OPENAI ARCHITECTURE PRIMER

Codex App Server

A bidirectional client control plane

A visual guide to JSON-RPC connections, thread and turn state, streamed events, approvals, authentication boundaries, and recovery.

FIRST-PARTY DOCUMENTATION / INDEPENDENT LUMINITY SYNTHESIS



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Codex App Server

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The App Server Is a Bidirectional Client Control Plane

A rich client owns the connection, request flow, server requests, streamed state, authentication, and recovery.

SIX CLIENT OBLIGATIONS

01
Initialize
client handshake

02
Request
correlate replies

03
Observe
streamed state

04
Approve
server requests

Authenticate 05
Own the supported sign-in and account-state boundary.

Recover 06
Handle overload, terminal failure, disconnects, and reinitialization.

The six-obligation model is Luminity synthesis. OpenAI documents the underlying protocol, lifecycle, authentication, and recovery mechanics.

IN THIS PRIMER

Key Points

01 **Own the protocol boundary**
Initialize the client, correlate requests and responses, and handle notifications and server requests.

02 **Govern lifecycle and authority**
Track threads, turns, items, approvals, authentication state, and terminal outcomes.

03 **Preserve compatibility and recovery**
Version the schema, bound transport exposure, and recover connection state before resuming work.

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Build the Protocol Boundary

One connection carries client requests, server responses, notifications, and server requests in both directions.

01

Connection — Transport Contract

stdio · default | Unix socket · local | WebSocket · experimental



Local Default — STDIO

stdio uses newline-delimited JSON over standard input and output.

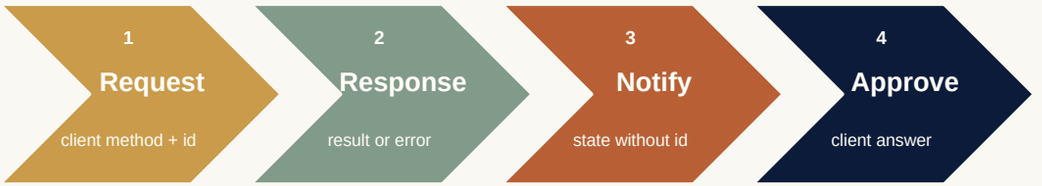
Remote Exposure — BOUNDARY

WebSocket requires authentication and TLS and remains experimental.

02

Message — Bidirectional Contract

request with id | notification | server request



Correlated Replies — REQUEST

Every request ID resolves to a response or protocol error.

Client Decisions — APPROVAL

Server requests require a client response and retained decision state.

03

The Compatibility Record

Runtime Version — VERSION

Record the deployed Codex version that owns the protocol surface.

Schema Contract — SCHEMA

Generate the client schema from that exact installed version.

Client Capability — CLIENT

Declare the client identity and the capabilities it can handle.

Experimental Surface — DRIFT

Keep WebSocket and experimental methods explicit in the contract.

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Own Lifecycle and Authority State

Connection, conversation, approval, authentication, and recovery state change on different protocol events.

01

Lifecycle State

✓ connect and initialize	CONNECTION
✓ thread/start or thread/resume	CONVERSATION
✓ turn/start or turn/steer	WORK UNIT
✓ item notifications	STREAMED STATE
✓ completed, interrupted, or failed	TERMINAL

Connection | Thread | Turn + Items

02

Approval State

Server request | Client decision | Resolution state



APPROVAL

A server request remains open until the client records a decision

TERMINAL STATE

Notifications report state but do not replace the decision record

03

Recovery Record

Transport + Schema — CONTRACT

Retain transport, Codex version, schema hash, client identity, and declared capabilities.

Thread + Turn — STATE

Retain thread and turn IDs, item state, terminal outcome, and cancellation history.

Authentication + Approval — AUTHORITY

Retain auth mode, account state, approval request, client decision, and resolution.

STATE RULE

- Connection ≠ conversation
- Notification ≠ decision
- Overload ≠ permission to retry
- Recovery requires reinitialization

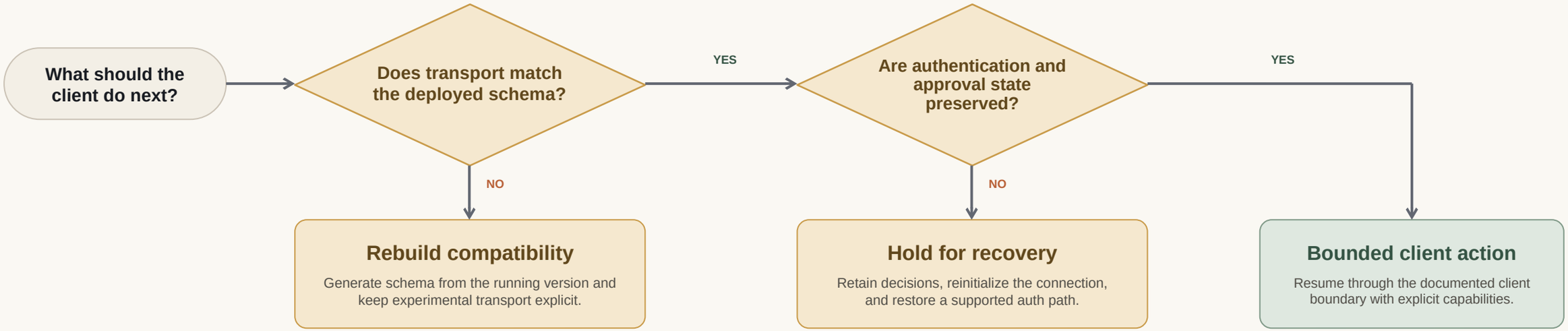
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App Server Authority and Recovery Boundary

Preserve the version contract, authentication state, and approval record before the client resumes work.



RETAIN THIS RECORD WITH EVERY CLIENT ACTION

Runtime + Schema — VERSION

Retain Codex version, schema hash, capabilities, and stability status.

Transport + Client — CONNECTION

Retain transport, client identity, and remote TLS and authentication controls.

Thread + Approval — AUTHORITY

Retain thread and turn IDs, approval decision, resolution, and cancellation.

Auth + Terminal State — RECOVERY

Retain auth mode, account state, terminal status, and recovery decision.

BOUNDARY

- Local transport by default
- Schema follows deployed version
- Approval remains client state
- Recovery requires reinitialization

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