

Evac Operations and COP

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- Situation
 - A large tropical storm has devastated a multi-national archipelago
 - An outbreak of zombie virus ZV1 has appeared in the population
 - ZV1 has a strong social stigma attached.....
- Collaborative effort with semi-trusting partner forces responds
 - Each force belongs to one of several “organizations”
- Multiple customers of COP at diverse fidelities
 - Modeled as belonging to one of several “organizations”



Roles that Submit Queries

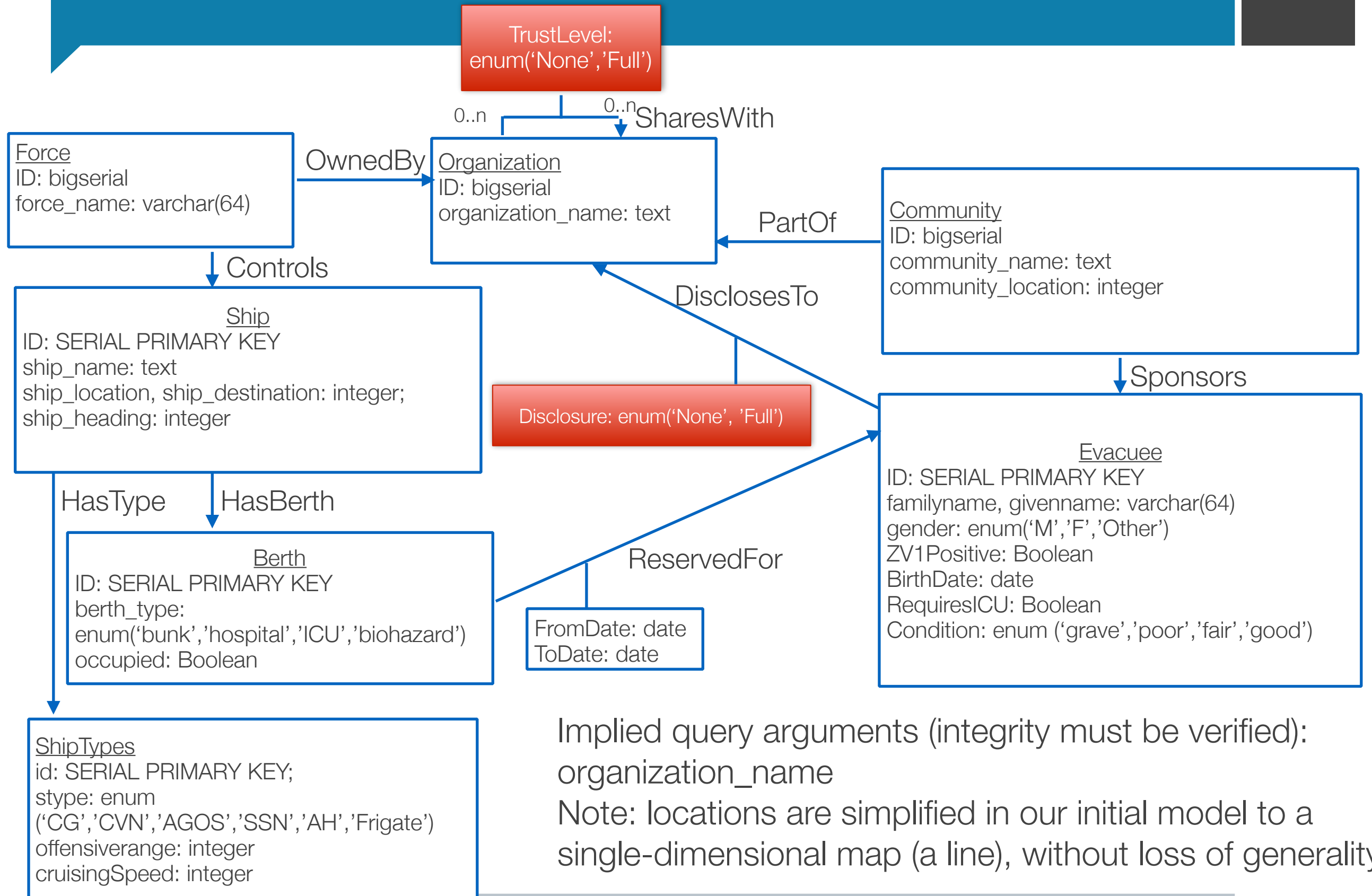
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- Naval commander (blue, green) / policy decider
 - Motivations: tactical force protection; situational awareness; non-disclosure of capabilities
 - Example query: what airlift assets do I have untasked but ready to go?
- Community emergency response coordinator
 - Motivations: caring for injured; satisfying local demand for relief; law & order
 - Technical constraints: limited compute power (mobile phone only)
 - Example query: when will the last evacuee be on board an airlift?

- Search & rescue specialist
 - Motivation: locate & rescue missing persons, deliver supplies as needed
 - Example query: How many evacuation beds are needed at <location> now?
- UN secretary for emergency relief (generic international official)
 - Motivations: high-level situational awareness; cooperation among relief providers
 - Example query: When will all affected casualties be evacuated?
- Evacuee or family member
 - Motivation: keep personal information from being used against me
 - Example query: where is the evacuee from my family housed now?

- Intelligence analyst
 - Motivations: awareness of threats to blue force; acquisition of details of green force; acquisition of details on individual evacuees
 - Abilities:
 - observe any computation done on any server except any physically controlled by a green or red force
 - insert data into any blue force data set; 3) query as any other user role
 - Example query
 - Do any of the helicopters in use for search and rescue carry heavy offensive weaponry? (hint: differential privacy helps here)

Data Model



Implied query arguments (integrity must be verified):
organization_name
Note: locations are simplified in our initial model to a
single-dimensional map (a line), without loss of generality

Sample Queries - See SQL file

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-- List names, types, and unoccupied berth counts of all ships and prioritize them by quickest arrival at city1

-- Role: Community Emergency Response Coordinator

```
SELECT ship_name, stype AS ship_type, count(berth_id) AS Number_Of_Berths, (abs(s.ship_location - c.community_location)/st.cruisingspeed) AS eta
FROM ship s
    JOIN shiptype st ON s.shiptype_id = st.id
    JOIN hasberth hb ON s.id = hb.ship_id
    JOIN berth b ON b.id = hb.berth_id,
    community c
WHERE c.community_name = 'city5' AND occupied = FALSE
GROUP BY ship_name, stype, s.ship_location, c.community_location, st.cruisingspeed
ORDER BY eta;
```

-- Count the total number of biohazard evacuation berths available in all forces Role: Search & Rescue specialist

```
SELECT count(berth_id) AS Number_Of_ICU_Berths
FROM ship s
    JOIN hasberth hb ON s.id = hb.ship_id
    JOIN berth b ON b.id = hb.berth_id
WHERE b.berth_type = 'biohazard' AND b.occupied = FALSE;
```

-- List names and genders of all evacuees that are HIV positive Role: Intelligence Analyst

```
SELECT givenname, familyname
FROM evacuee
WHERE ZV1Positive = TRUE;
```

-- How far away is the nearest potential adversary ship (USN vs. PRC)? Role: naval commander

-- How many more evacuation berths of each type are needed in this response effort? Role: UN secretary for emergency relief

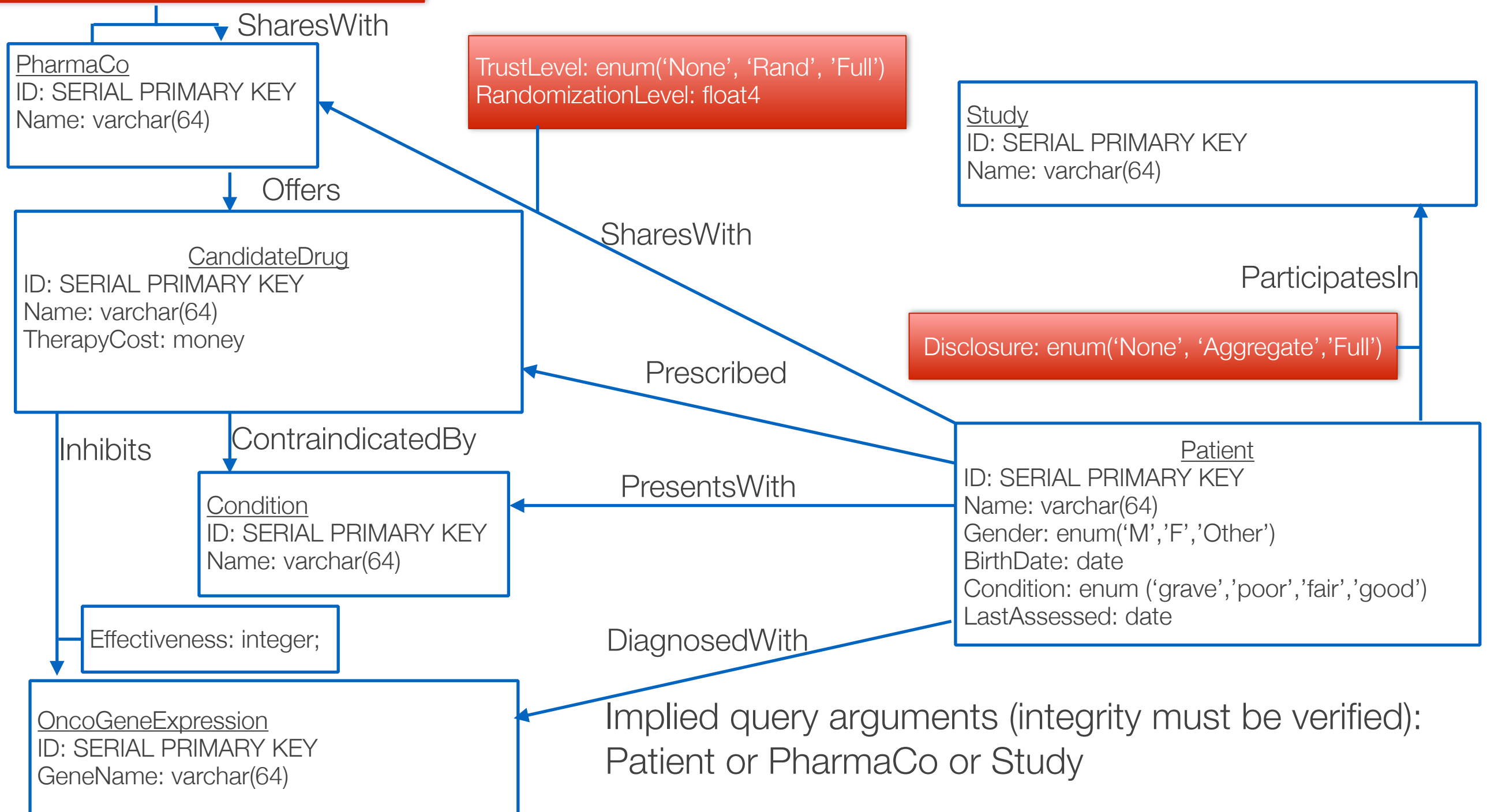
-- What ship is evacuee John Doe occupying a berth on? Role: several

-- List the names, locations, force affiliations, headings, cruising speed, and berth occupancy rate of all ships

-- List the names, locations, organization affiliations, and evacuee populations of all communities

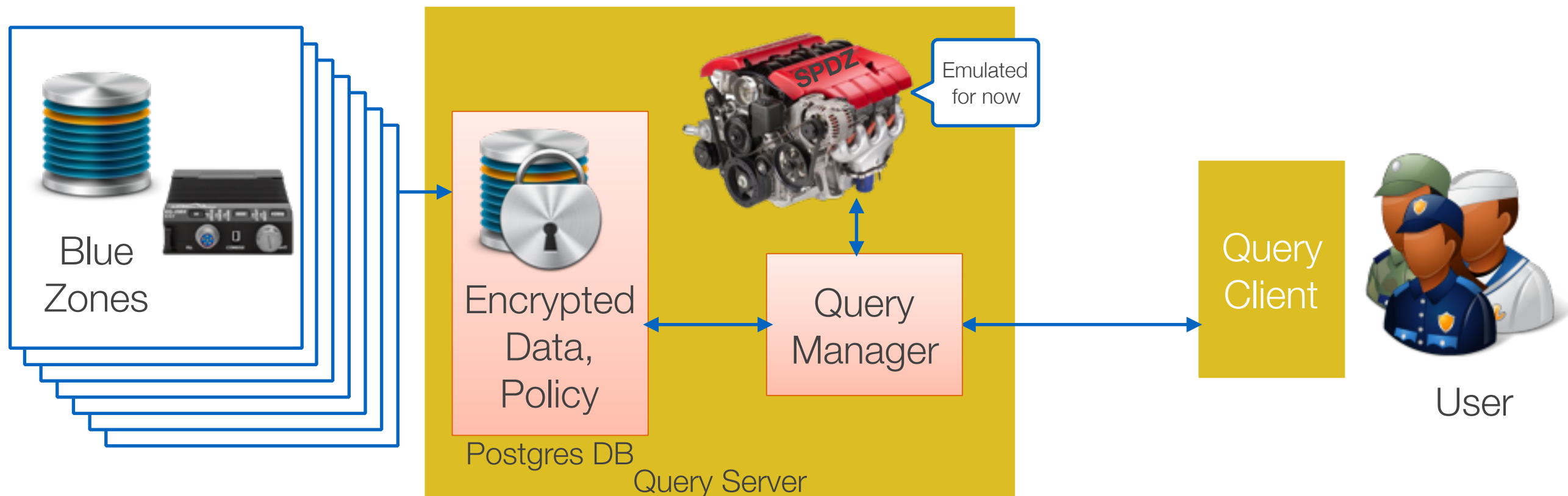
A Medical Setting For Future Use

TrustLevel: enum('None', 'Rand', 'Full')
RandomizationLevel: float4



Architecture of First Prototype

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Idea: Privacy as a Currency

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- Currency of privacy - several dimensions
 - Earned by proof of work X proof of sharing X proof of trust
 - Rates of pay set by type of event
 - Privacy “pricing” market, minimum bid set by data subjects
 - How dynamic data is correlates to price
 - Optimized value computation - “stock market” of information / resolution
 - Continued ownership of access?
 - Or “auction” - purchase degrades value
- Policies specify accuracy - how to implement