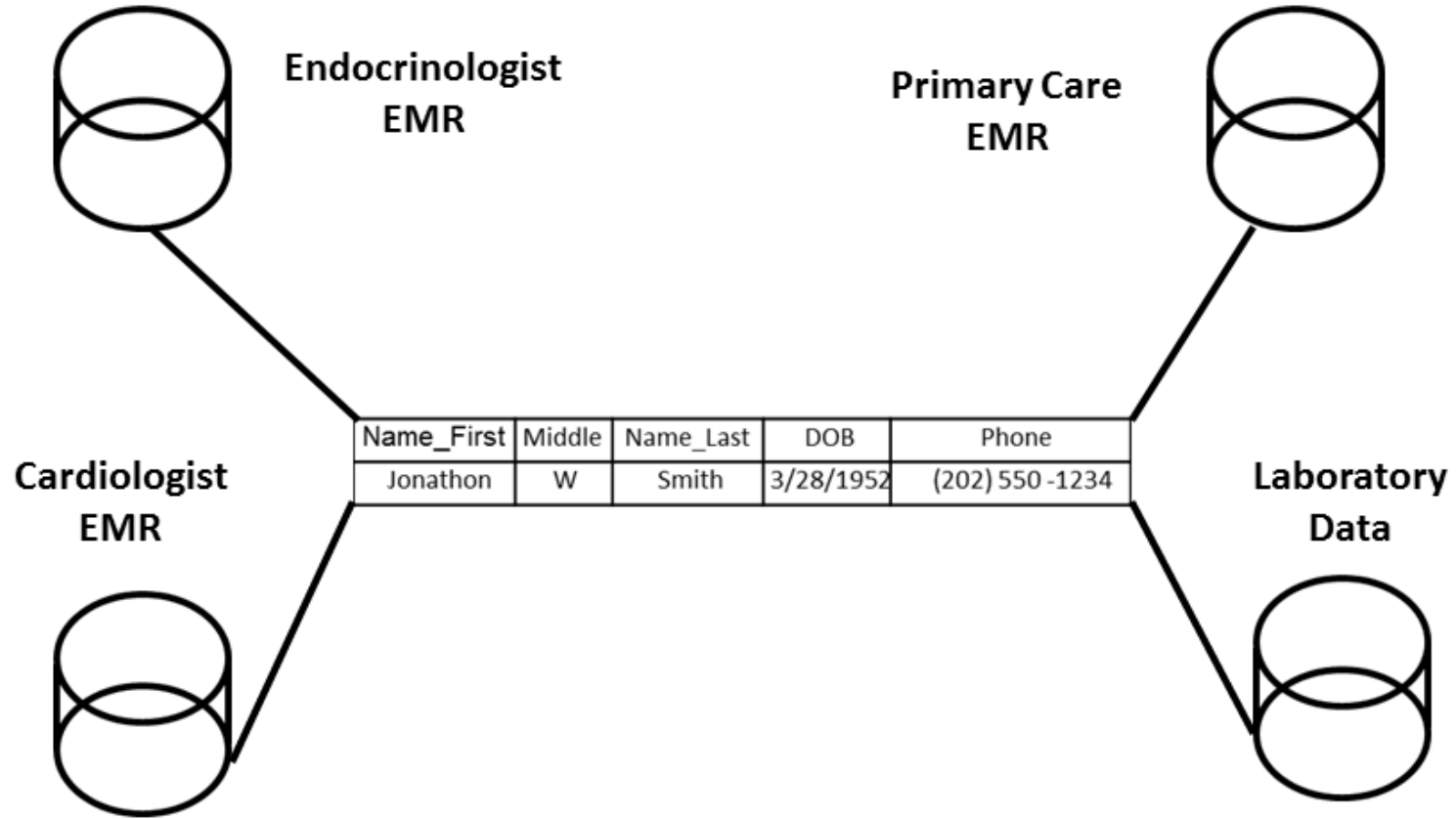


Patient Matching Definition

Patient matching: **Comparing** data from **multiple sources** to identify records that represent the **same patient**. Typically involves comparing varied demographic fields from different health data stores to create a unified view of a patient.

Name_First	Middle	Name_Last	DOB	Phone
Jonathon	W	Smith	3/28/1952	(202) 550-1234

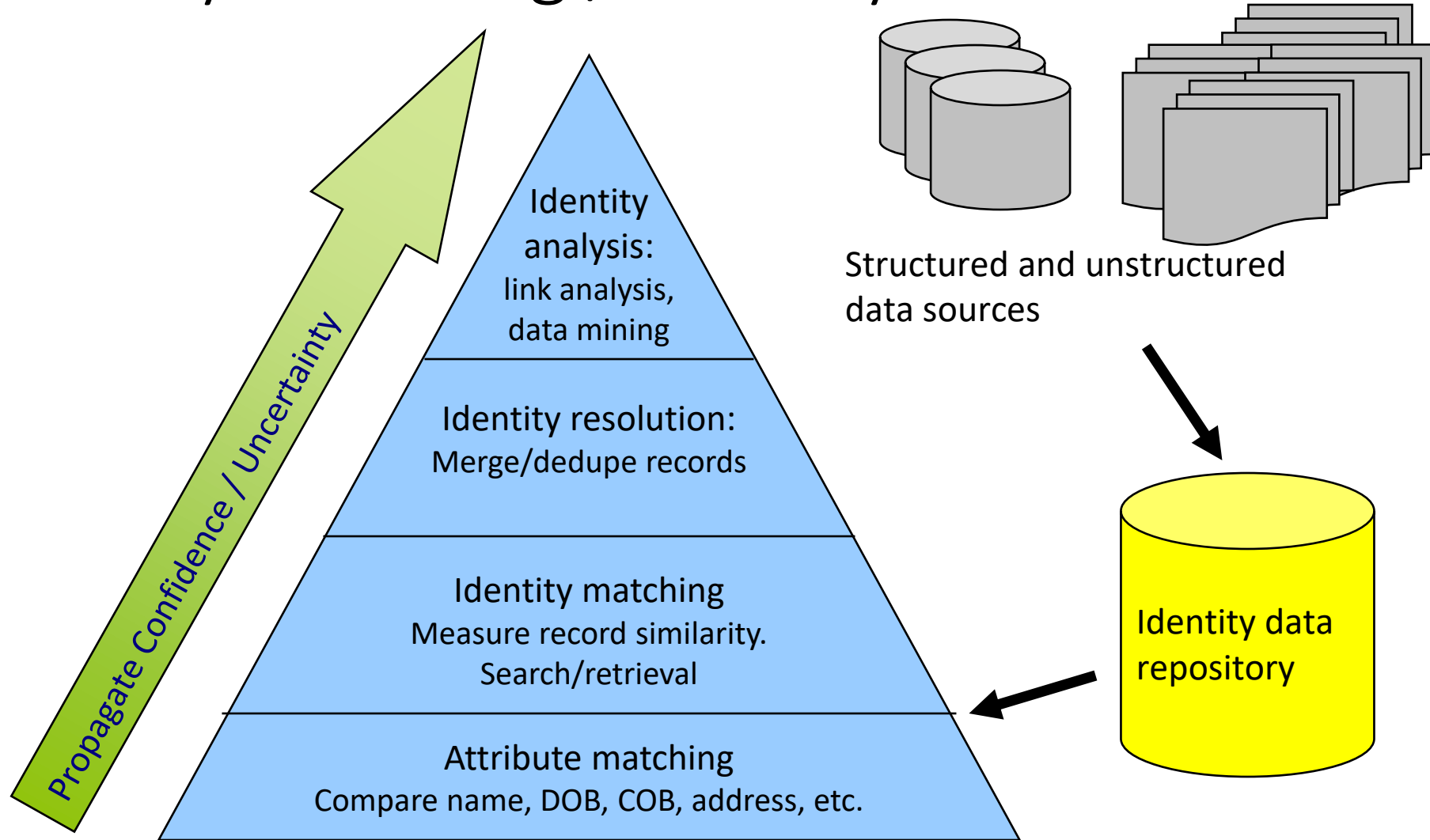
First	Middle	Last	DOB	Phone
Smitty	W	Smith	3/28/1952	(202) 550-2143



First_Name	Middle	Last Name	DOB	Phone
Jonathon	W	Smith	3/28/1952	(202) 550-1234

First_Name	Middle	Last Name	DOB	Phone
Jon		Simth	30-28-52	999-999-9999

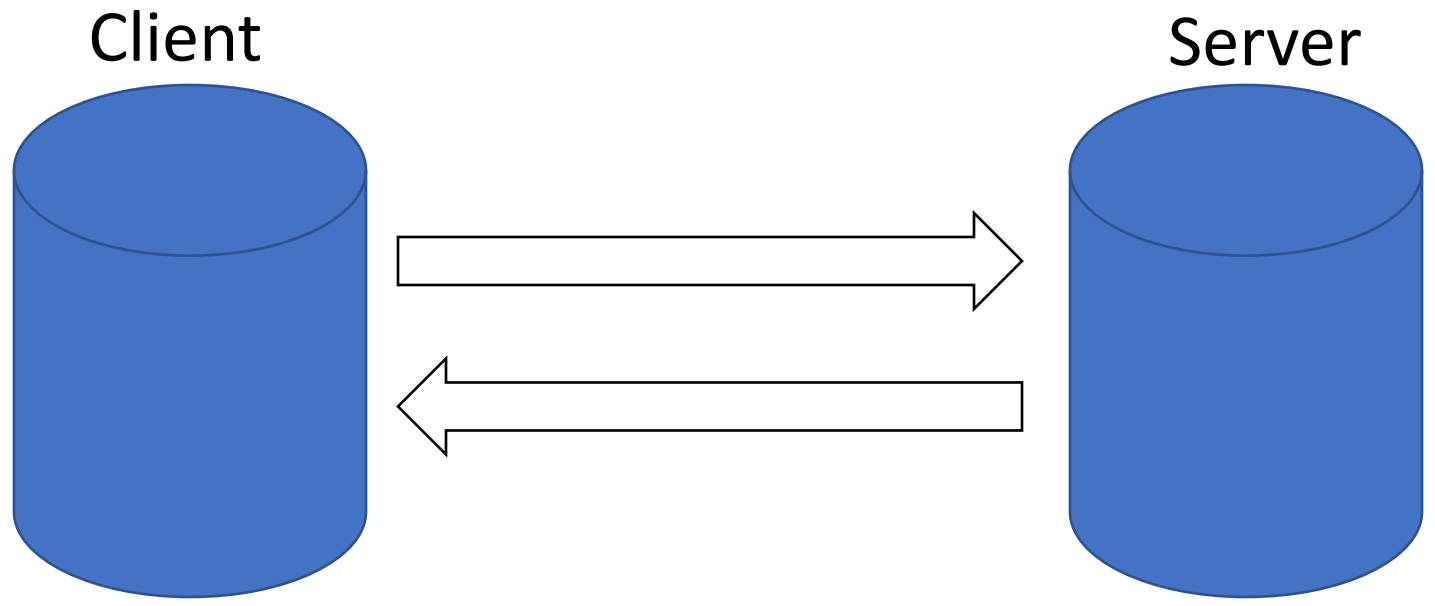
Identity Matching / Identity Resolution



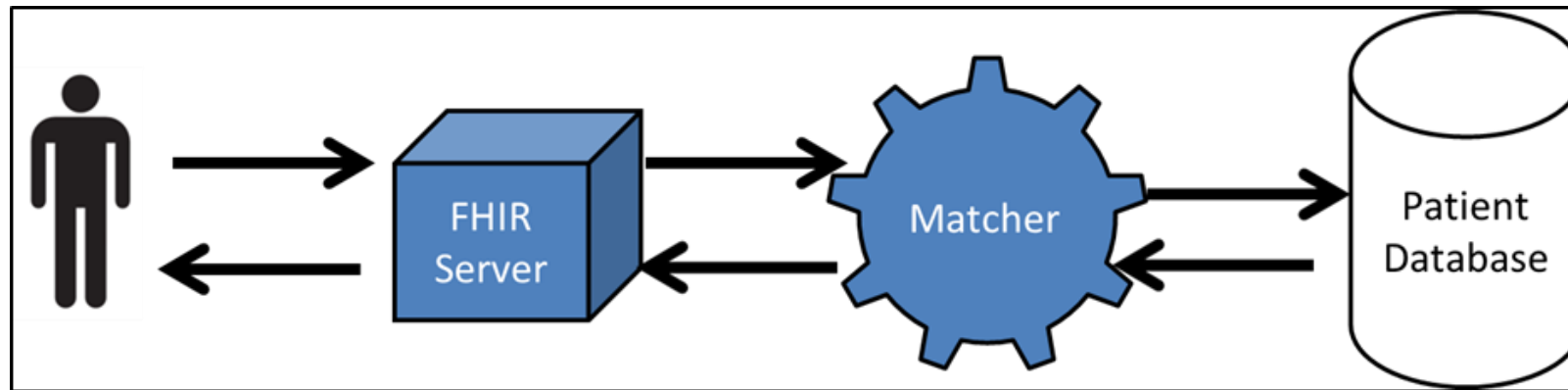
How FHIR Can Help

- FHIR Enabled Patient Matching
 - Current matching system have different scoring scales which makes interpretation of meaning difficult when using different systems.
 - 0-1, 0-100%, -4000-40000
 - Standardize patient matching score
 - -1 – 1, 0-100%, 0-1, (Probable, Possible, Certainly Not), Others
- Testing of Patient Matching Systems
 - Fit for Use
 - Algorithms tested on data that is representative of its use case.
 - Add Validation stamp to the FHIR returned FHIR profiles
- Move towards a specification for patient matchers that allows them to be interchanged like SMART on FHIR applications

Simplest Model



Need a Way to Incorporate Probabilistic Matching



Use Case

- A patient arrives at a provider
- The provider wants to query an eMPI to see if there are existing records for this person

FHIR

- FHIR Necessary but not Sufficient for Interoperability
- No Magic Bullet for matching
 - Currently many different matching solutions work well
 - No standardized solution to allow uniform integration into Health IT enterprises.
- Challenge
 - FHIR Great solution for Connection, Structure
 - Provides more than one way to do things
 - Need ability to Do Complex Matching and Entity Resolution
- Matching Complex Challenge
 - Dirty Data
 - Blocking
 - Schema Matching
 - Computational Complexity
 - Lack of Unique Identifiers or Identifiers

Patient Search Parameters

5.1.9 Search Parameters 🌐

Search parameters for this resource. The [common parameters](#) also apply. See [Searching](#) for more information about searching in REST, messaging, and services.

Name	Type	Description	Paths
active	token	Whether the patient record is active	Patient.active
address	string	An address in any kind of address/part of the patient	Patient.address
address-city	string	A city specified in an address	Patient.address.city
address-country	string	A country specified in an address	Patient.address.country
address-postalcode	string	A postalCode specified in an address	Patient.address.postalCode
address-state	string	A state specified in an address	Patient.address.state
address-use	token	A use code specified in an address	Patient.address.use
animal-breed	token	The breed for animal patients	Patient.animal.breed
animal-species	token	The species for animal patients	Patient.animal.species
birthdate	date	The patient's date of birth	Patient.birthDate
careprovider	reference	Patient's nominated care provider, could be a care manager, not the organization that manages the record	Patient.careProvider (Organization , Practitioner)
deathdate	date	The date of death has been provided and satisfies this search value	Patient.deceasedDateTime
deceased	token	This patient has been marked as deceased, or as a death date entered	Patient.deceased[x]
email	token	A value in an email contact	Patient.telecom(system=email)
family	string	A portion of the family name of the patient	Patient.name.family
gender	token	Gender of the patient	Patient.gender
given	string	A portion of the given name of the patient	Patient.name.given
identifier	token	A patient identifier	Patient.identifier
language	token	Language code (irrespective of use value)	Patient.communication.language
link	reference	All patients linked to the given patient	Patient.link.other (Patient)
name	string	A portion of either family or given name of the patient	Patient.name
organization	reference	The organization at which this person is a patient	Patient.managingOrganization (Organization)
phone	token	A value in a phone contact	Patient.telecom(system=phone)
phonetic	string	A portion of either family or given name using some kind of phonetic matching algorithm	Patient.name
telecom	token	The value in any kind of telecom details of the patient	Patient.telecom

<http://www.hl7.org/implement/standards/fhir/patient.html#search>

What's missing to satisfy the use case?

- The user can't specify min/max matching scores on the returned results
- There is a desire for uniformity on the search score that is returned
 - Additionally, information on system validation and training would be helpful in interpreting the results.

Sample Query

- SearchPerson: POST

<https://pme.mybluemix.net/mdmcloud/pme/search/person>

```
• {  
  "person": { "legalName": [  
    { "lastName":"Smith",  
      "givenNameOne":"Tiger" }  
  ],  
  "businessAddress": { "addressLineOne": "12 Main street",  
    "residenceNumber": "22",  
    "city":"Toronto",  
    "provinceState": "Ontario",  
    "zipPostalCode": "M5V 6D8",  
    "country": "Canada"  
  }  
}
```

<https://www.ng.bluemix.net/docs/#services/probabilisticmatch/index.html> accessed Feb. 18th 2016

Sample Response

- { "searchPersonResult": [
 {
 "matchType": "CERTAIN",
 "score": "95",
 "sourceId": {
 "primaryKey": "101",
 "source": "MDMSP" } }, {
 "matchType": "POSSIBLE_MATCH",
 "score": "94",
 "sourceId": {
 "primaryKey": "102",
 "source": "MDMSP" } },

Search Using FHIR

- Advanced Search Abstraction
 - GET [base]/Patient?query=name¶meters...
- Example
 - GET [base]/Patient?given=Robert& \ family=Smith&birthdate=1990-01-01
- This can be leveraged to create a patient matching system interface

Potential Extensions to Search

- Single Threshold
 - GET [BASE]/Patien?given=Robert&Family=1990-01-01&/score?minscore>=90
- Dual Threshold
 - GET [BASE]/Patien?given=Robert&Family=1990-01-01&/score?minscore>=90&maxscore>=95
 - Could then cut off matches automatically for no-return, needs further review, and automatic matches