API Types and Evolution

Pedro Félix

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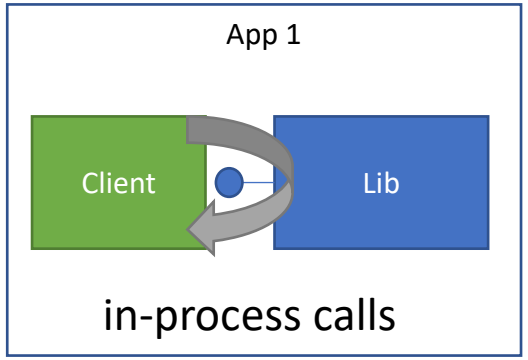
Summary

- In-process APIs versus remote APIs
- Comparing the evolution and versioning of in-process and remote APIs
- Remote APIs types
  - Client scenarios
  - Exposed functionality

In-process vs. remote APISs

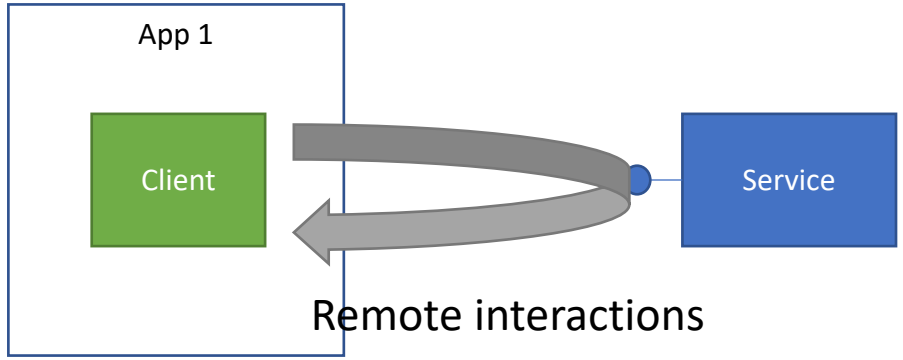
In process APIs

- Same security boundary
  - No authentication, no authorization, no confidentiality or integrity protection
- No I/O, synchronous calls
- Failure modes
  - Deterministic errors
  - Typically due to unsatisfied pre-requisites
  - Catastrophic errors typically impact the complete application
- Same type system
  - Object sharing between client and API provider (i.e. Library)
- Return values or exceptions



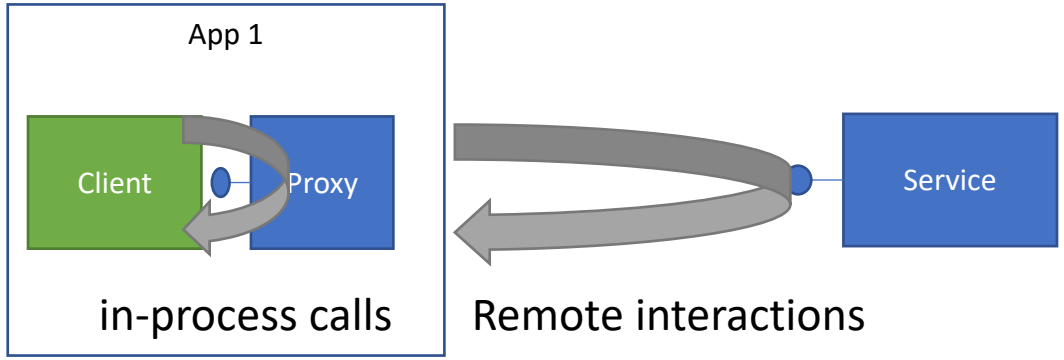
Remote APIs

- Different security boundaries
  - Authentication, authorization,
  - Confidentiality and integrity protection
- I/O, asynchronous calls
- Failure modes
  - Indeterministic errors
  - Transient errors
  - Communication errors
- Different type systems
  - No object sharing
  - Representation based on agreed formats
- **Message exchanges**, not **calls**.
- Non-success messages and communication errors
  - HTTP origin-servers don’t throw exceptions
  - They responds with non-success messages or fail to communicate



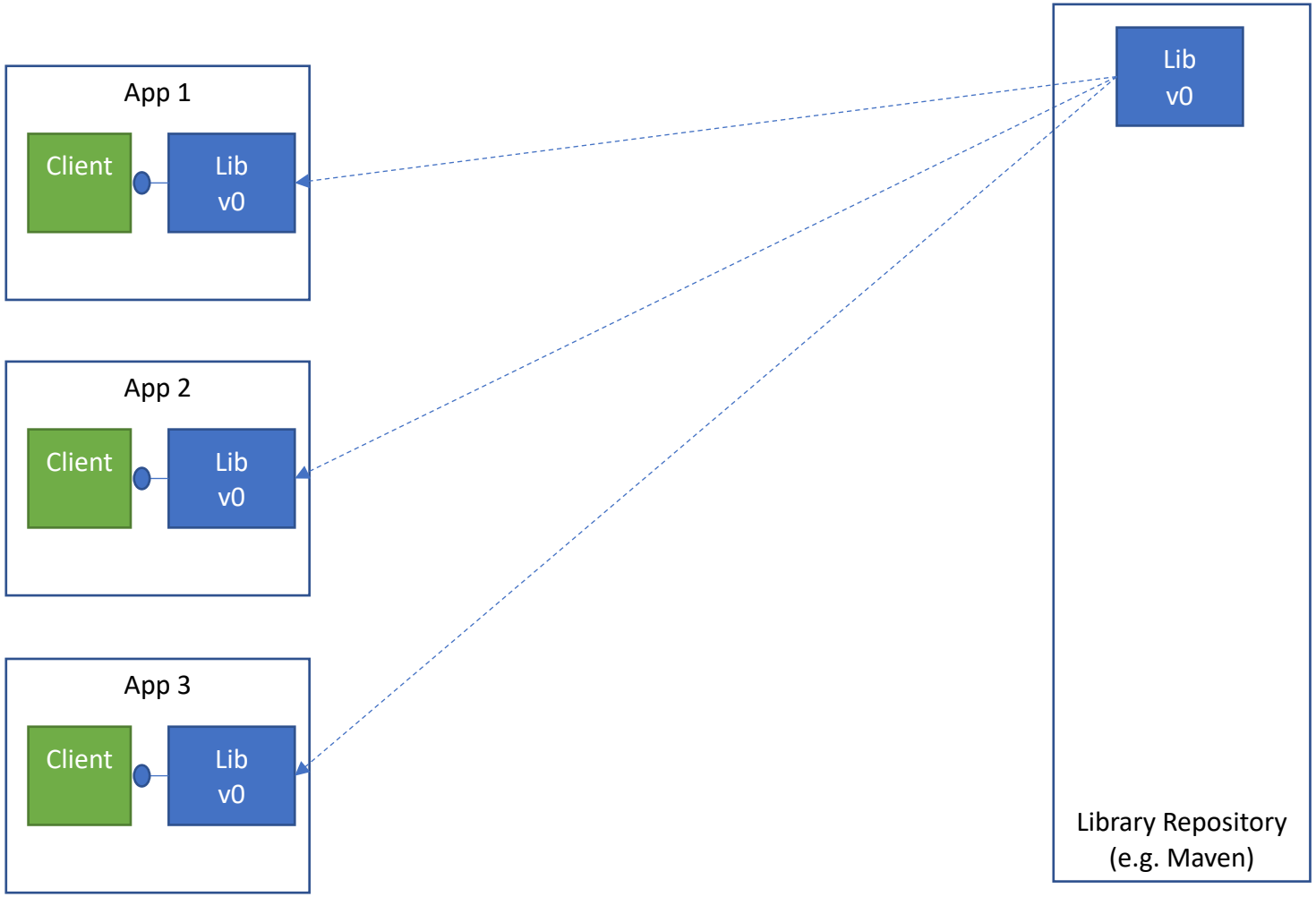
Remote APIs

- Proxies
  - Local-representant of a remote service
  - As-if the service was in-process
- Leaky abstraction
  - The remote characteristic cannot be abstracted away
  - Due to the reasons presented before
- In the end, the client app is still interacting with a remote service

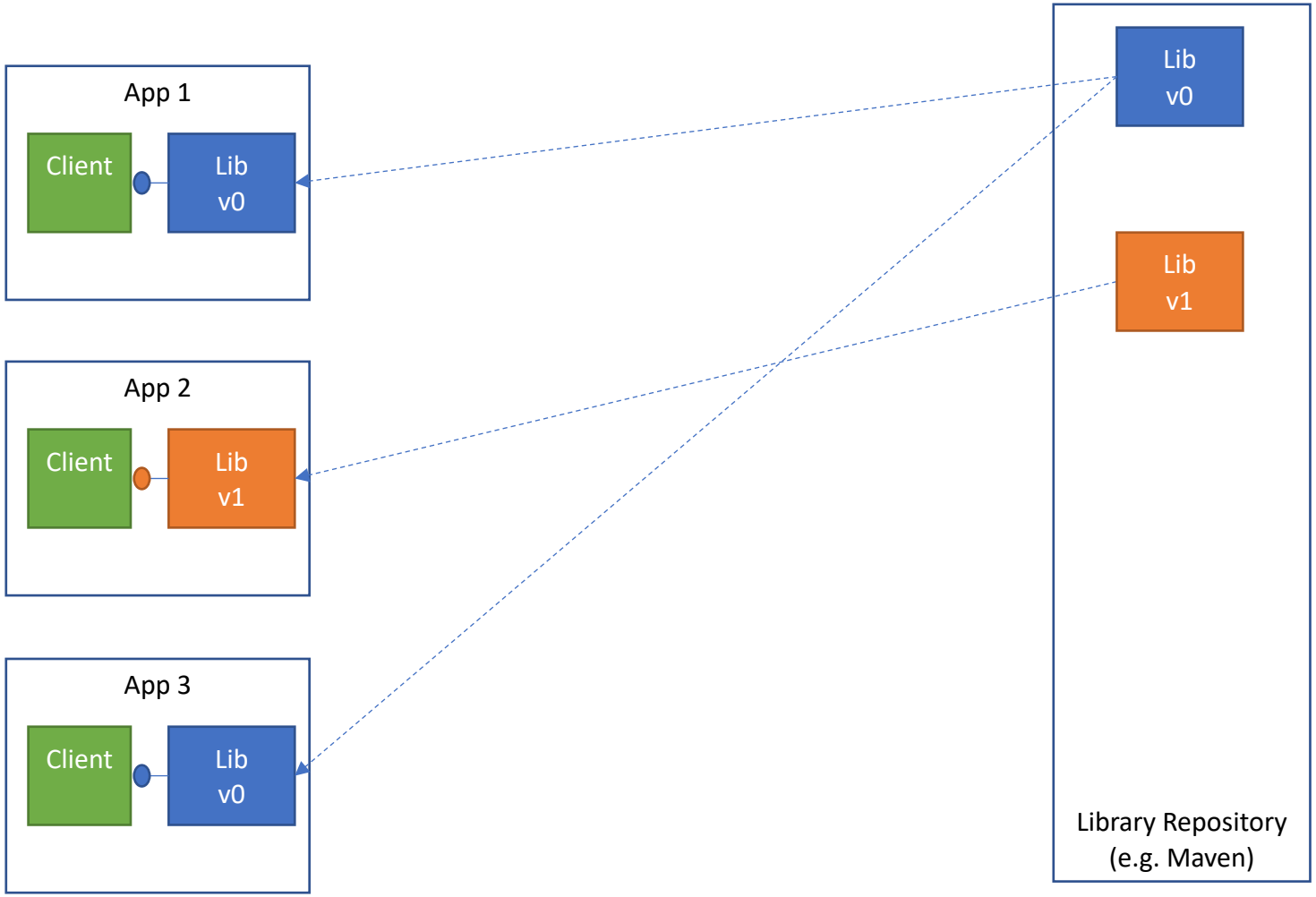


Evolution and versioning

Versioning


App 1
Client
Lib
v0
App 2
Client
Lib
v0
App 3
Client
Lib
v0
Lib
v0
Library Repository
(e.g. Maven)

Versioning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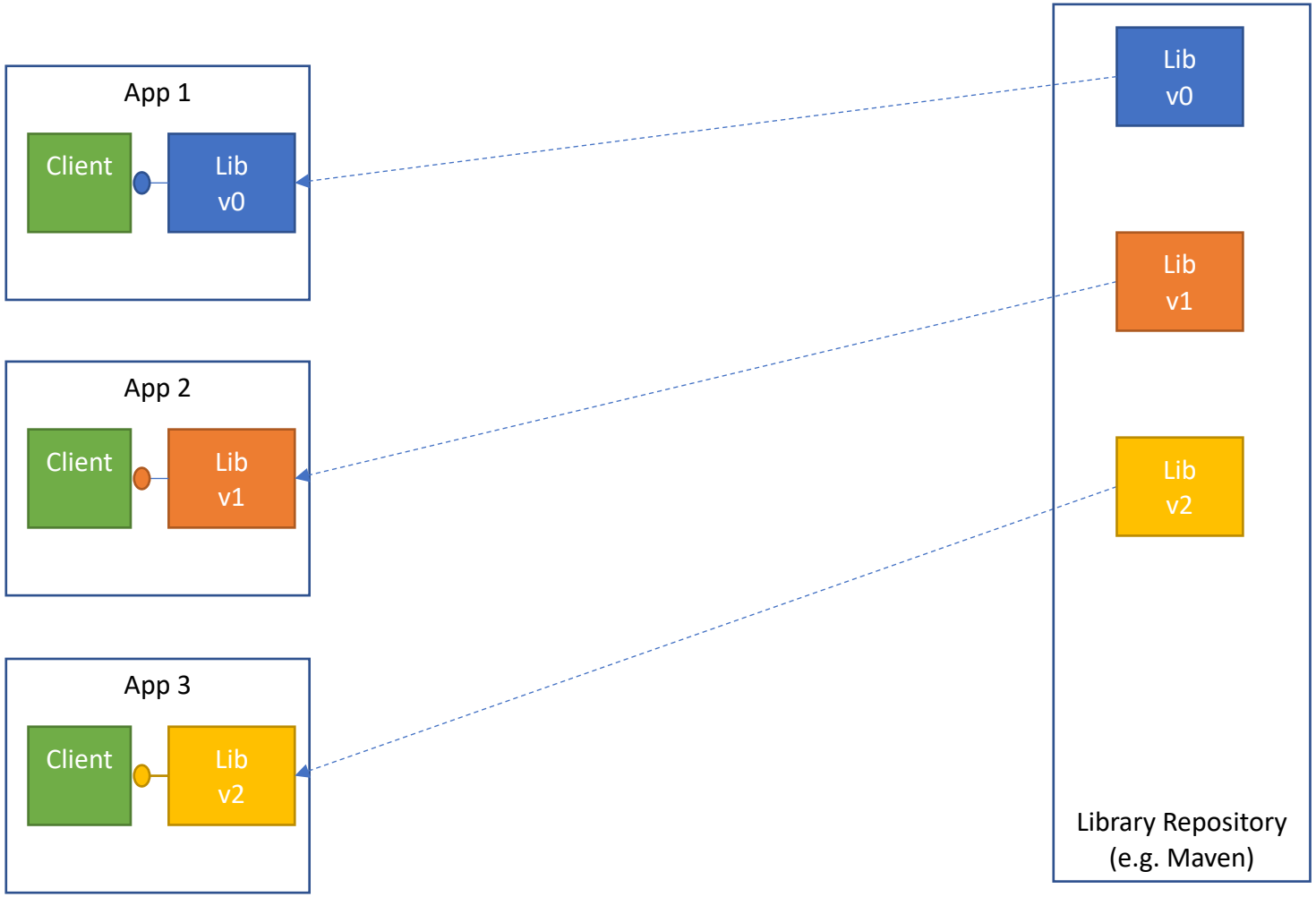
App 1
Client
Lib
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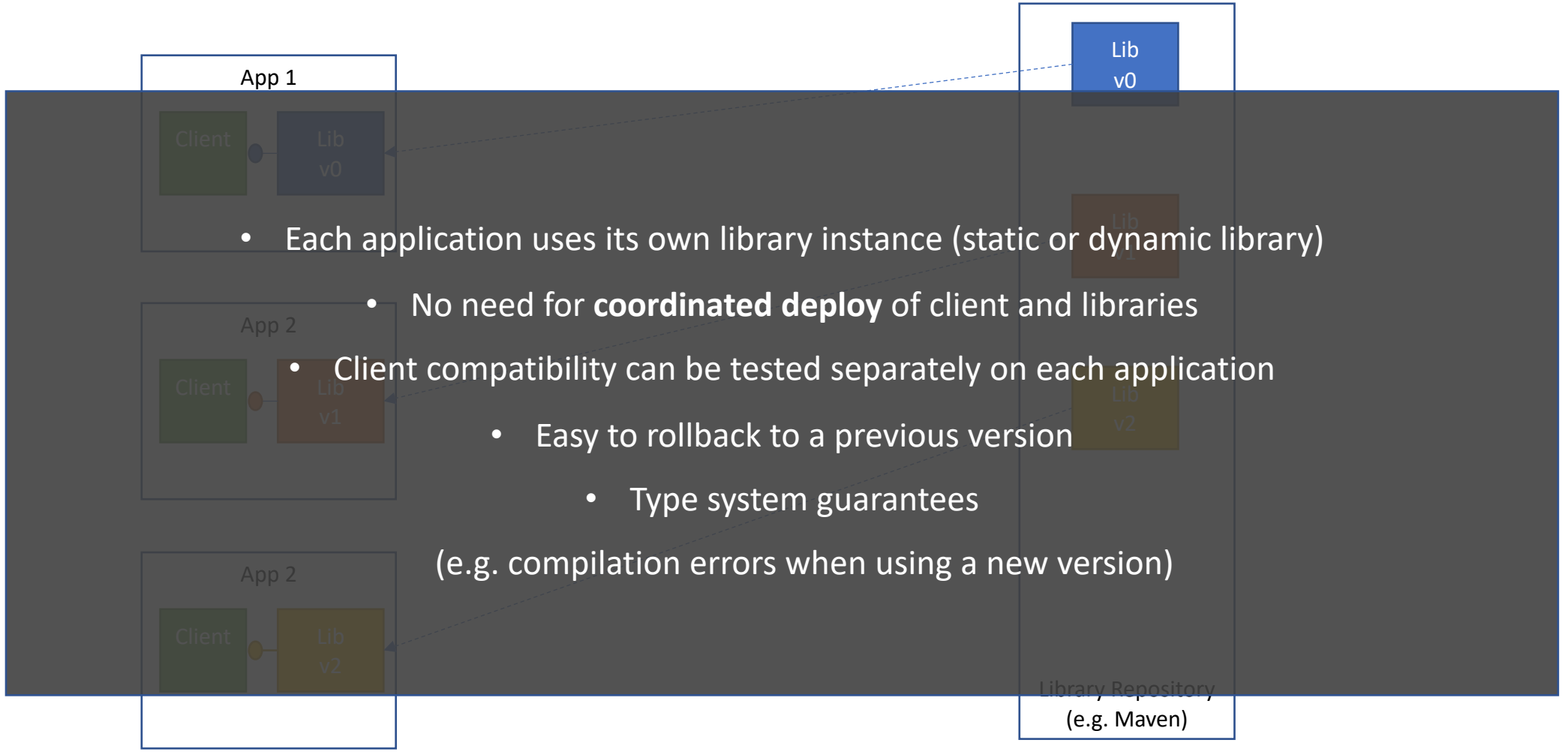
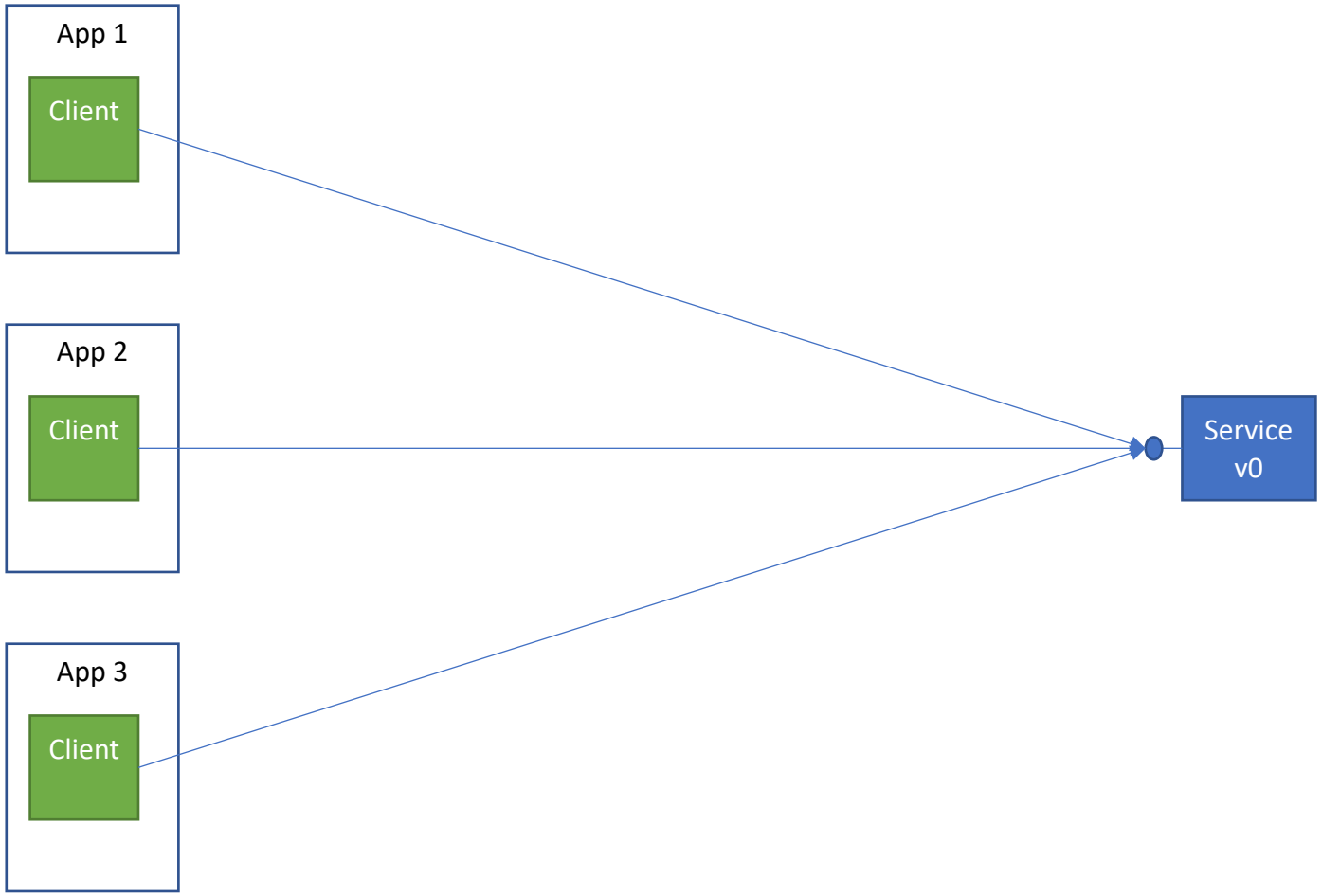
Versioning



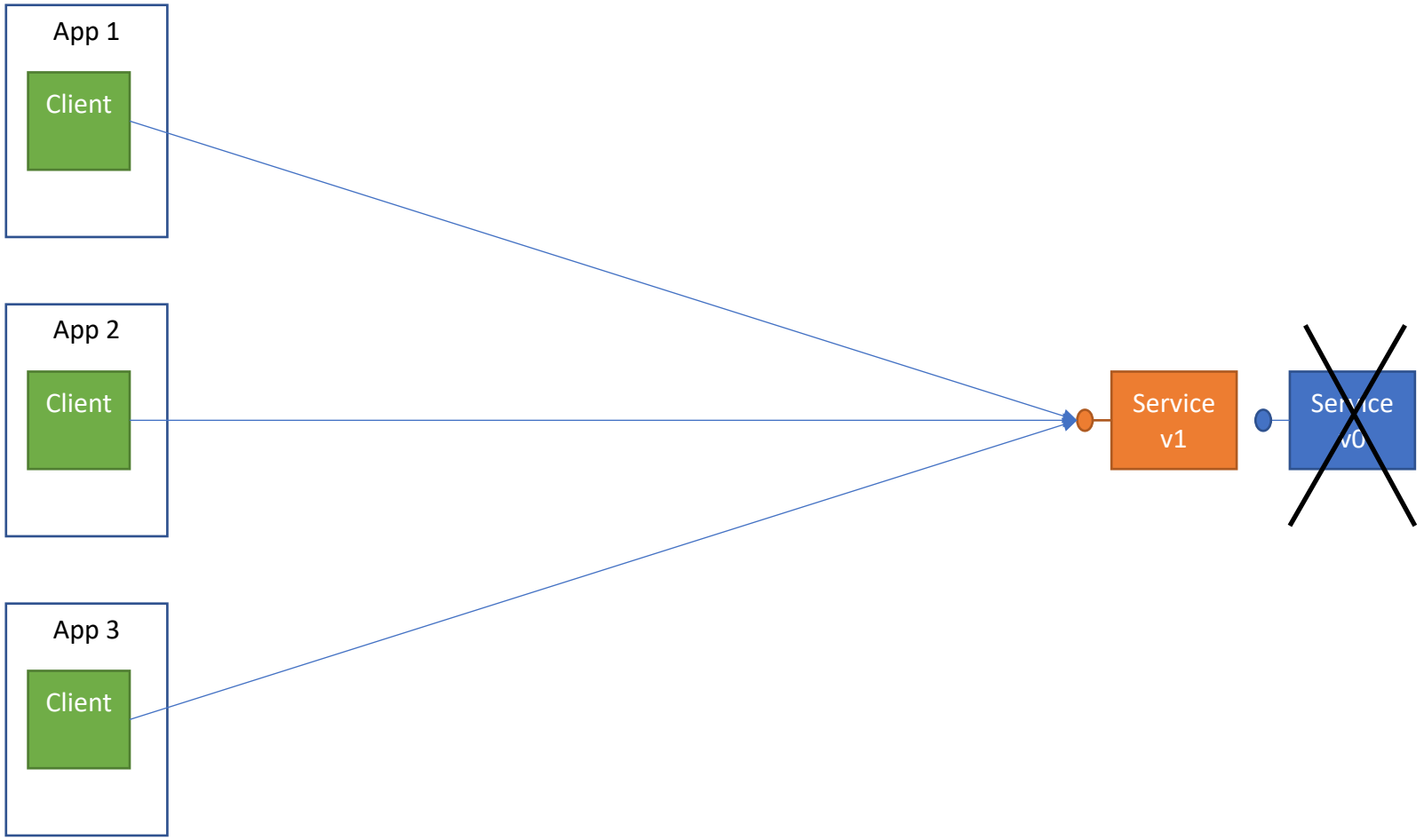
- Each application uses its own library instance (static or dynamic library)
- No need for **coordinated deploy** of client and libraries
- Client compatibility can be tested separately on each application
- Easy to rollback to a previous version
- Type system guarantees

(e.g. compilation errors when using a new version)

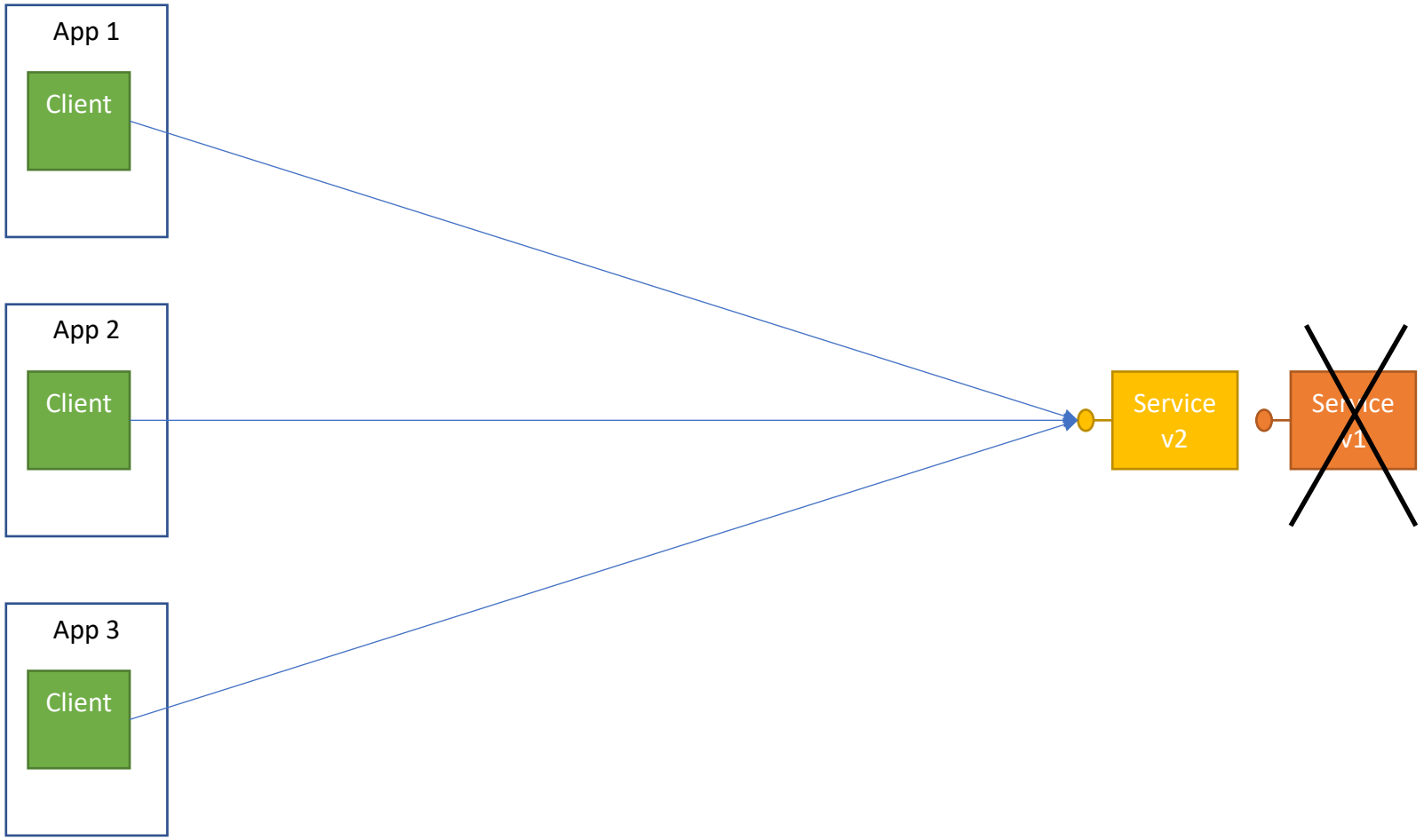
Versioning



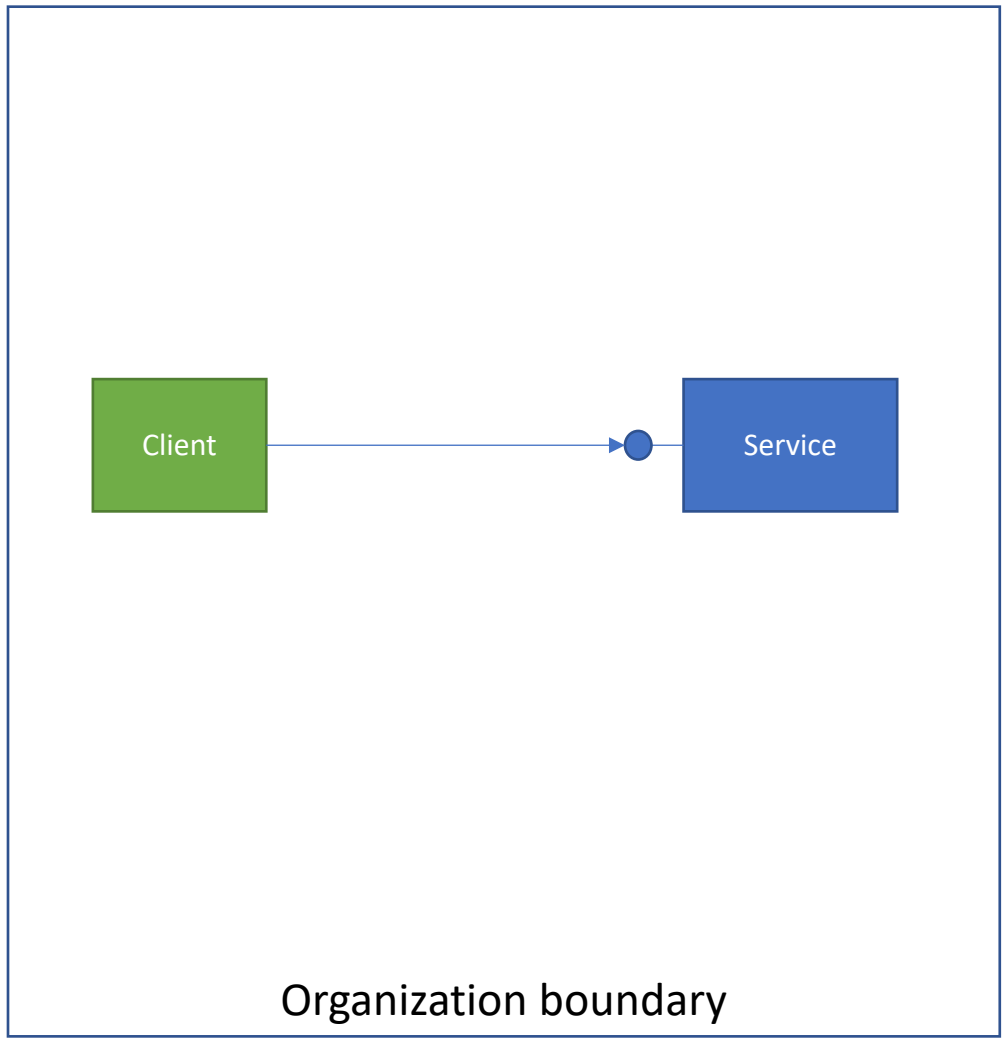
Versioning



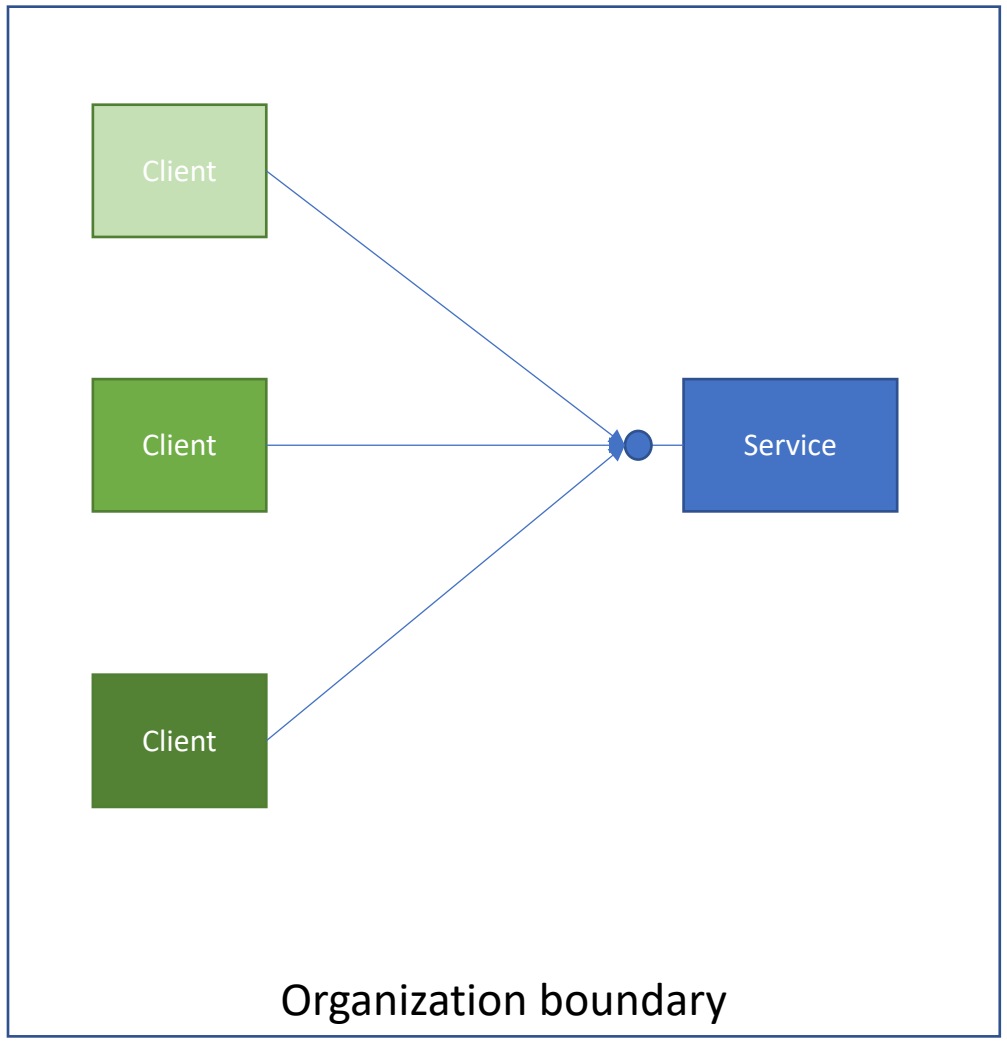
Versioning



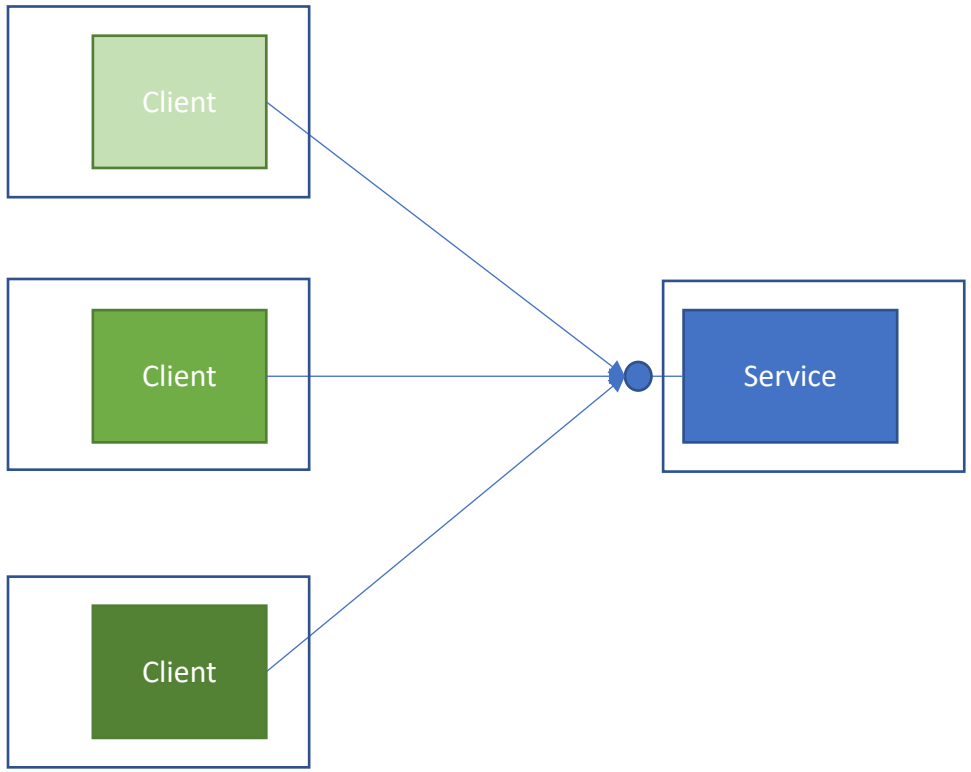
Client scenarios



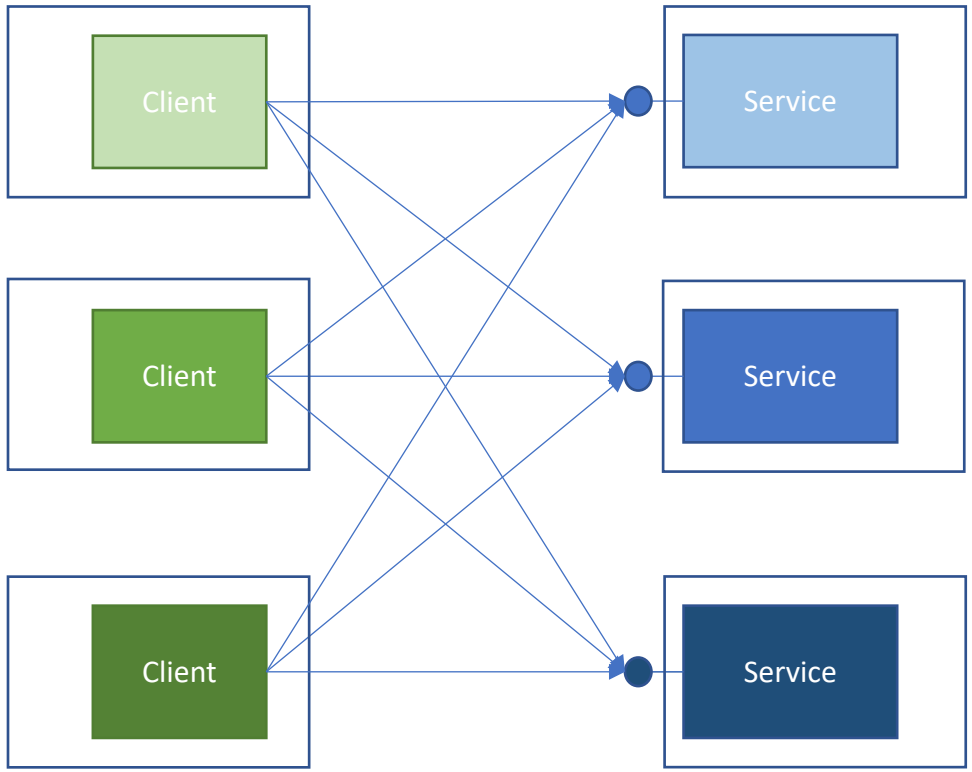
- Single client
- Client and service on the same organization boundary
  - Simpler API contract coordination
  - Simpler coordinated deploy
  - Depends on the client lifecycle
    Web app is not the same as iOS app
- Short time span
  - E.g. TV show contests system
  - E.g. Elections systems



- Multiple clients make coordinated evolution harder
- Client and service on the same organization boundary

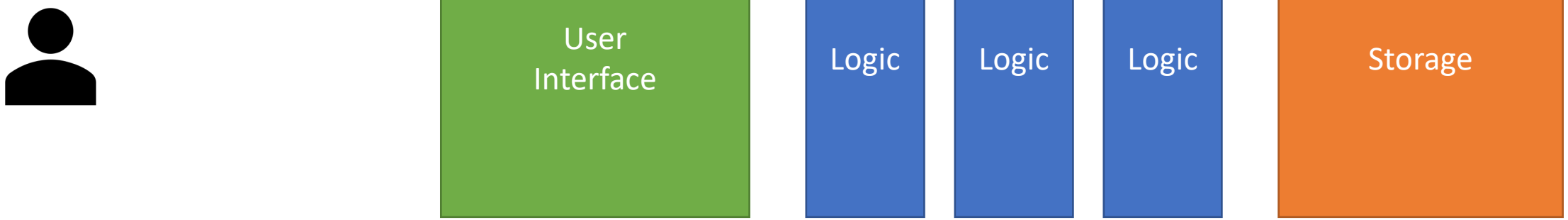


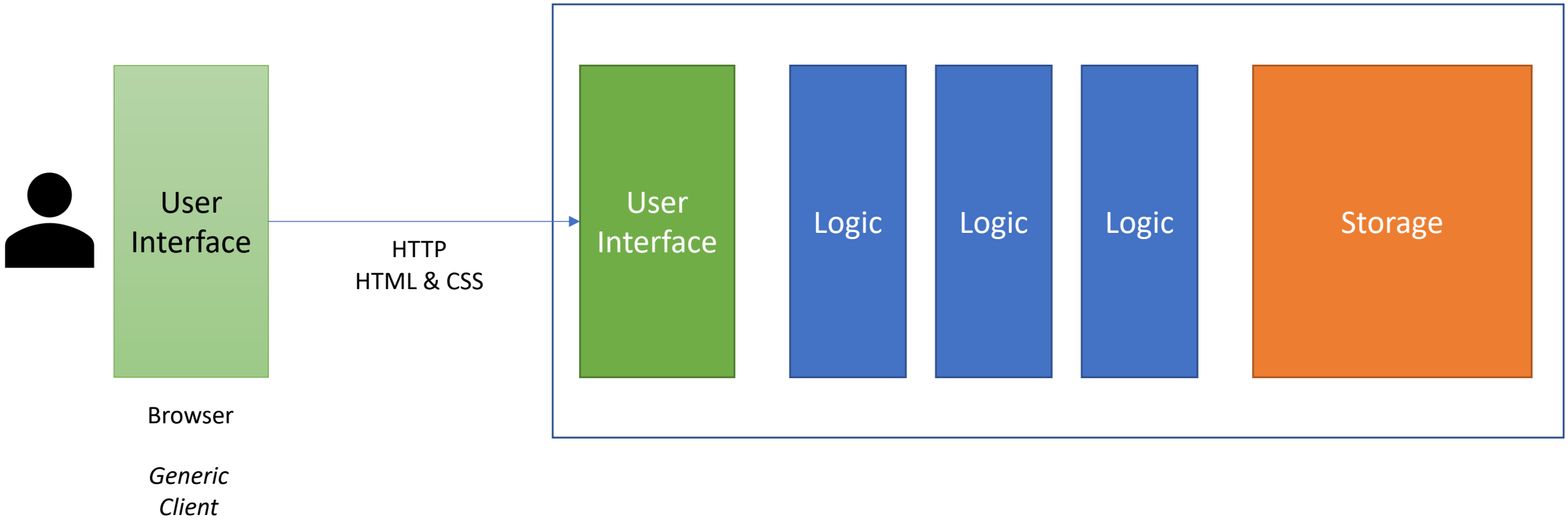
- Multiple clients in distinct organizations makes coordinated evolution even harder

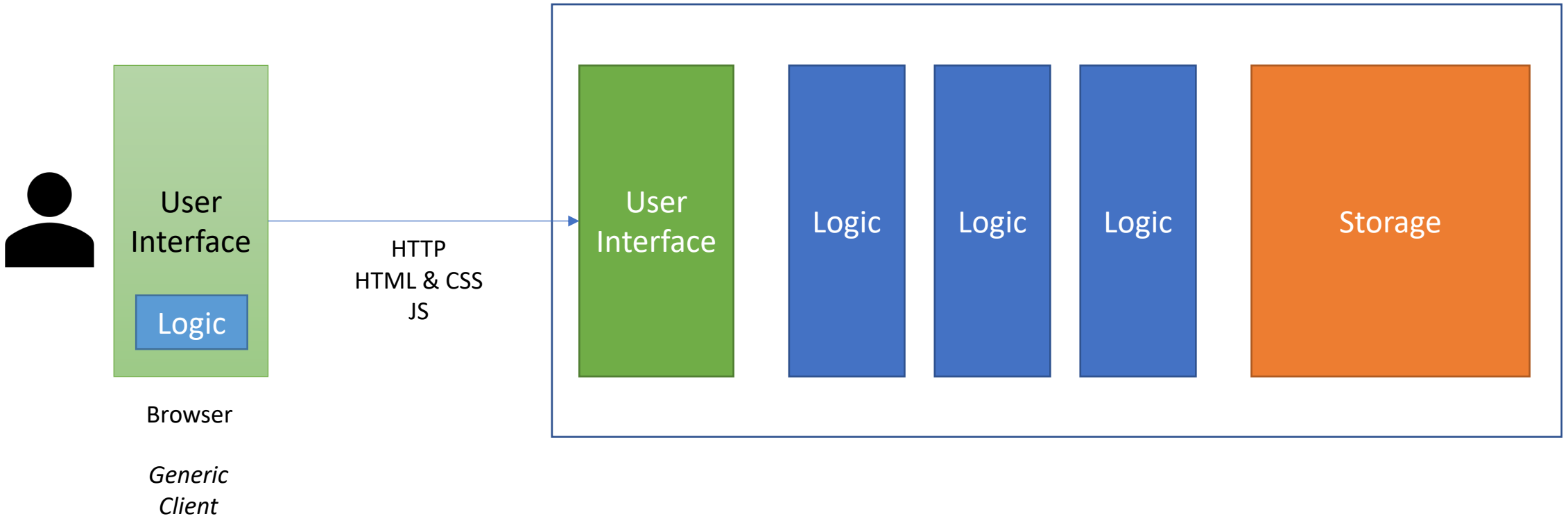


- API with multiple consumers
- And multiple providers
- API is a specification
  - E.g. OAuth 2.0
  - E.g. Git remote protocol
- Specification evolution implies coordination between consumers and providers
- Long time spans
  - E.g. Decades
- See https://www.crummy.com/writing/speaking/2015-RESTFest/

API funcionality


User
Interface
Logic
Logic
Logic
Storage


User Interface
HTTP
HTML & CSS
User Interface
Logic
Logic
Logic
Storage
Browser
Generic Client


User Interface
Logic
HTTP
HTML & CSS
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User Interface
Logic
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Logic
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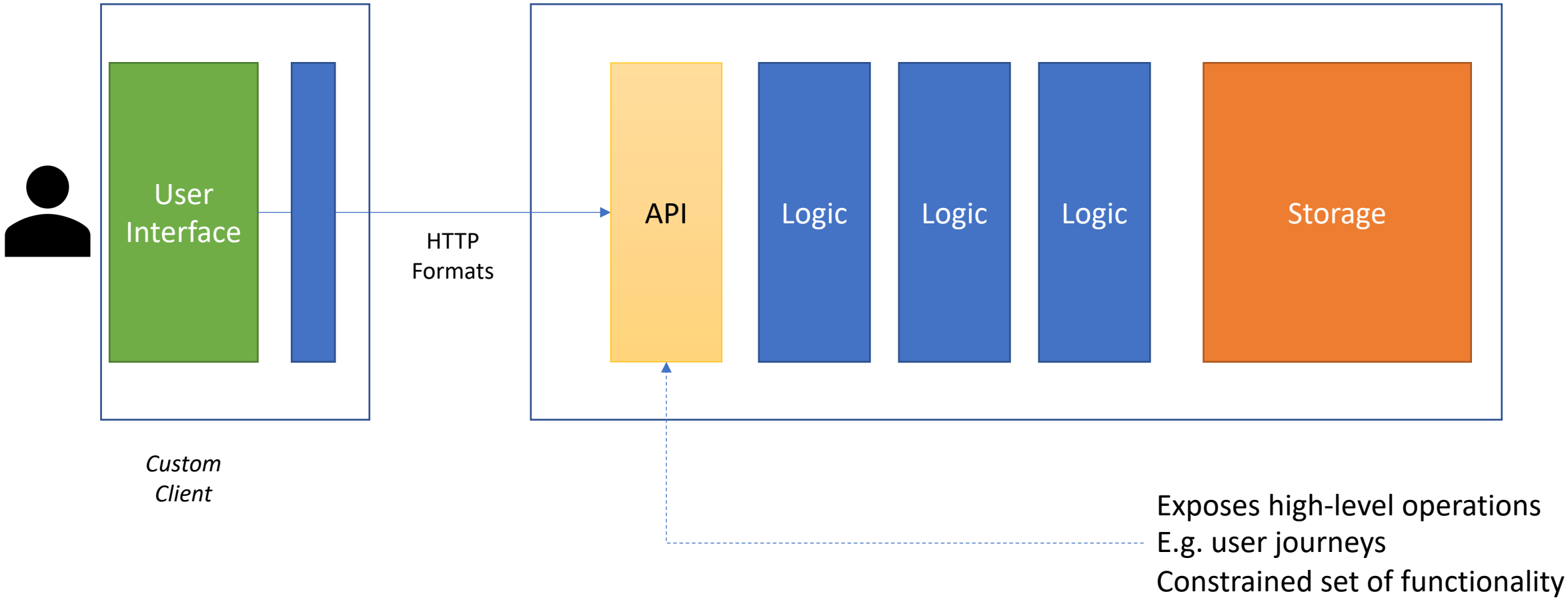
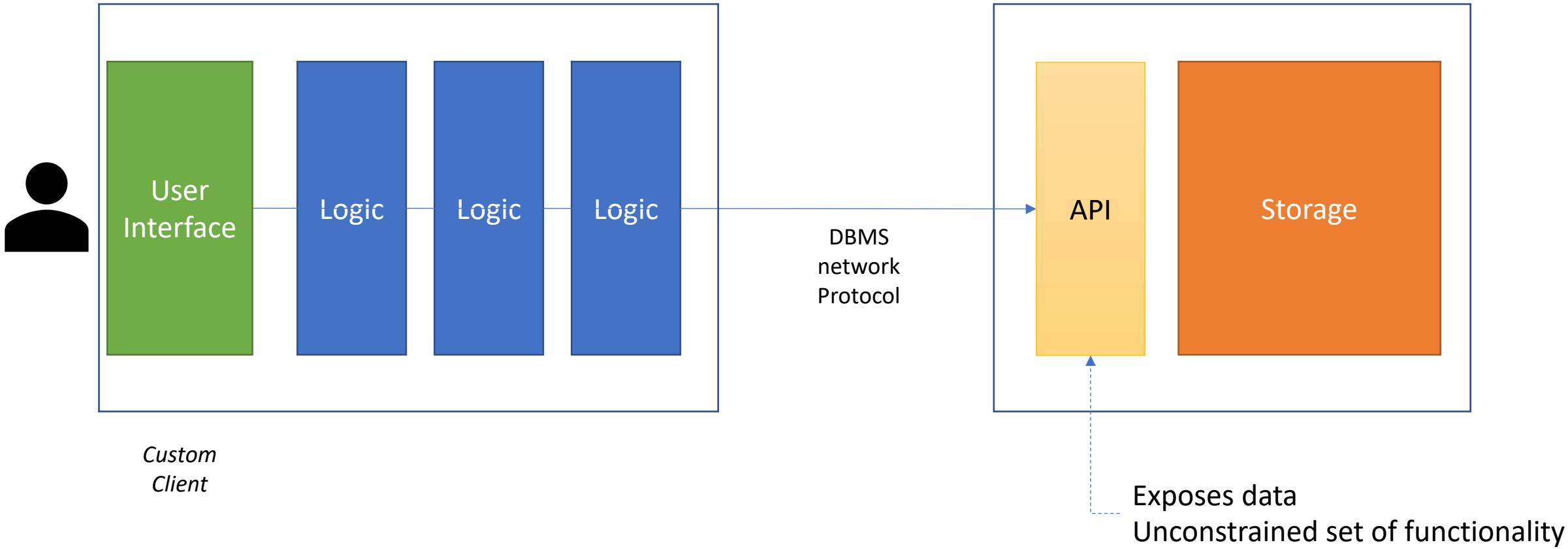
Generic Client


User Interface
HTTP Formats
API
Logic
Logic
Logic
Storage
Custom Client
Exposes high-level operations
E.g. user journeys
Constrained set of functionality


User Interface
Logic
Logic
Logic
DBMS network Protocol
API
Storage
Custom Client
Exposes data
Unconstrained set of functionality

Conclusion

- Remote APIs are not the same thing as in-process APIs.
- Versioning techniques for in-process APIs are not easily extended to remote APIs.
- Remote APIs can be used in different contexts.
  - Ranging from short-lived APIs with a single client, run by the same organization…
  - … to long-lived APIs with multiple providers and multiple clients.
- When designing APIs all these aspects need to be taken into consideration.
- There isn’t a “one size fits all” approach