# Architecture Matrices

## Component Overview

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| Component | Function(s) | High-Level Requirement | Status |
| On-Premises Application | Consumes API services via API-C | Should communicate securely with AWS APIs via API Connect | Amended |
| API Connect (On-Premises) | Routes API requests to AWS API Gateway | Acts as a gateway between on-prem and AWS, ensuring security & governance | Amended |
| AWS Direct Connect | Provides dedicated network link between on-prem and AWS | Ensures secure and low-latency communication | New |
| API Gateway | Manages and routes API requests to AWS Lambda | Exposes API endpoints for CRUD operations | New |
| AWS Lambda (Create) | Handles document creation and metadata storage | Generates GUID, stores file in S3, and saves metadata in DynamoDB | New |
| AWS Lambda (Read) | Retrieves document metadata from DynamoDB | Fetches S3 URL using GUID and returns it | New |
| AWS Lambda (Update) | Updates document metadata | Modifies S3 URL or timestamp in DynamoDB | New |
| AWS Lambda (Delete) | Deletes document and metadata | Removes file from S3 and deletes metadata entry from DynamoDB | New |
| Amazon DynamoDB | Stores metadata (GUID, S3 URL, timestamp) | Maintains structured metadata for document tracking | New |
| Amazon S3 | Stores document content securely | Ensures high availability and durability of stored documents | New |

## Error Handling Principles

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| Component | Description | Possible Implications |
| API Gateway | Returns standardized error responses (HTTP codes) | Clients can handle errors consistently; incorrect mapping may cause failures |
| AWS Lambda | Implements try-catch for error handling | Unhandled exceptions can cause function failures and retries |
| DynamoDB | Handles conditional writes and throttling errors | Failed writes may lead to data inconsistency or retries |
| S3 | Manages access control errors and file not found issues | Unauthorized access can lead to security risks; missing files impact availability |
| API Connect (On-Premises) | Logs and transforms error responses from AWS | Misconfigured error mappings may lead to incorrect client responses |
| Direct Connect | Handles network disruptions with failover strategies | Connectivity issues can cause API downtime or degraded performance |

## Service/Function Model

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| --- | --- | --- |
| Component | Service | Function(s) |
| On-Premises Application | API Consumer | Sends requests to API Connect for CRUD operations |
| API Connect (On-Premises) | API Gateway (On-Prem) | Routes API requests to AWS API Gateway |
| AWS Direct Connect | Network Connectivity | Provides a secure, low-latency connection between on-prem and AWS |
| API Gateway | API Management | Routes requests to appropriate AWS Lambda functions |
| AWS Lambda (Create) | Compute (Serverless) | Handles document creation, generates GUID, stores metadata |
| AWS Lambda (Read) | Compute (Serverless) | Retrieves metadata from DynamoDB and returns S3 URL |
| AWS Lambda (Update) | Compute (Serverless) | Updates document metadata in DynamoDB |
| AWS Lambda (Delete) | Compute (Serverless) | Deletes document and metadata from S3 and DynamoDB |
| Amazon DynamoDB | Database | Stores metadata (GUID, S3 URL, timestamp) |
| Amazon S3 | Object Storage | Stores document content securely |

## Component/Interface Matrix

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S.No | Name | From | To | Protocol | Description |
| 1 | API Request Flow | On-Prem Application | API Connect (On-Prem) | HTTPS (REST) | Sends API request for document operations |
| 2 | API Routing | API Connect (On-Prem) | AWS API Gateway | HTTPS (REST) | Routes request to AWS for processing |
| 3 | Secure Network Link | On-Prem Network | AWS Direct Connect | Private Link | Ensures low-latency, secure connection |
| 4 | API Invocation | API Gateway | AWS Lambda (CRUD) | HTTPS (REST) | Triggers respective Lambda functions for CRUD |
| 5 | Metadata Storage | AWS Lambda (Create) | DynamoDB | HTTPS (SDK) | Stores document metadata (GUID, S3 URL, time) |
| 6 | Metadata Retrieval | AWS Lambda (Read) | DynamoDB | HTTPS (SDK) | Fetches metadata based on GUID |
| 7 | Metadata Update | AWS Lambda (Update) | DynamoDB | HTTPS (SDK) | Updates document metadata |
| 8 | Metadata Deletion | AWS Lambda (Delete) | DynamoDB | HTTPS (SDK) | Deletes metadata entry |
| 9 | Document Storage | AWS Lambda (Create) | S3 | HTTPS (S3 API) | Uploads document to S3 |
| 10 | Document Retrieval | AWS Lambda (Read) | S3 | HTTPS (S3 API) | Retrieves document from S3 |
| 11 | Document Deletion | AWS Lambda (Delete) | S3 | HTTPS (S3 API) | Removes document from S3 |

## Component/Technology Matrix

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| --- | --- |
| Component | Technology |
| On-Premises Application | Custom Application (Any) |
| API Connect (On-Premises) | IBM API Connect / Any API Gateway |
| AWS Direct Connect | AWS Direct Connect |
| API Gateway | AWS API Gateway |
| AWS Lambda (CRUD Functions) | AWS Lambda (Python) |
| Amazon DynamoDB | AWS DynamoDB (On-Demand) |
| Amazon S3 | AWS S3 (Object Storage) |