



School: ..... Campus: .....

Academic Year: ..... Subject Name: ..... Subject Code: .....

Semester: ..... Program: ..... Branch: ..... Specialization: .....

Date: .....

## **Applied and Action Learning**

(Learning by Doing and Discovery)

**Name of the Experiment : Cross the Chain – Bridge or Interoperability Demo**

### **Objective/Aim:**

Perform a basic **cross-chain bridging operation** on a testnet: connect MetaMask, choose a source chain and destination chain, approve bridging, send tokens between chains, and record transactions and observations.

### **Apparatus/Software Used**

1. **MetaMask Wallet**
2. **Brave Web Browser**
3. **LayerZero / Hop / Polygon Bridge Website**
4. **Ethereum Sepolia Testnet & Polygon Mumbai Testnet**

### **Theory/Concept:**

#### **Cross-Chain Bridges**

Cross-chain bridges allow transfer of tokens or data between two different blockchain networks. Because blockchains are isolated, they cannot natively talk to each other. Bridges use smart contracts and off-chain or on-chain relayers to enable interoperability.

#### **Key concepts:**

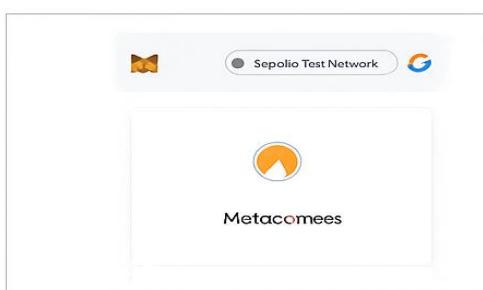
- Lock-and-Mint: Tokens on source chain are locked → equivalent tokens minted on destination chain.
- Burn-and-Mint: Tokens burned on Chain A → minted on Chain B.
- Liquidity-Based Bridges: Relayers provide liquidity on both chains for faster transfers.

#### **Interoperability**

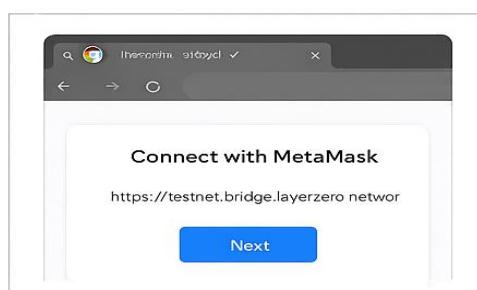
Interoperability enables dApps to share data or assets across chains, improving user experience and utility.

## Procedure:

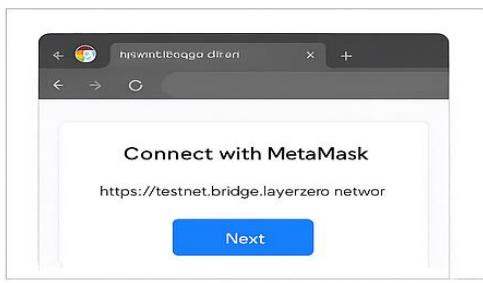
1. Open MetaMask and switch to the Sepolia Testnet.
2. Visit a bridge website (example: <https://testnet.bridge.layerzero.network>).
3. Click Connect Wallet and connect via MetaMask.
4. Select the Source Chain as Ethereum Sepolia.
5. Select the Destination Chain as Polygon Mumbai.
6. Choose the token to bridge (e.g., Test ETH or Test USDC depending on bridge support).
7. Enter a small test amount to transfer.
8. Click Approve (if required) and confirm approval in MetaMask.
9. Click Bridge / Transfer to initiate cross-chain transfer.
10. Confirm the transaction in MetaMask and wait for the bridge to complete.
11. Switch MetaMask to the destination chain to check for received tokens.



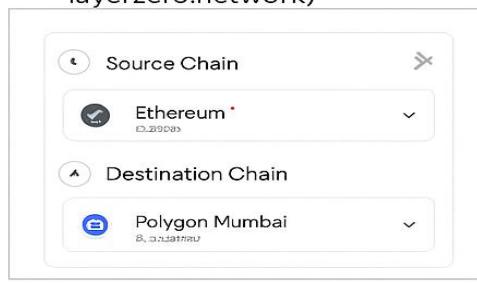
**1** Open MetaMask and switch to the Sepolia Testnet.



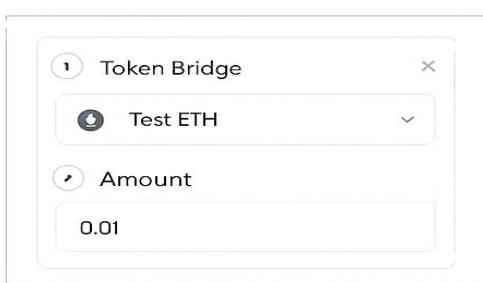
**2** Visit a bridge website (example; <https://testnet.bridge.layerzero.network>)



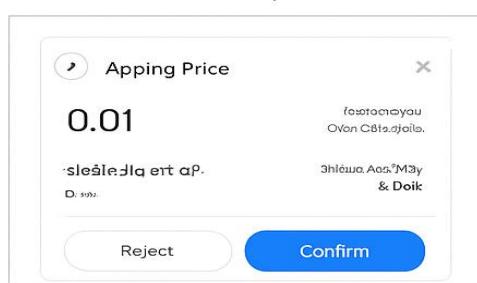
**3** Click Connect Wallet and connect via MetaMask.



**4** Select the Source Chain as Ethereum Sepolia.



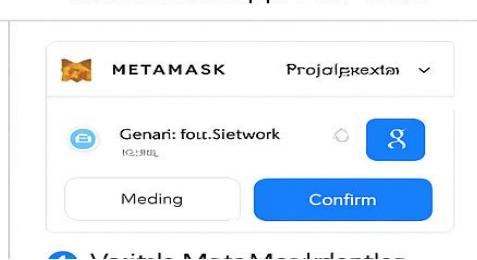
**5** Enter a small test amount to transfer.



**6** Click Approve (if required) and confirm approval



**7** Confirm the transaction in MetaMask and wait for the bridge to complete.



## **Observation**

### **Step No. Observation**

- 1 MetaMask successfully connected to the testnet and allowed DID creation.
- 2 A DID was generated and linked to the wallet address.
- 3 Issuer DID created a verifiable credential for the user.
- 4 Credential appeared in the user wallet/credential vault.
- 5 Verification portal correctly validated the credential signature and issuer identity.

## **ASSESSMENT**

Rubrics	Full Mark	Marks Obtained	Remarks
Concept	10		
Planning and Execution/ Practical Simulation/ Programming	10		
Result and Interpretation	10		
Record of Applied and Action Learning	10		
Viva	10		
<b>Total</b>	<b>50</b>		

*Signature of the Faculty:*

*Signature of the Student:*

*Name :*