Open@Epic CONFERENCE 2025

Performance, Scalability, and Data Privacy

Presenters

Seth Tracy

Interfaces and Web Services

Learning Objectives

1. Pick the right tool for the job
2. Identify common performance pitfalls
3. Understand best practices for data privacy and security

Brute Force and Vibes

Building for Scale

“If all you have is a hammer, everything looks like a nail”

-Abraham Maslow

Seth's

~~Maslow's~~

Hierarchy of Scalable App Design

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~~Maslow's~~

Hierarchy of Scalable App Design

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~~Maslow's~~ Hierarchy of Scalable App Design

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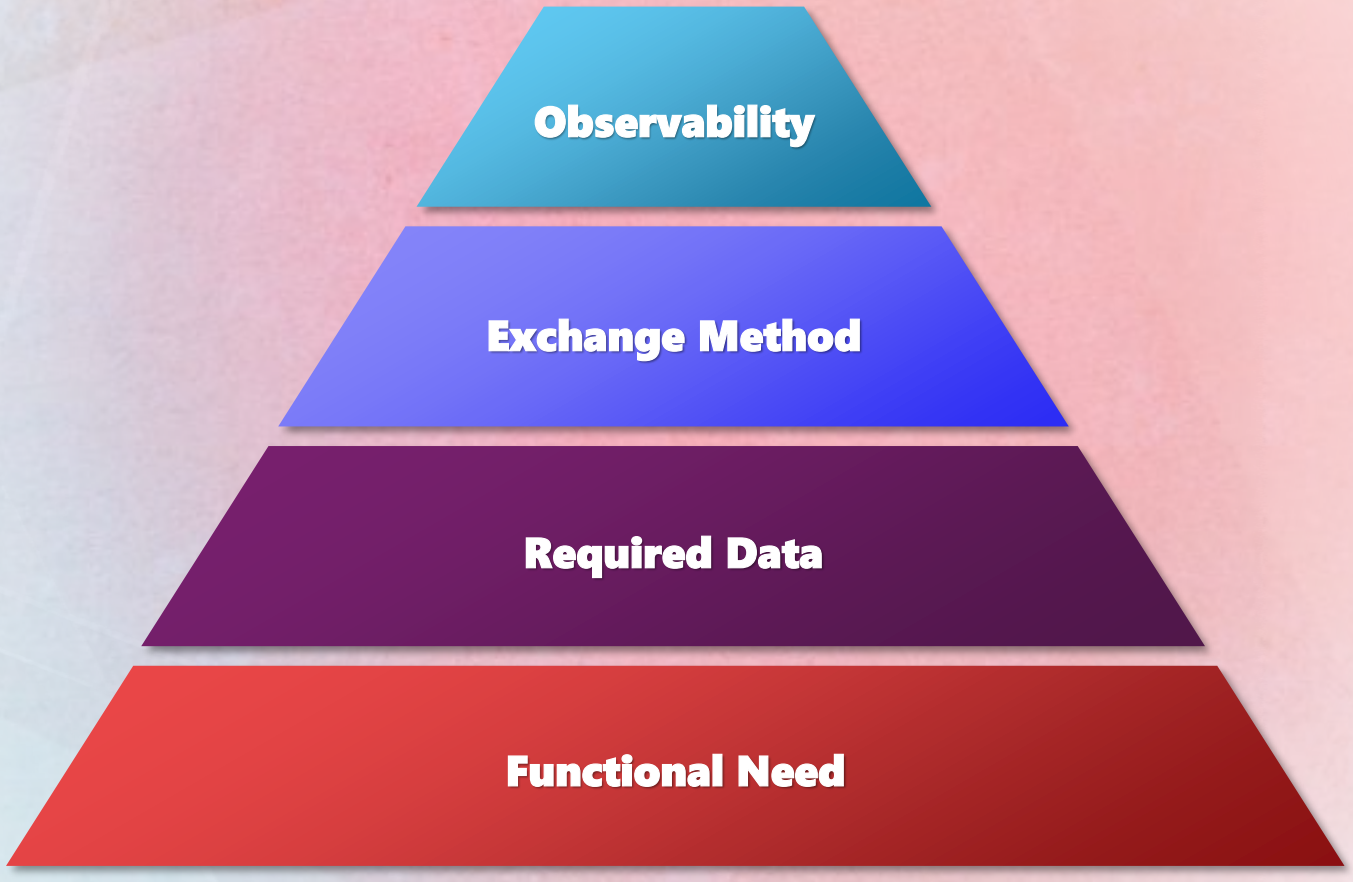
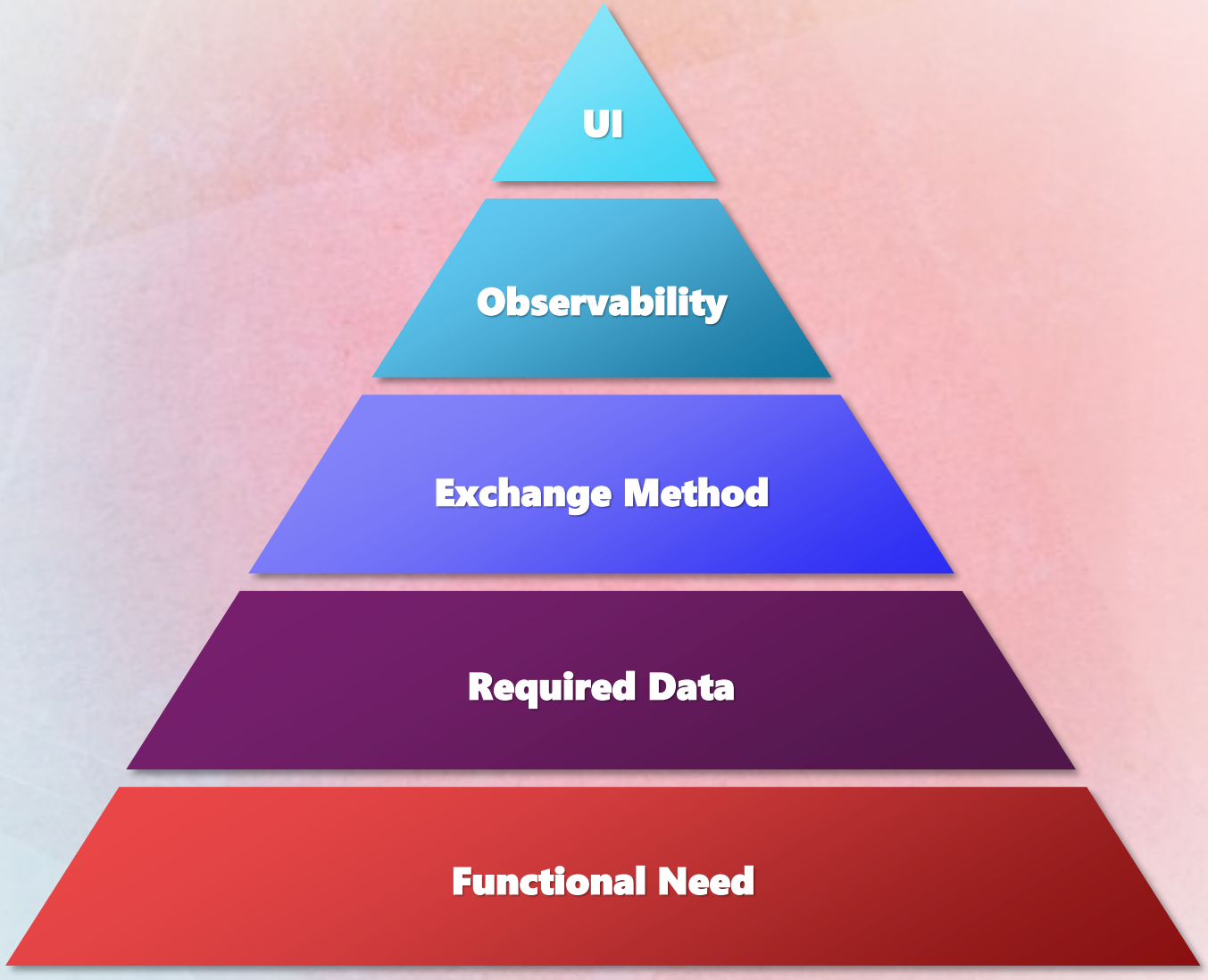
Hierarchy of Scalable App Design



Seth's

~~Maslow's~~ Hierarchy of Scalable App Design



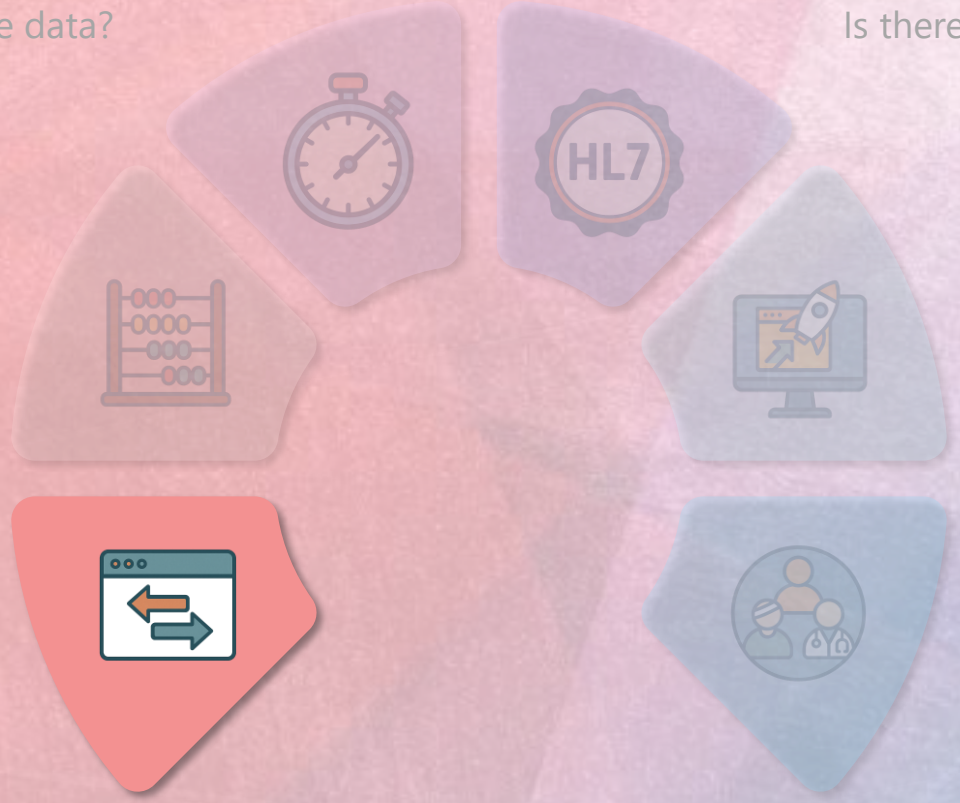
Picking Your Hammer

Recency

When do you need the data?

Standards

Is there an existing standard to use?



Volume

How much data do you need?

Trigger Type

Is the app launching from a specific context?

Direction

Will the data be pushed or pulled?

Audience

Who is consuming the data?

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System to System

	Recency	Volume	Direction	Standards	Trigger
HL7 Interfaces	Real-time	High	Push	✓	Event-driven
RESTful FHIR	Real-time	Low	Push/Pull	✓	On-demand
HL7 CDA	Varies	Moderate	Push/Pull	✓	Varies

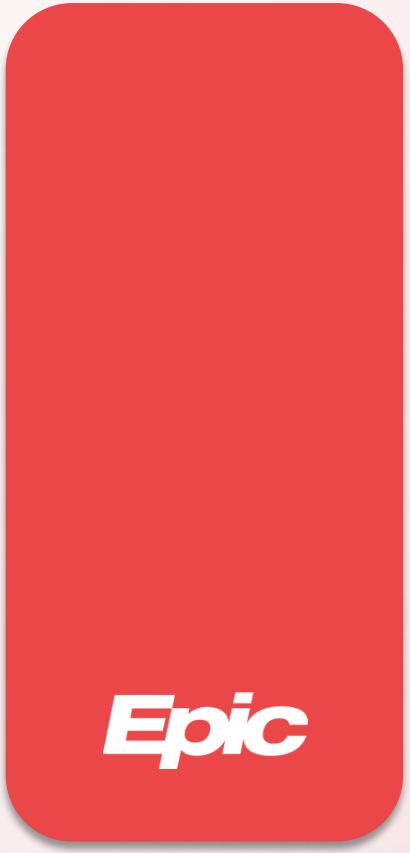
Contextual Launch

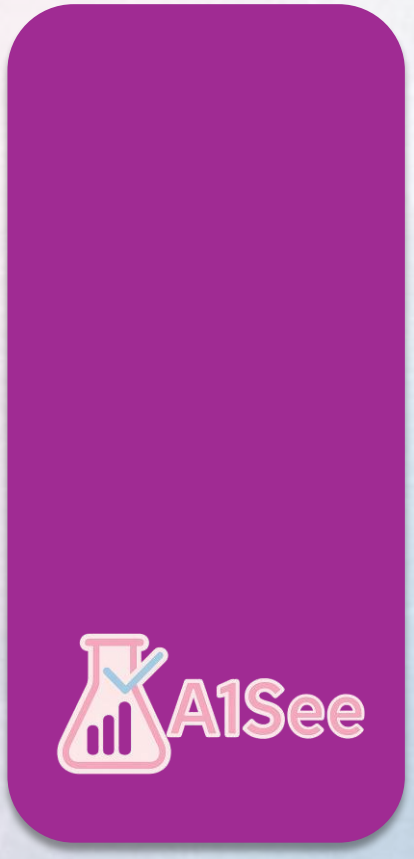
	Recency	Volume	Direction	Standards	Trigger
SMART-on-FHIR	Real-time	Low	Bidirectional	✓	On-demand
CDS Hooks	Real-time	Low	Bidirectional	✓	Event-driven
FHIRCast	Real-time	Low	Bidirectional	✓	Contextual

Other Exchanges

	Recency	Volume	Direction	Standards	Trigger
Bulk FHIR	Delayed	Moderate	Pull	✓	Batch
Reporting Tools	Delayed	High	Push/Pull	X	Batch
Other Web Services	Real-time	Low	Varies	X	Varies

Putting It Together





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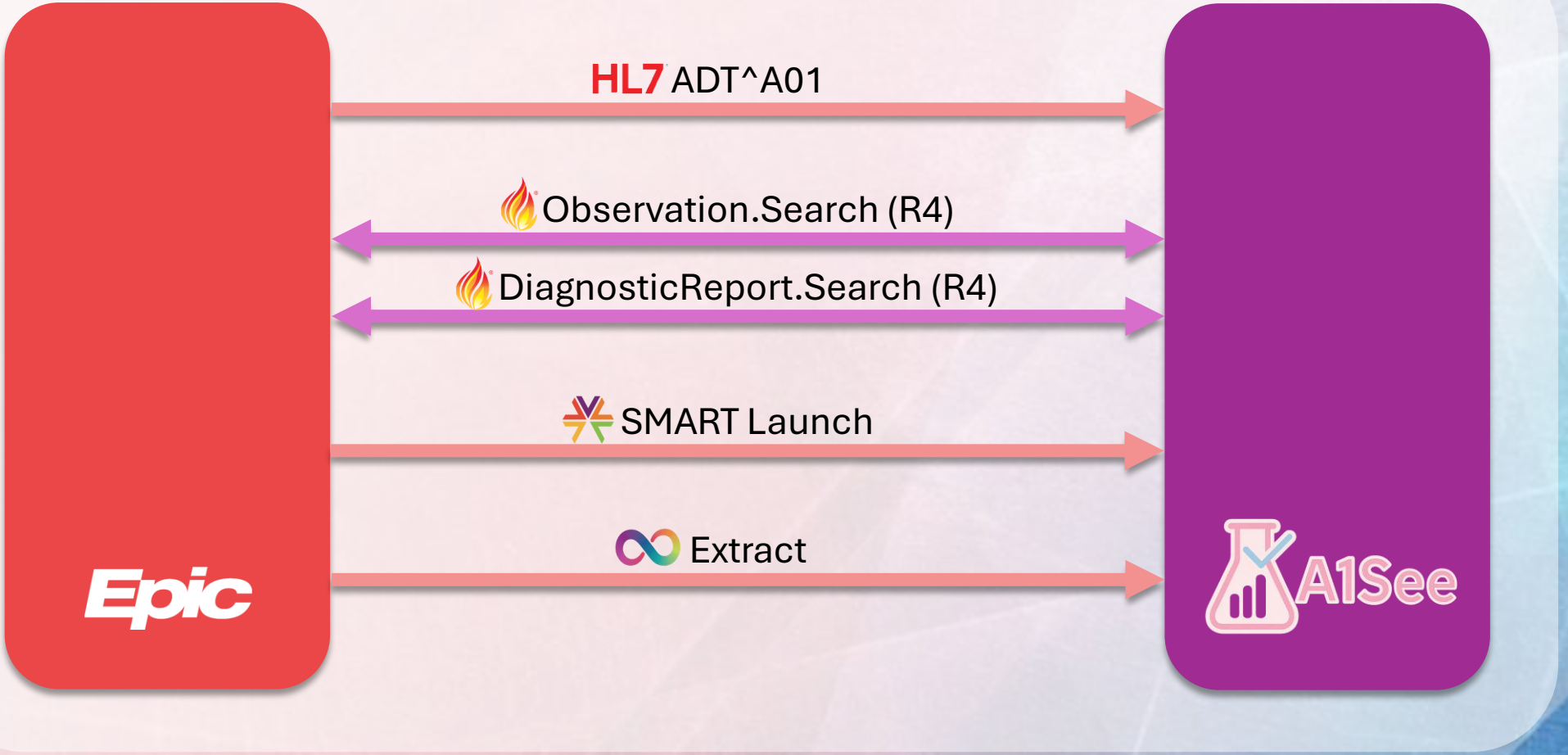


	Recency	Volume	Direction	Standards	Trigger
HL7 Interfaces	Real-time	High	Push	✓	Event-driven
RESTful FHIR	Real-time	Low	Push/Pull	✓	On-demand
HL7 CDA	Varies	Medium	Push/Pull	✓	Varies
SMART-on-FHIR	Real-time	Low	Bidirectional	✓	On-demand
CDS Hooks	Real-time	Low	Bidirectional	✓	Event-driven
FHIRCast	Real-time	Low	Bidirectional	✓	Contextual
Bulk FHIR	Delayed	Moderate	Pull	✓	Batch
Reporting Tools	Delayed	High	Push/Pull	X	Batch
Other Web Services	Real-time	Low	Varies	X	Varies

It Was Fast on My Machine

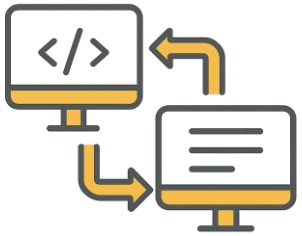
Designing for Performance

Across *the* Epic Community

more than

1.5 billion

messages per day



over

2.04 billion

API calls per day

with

2,000+

apps connected

Best Practices

Narrow,
Specific Calls

Best Practices

Narrow, Specific Calls

Efficient Parameters

Best Practices

Narrow, Specific Calls

Efficient Parameters

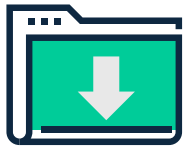
Avoid Polling

Best Practices

Narrow, Specific Calls

Efficient Parameters

Avoid Polling



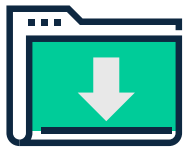
Cache Data

Best Practices

Narrow, Specific Calls

Efficient Parameters

Avoid Polling



Cache Data

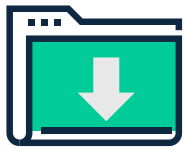
Volume Guardrails

Best Practices

Narrow, Specific Calls

Efficient Parameters

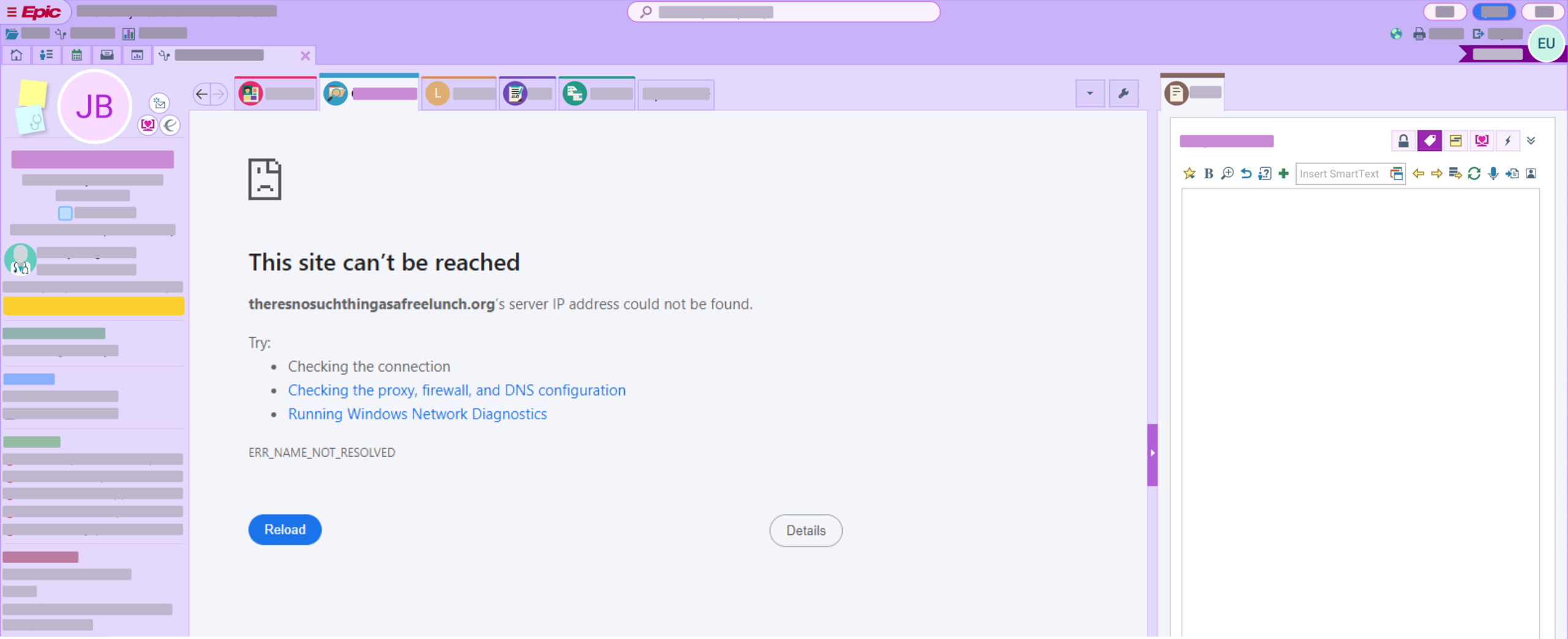
Avoid Polling



Cache Data

Volume Guardrails

Bundle API Calls



Customer Testing

400: Bad Request, Great Insight

Customer Testing

Infrastructure

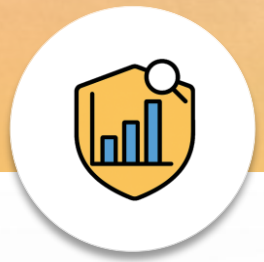
Customer Testing

Infrastructure

Query Estimates

Customer Testing

Infrastructure



Query Estimates

App Pilots

Cache Me If You Can

Privacy and Security Considerations

In *the* News

Healthcare IT News

Aug 2025

New numbers from the Change Healthcare data breach: 193 million affected

U.S.Department of Heath and Human Services

Sep 2020

Health insurer pays $6.85 million to settle data breach affecting over 10.4 million

USA TODAY

Feb 2024

Health care data breaches hit 1 in 3 Americans last year: is your data vulnerable?

engadget

Jun 2019

19 million patient records were stolen from Quest Diagnostics and LabCorp

Detroit Free Press

May 2023

More than 1 million Michiganders affected by Welltok cyberattack

NBC NEWS

June 2017

Anthem to pay record $115M to settle lawsuits over data breach

User Expectations

Trust By Default

Full Control

Zero Tolerance

Considerations

Authentication and Encryption

Considerations

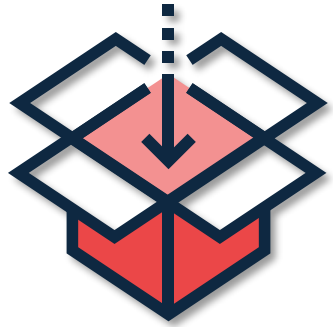
Authentication and Encryption

Observability and Auditing

Considerations

Authentication and Encryption

Observability and Auditing

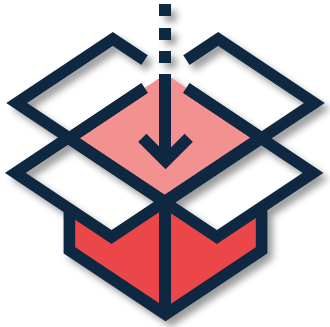


Caching Data

Considerations

Authentication and Encryption

Observability and Auditing



Caching Data

Locale-specific Legislation

Takeaways

Start with
Functional Need
not technology

Test with customers,
Performance
isn't an afterthought

Design with high
User Expectations
for security and privacy

Resources

- Interoperability Guide
- Developer Guidelines
- FHIR Sandbox
- HL7v2 Interface Overview
- OAuth 2.0 Tutorial
- CDS Hooks Tutorial
- Bulk FHIR Tutorial
- App Launch Tutorial

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