer a short-term gap filler
* Geimer – It may be the right business model for the future. Don’t want to ignore bulk data because it’s implementable and addresses some of today’s problems
* Bob – Bulk data doesn’t address the need for real-time data
* Geimer – still useful for replicating services across intermediaries. If an intermediary doesn’t have data to respond to a query and needs to ask another intermediary who then needs to ask all of its endpoints, it won’t happen in real-time either

Bob – we’re focused on finding data about a patient, not on managing a clinical workflow. Is there a reason?

* Brandon – consider a provider in an acute care setting looking for a patient’s past lab values. Should the provider query everybody in the region individually, or first figure out where the patient has been and then query those places?
* Bob - if the patient is insured, I can go to the payer and figure out where the patient has been seen.
* Brandon – that just shifts responsibility for record location
* Bob – the difference is that there is a formal relationship between patient and payer, yet we’re talking about creating an intermediary that replicates the relationship
* Brandon – not necessarily relying on a special intermediary to do this. Rather, these are the components of effective exchange. If payers are going to stand up this infrastructure, there is no reason not to rely on them. Maybe payers are the intermediaries of the future.
* Jason – sometimes patients are covered by more than one payer
* Geimer – or they see providers that aren’t part of their payer’s network
* Brandon – ultimately, patient matching and record location are essential components that have to be solved at scale
* Alix - Has to provide for the messy diversity that will be the reality for a long time. Has to be designed to handle the point-to-point “happy path” as well as more convoluted environments

Bob – The use cases we keep discussing involve the discovery of information. There are other aspects of clinical workflow like prior authorization, orders, referrals etc. I’d argue that having to locate the records for a patient who shows up at the provider’s office is the exception rather than the rule. How do we deal with everything else that happens every day for every provider? In a normal clinical workflow, the provider sees the patient. The provider needs to know if there is something they have to do (e.g. quality measures, gaps in care). They need to know if they need special documentation, who to order from, etc.

Murta – Are the two intermediaries replicas of each other, i.e. they are separate nodes but they are providing the same functionality using the same resources and they don’t cover different things

* Brandon – They don’t have to be. Intermediary services act like networks and don’t necessarily cover every patient. The only thing that is completely replicated is the FHIR resource directory. Everybody will have to submit their FHIR resource to a national directory
* Geimer – MiHIN is a network-of-networks. They proxy everything, so they know where all of the resources are but providers don’t have to submit them [to a central directory]. Its functionally equivalent
* Murta – From the FHIR directory perspective, the intermediaries replicate one another. Similar to a blockchain where you have federated nodes that are separate but equal and they all have access to the same information regardless of where it is stored. What if I only wanted to use the directory to find endpoints, without also using the other components?
* Brandon – yes, can still do point-to-point

Murta – in the simplest case, intermediaries provide directory services at scale. You don’t have to configure every endpoint bidirectionally. Instead you ping the intermediary service, receive an endpoint, and then it becomes the broker to exchange information

* Bob – is the intermediary the broker to exchange information or the place to find the endpoint? Those are two different operations. If the intermediary is the broker, then they have to do state management, routing, etc.

Bob – We’re assuming that the primary purpose of scaling is to continually discover a patient’s record. I know we built HIEs to do that, but once I have the information I need, I still have to deal with a workflow involving a potentially huge number of FHIR transactions. There is a whole workflow side that these models don’t scale.

* Brandon – If I discover where the record is, and the changes to that record, I can query for it as appropriate. Trying to limit the number of calls it takes to facilitate the workflow. Otherwise, we’ll end up in an environment like we had in v2.
* Bob – What about the rest of the workflow that doesn’t involve discovery? E.g. I’m going to order a test or medication. Do I need prior auth for it? Do I need special documentation? Has nothing to do with where the record is, has to do with who the payer is, what providers are in the network, etc.
* Alix – Are we talking about different workflow needs that have to fit into a standardized model? There will be times when you don’t know who has what you need, so you have to have the ability to discover the endpoint.
* Bob – you are conflating two things. Discovery of the endpoint is one thing. Getting a record I’ve never had before is essentially a one-time occurrence. Discovery is the start of the workflow, not the flow itself
* Alix – Multiple functions I need to perform to complete a clinical workflow. Shouldn’t I have a standard model for reaching out beyond my walls to get data regardless of what step I’m at in the process?
* Bob – yes. The question is what are the transactions and what volume of data will they create? Gathering the record is a one-time occurrence and might not happen every visit. Many other things happen during an encounter
* Brandon – Aren’t they just in the resource directory? If I need to do a referral I’ll call the resource directory. The Referral resource in FHIR says…
* Geimer – No, in this case you are creating the Referral resource and pushing it somewhere. You aren’t looking for a referral, you are creating one
* Bob – exactly. These are the type of activities that will create a large volume of transactions

Brandon – let’s go through the referral workflow then. What’s the first thing I need to know?

* Bob - need to know if they are in network, whether they have calendar space available. Need to schedule the appointment. Have to do these functions in real-time because of attrition
* Brandon – You need to know which FHIR resources you have to call to make the referral.
* Bob – A more complex example: ordering an MRI. First you have to get prior auth from the payer, which doesn’t necessarily involve exchanging information located from outside of the EHR. Next you have to figure out which imaging centers are in network and will be covered by the payer. Then you have to figure out which imaging center works best for the patient and schedule the appointment. The patient can leave with their MRI authorized and an appointment at a convenient imaging center. Helps increase the chances that the patient will get the MRI. We’ll probably see more volume leveraging FHIR for these types of transactions than we would see for discovering patient records. Whichever model we use has to scale this aspect as well as record location. Starting to integrate administrative and clinical data, so our scaling solution has to handle both, because that’s where the transaction volume will be

Brandon – So we need to include additional infrastructure in the model, e.g. aggregation? Is this different than a FHIR resource directory?

* Bob – Do you mean endpoint directory?
* Brandon – The endpoint directory or the FHIR resource won’t say “can you take the patient for an MRI next Tuesday.”
* Bob – do I want to make a call to each payer through a point-to-point connection or do I want somebody in the middle that can route those connections for me? Think transaction routing rather than master patient indexing. I potentially want to send a prior auth request to a single endpoint, and let the entity in the middle route it to the appropriate payer based on the information I provide. They maintain the connections/exchanges and return a response. The intermediary won’t maintain the information necessary to answer my request, but it will know where to route the transaction
* Tony – We’re trying to develop the infrastructure to allow an intermediary to do those activities, but we don’t need to design the broker itself. Just need a registry of the endpoints and allow entities to access the endpoints to discover whether FHIR resources exist to support these activities
* Bob – we have to set some parameters. E.g. if these transactions are real-time the intermediary has to be able to maintain state and do everything I would otherwise do for a point-to-point connection. If there are multiple intermediaries, they have to do so as a group. Not trying to architect the intermediary, rather the performance characteristics of it
* Tony – As long as we can support the point-to-point transactions, it doesn’t matter if somebody wants to create an intermediary as a service for those endpoints. And to support point-to-point all we need is identity, consent, and a directory. Basically just the services to find the information you need to make point-to-point connections work
* Bob - do I need something above and beyond what I need for a point-to-point connection to make an intermediary work? E.g. certain information to handle routing
* Tony – Consider a claims clearinghouse. The fundamental data they need is the same that a broker would need and the same that a provider would need to connect directly to the payer.