Architecture and Message Flow Design

This document describes the architecture and message flow design of the prototype “MyOApp”.

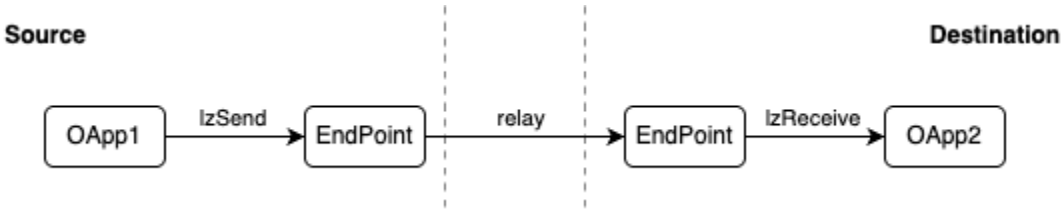

Figure 1. Overview of the message flow

“MyOApp” leverages LayerZero V2 to allow cross-chain message communication between contracts in different blockchains. Figure 1 provides an overview of the message flow when two contracts in different chains communicate with each other. Let OApp1 be a contract on a source chain, and OApp2 be a contract on a destination chain. Their communication is facilitated by EndPoints on both source and destination chains. EndPoints are core contracts of LayerZero that handle incoming and outgoing messages via the lzSend and lzReceive functions.

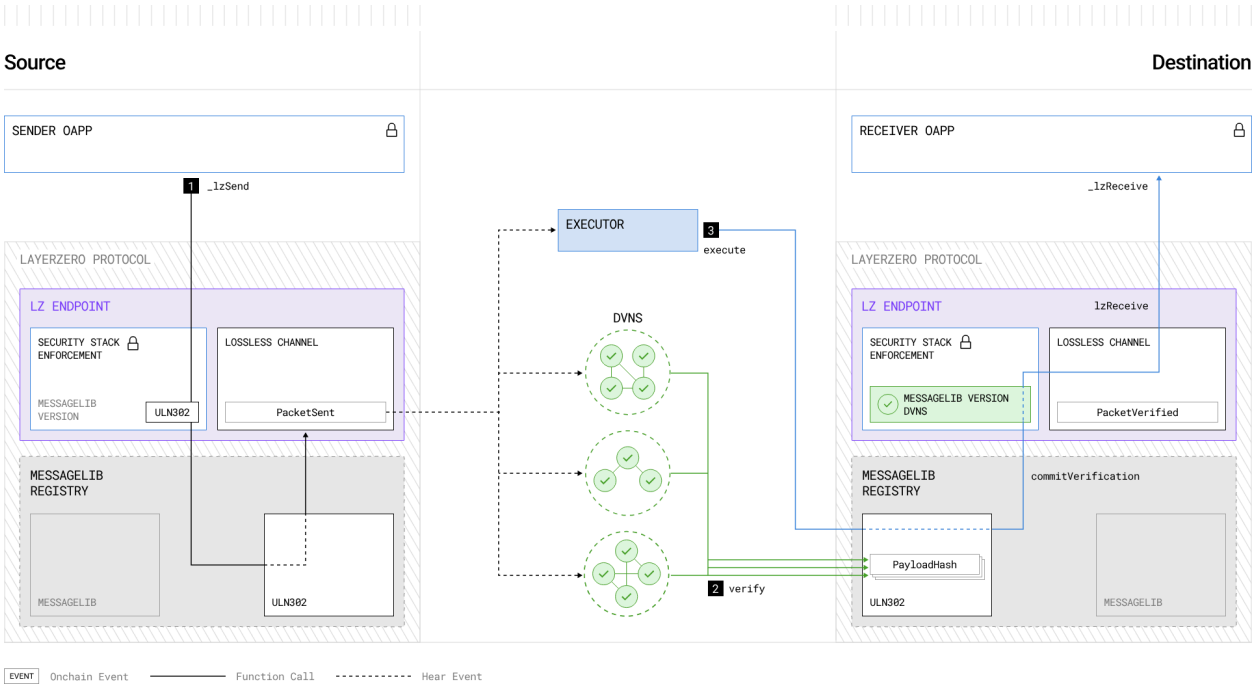

Figure 2. How LayerZero V2 works (source: LayerZero Docs)

Figure 2 describes how LayerZero V2 works in detail.

1. **Message dispatch:** The sender contract (e.g., OApp1 in Figure 1) initiates the process by calling the source Endpoint with details of the message payload, the destination Endpoint, and the receiver contract (e.g., OApp2). The source Endpoint then generates

a standardized Message Packet with a globally unique ID based on the source contract's configuration.

2. **Establishing a Secure Channel:** The generated Message Packet is emitted as an event by the source Endpoint and is sent to Executor and DVNs contracts in a destination chain via a lossless channel.
3. **Verification and Nonce Management:** The DVNs (Decentralized Verifier Networks) contracts in the destination chain verify the Message Packet before committing it in the destination chain.
4. **Message Execution:** Finally, the Executor contract calls the Endpoint's exit function lzReceive to trigger the execution of the verified message. This call delivers the message payload to the receiver contract, which can then execute its defined logic based on the incoming data.