# CloudFormation template updates for Recommendation 6

AWSTemplateFormatVersion: '2010-09-09'

Transform: AWS::Serverless-2016-10-31

Description: 'Optimized FLP Set-Aside Request Infrastructure'

Parameters:

Environment:

Type: String

Default: dev

AllowedValues: [dev, test, prod]

Resources:

# RECOMMENDATION 6: Optimized Lambda configurations

FillForm2501Function:

Type: AWS::Serverless::Function

Properties:

CodeUri: handlers/fill2501Form/

Handler: fill2501Form-handler.handler

Runtime: nodejs18.x

# RECOMMENDATION 6: Increased memory and timeout for PDF processing

MemorySize: 1024 # Increased from default 128MB

Timeout: 300 # 5 minutes for complex PDF operations

ReservedConcurrencyLimit: 10 # Prevent cold starts

Environment:

Variables:

NODE\_OPTIONS: '--max-old-space-size=896' # Optimize memory for PDF operations

PDF\_CACHE\_SIZE: '50' # Cache up to 50 PDF templates

WEBSOCKET\_ENDPOINT: !Ref WebSocketApi

DeadLetterQueue:

Type: SQS

TargetArn: !GetAtt FormProcessingDLQ.Arn

VpcConfig:

SecurityGroupIds:

- !Ref LambdaSecurityGroup

SubnetIds:

- !Ref PrivateSubnet1

- !Ref PrivateSubnet2

Upload2501FormFunction:

Type: AWS::Serverless::Function

Properties:

CodeUri: handlers/upload2501Form/

Handler: upload2501Form-handler.handler

Runtime: nodejs18.x

MemorySize: 512 # Sufficient for file uploads

Timeout: 180 # 3 minutes

ReservedConcurrencyLimit: 15

Environment:

Variables:

UPLOAD\_RETRY\_COUNT: '3'

UPLOAD\_TIMEOUT: '120000'

SaveSetAsideRequestFunction:

Type: AWS::Serverless::Function

Properties:

CodeUri: handlers/saveSetAsideRequest/

Handler: saveSetAsideRequest-handler.handler

Runtime: nodejs18.x

MemorySize: 256 # Lightweight for database operations

Timeout: 60 # 1 minute

ReservedConcurrencyLimit: 20

Environment:

Variables:

# RECOMMENDATION 4: Database connection pooling

DATABASE\_URL: !Sub '${DatabaseConnectionString}?connection\_limit=20&pool\_timeout=20&socket\_timeout=20'

PRISMA\_CLI\_BINARY\_TARGETS: 'linux-x64'

VpcConfig:

SecurityGroupIds:

- !Ref LambdaSecurityGroup

SubnetIds:

- !Ref PrivateSubnet1

- !Ref PrivateSubnet2

GetSetAsideStatusFunction:

Type: AWS::Serverless::Function

Properties:

CodeUri: handlers/getSetAsideStatus/

Handler: getSetAsideStatus-handler.handler

Runtime: nodejs18.x

MemorySize: 128 # Minimal for status checks

Timeout: 30

ReservedConcurrencyLimit: 50 # High concurrency for status polling

SetAsideRequestParentFunction:

Type: AWS::Serverless::Function

Properties:

CodeUri: handlers/setAsideRequestParent/

Handler: setAsideRequestParent-handler.handler

Runtime: nodejs18.x

MemorySize: 256

Timeout: 60

ReservedConcurrencyLimit: 25

# RECOMMENDATION 2: WebSocket API for real-time updates

WebSocketApi:

Type: AWS::ApiGatewayV2::Api

Properties:

Name: !Sub '${AWS::StackName}-websocket-api'

ProtocolType: WEBSOCKET

RouteSelectionExpression: '$request.body.action'

WebSocketStage:

Type: AWS::ApiGatewayV2::Stage

Properties:

ApiId: !Ref WebSocketApi

StageName: !Ref Environment

AutoDeploy: true

# RECOMMENDATION 5: Redis cache for improved performance

RedisCluster:

Type: AWS::ElastiCache::ReplicationGroup

Properties:

ReplicationGroupDescription: 'Set-aside request cache'

ReplicationGroupId: !Sub '${AWS::StackName}-redis'

CacheNodeType: cache.t3.micro

CacheParameterGroupName: default.redis7

NumCacheClusters: 2

Engine: redis

EngineVersion: '7.0'

Port: 6379

SecurityGroupIds:

- !Ref RedisSecurityGroup

SubnetGroupName: !Ref RedisSubnetGroup

AtRestEncryptionEnabled: true

TransitEncryptionEnabled: true

# RECOMMENDATION 6: Enhanced SQS configuration with DLQ

FormProcessingQueue:

Type: AWS::SQS::Queue

Properties:

QueueName: !Sub '${AWS::StackName}-form-processing'

VisibilityTimeoutSeconds: 300

MessageRetentionPeriod: 1209600 # 14 days

ReceiveMessageWaitTimeSeconds: 20 # Long polling

RedrivePolicy:

deadLetterTargetArn: !GetAtt FormProcessingDLQ.Arn

maxReceiveCount: 3

FormProcessingDLQ:

Type: AWS::SQS::Queue

Properties:

QueueName: !Sub '${AWS::StackName}-form-processing-dlq'

MessageRetentionPeriod: 1209600 # 14 days

# RECOMMENDATION 6: Enhanced Step Function with error handling

SetAsideRequestStateMachine:

Type: AWS::Serverless::StateMachine

Properties:

DefinitionUri: step-function-definition.json

DefinitionSubstitutions:

FillFormFunctionArn: !GetAtt FillForm2501Function.Arn

UploadFormFunctionArn: !GetAtt Upload2501FormFunction.Arn

SaveRequestFunctionArn: !GetAtt SaveSetAsideRequestFunction.Arn

Policies:

- LambdaInvokePolicy:

FunctionName: !Ref FillForm2501Function

- LambdaInvokePolicy:

FunctionName: !Ref Upload2501FormFunction

- LambdaInvokePolicy:

FunctionName: !Ref SaveSetAsideRequestFunction

Type: EXPRESS

Logging:

Level: ALL

IncludeExecutionData: true

Destinations:

- CloudWatchLogsLogGroup:

LogGroupArn: !GetAtt StateMachineLogGroup.Arn

# RECOMMENDATION 7: Enhanced monitoring and logging

StateMachineLogGroup:

Type: AWS::Logs::LogGroup

Properties:

LogGroupName: !Sub '/aws/stepfunctions/${AWS::StackName}-state-machine'

RetentionInDays: 30

# Performance monitoring dashboard

PerformanceDashboard:

Type: AWS::CloudWatch::Dashboard

Properties:

DashboardName: !Sub '${AWS::StackName}-performance'

DashboardBody: !Sub |

{

"widgets": [

{

"type": "metric",

"properties": {

"metrics": [

["AWS/Lambda", "Duration", "FunctionName", "${FillForm2501Function}"],

["AWS/Lambda", "Errors", "FunctionName", "${FillForm2501Function}"],

["AWS/Lambda", "Throttles", "FunctionName", "${FillForm2501Function}"]

],

"period": 300,

"stat": "Average",

"region": "${AWS::Region}",

"title": "PDF Generation Performance"

}

},

{

"type": "metric",

"properties": {

"metrics": [

["AWS/States", "ExecutionTime", "StateMachineArn", "${SetAsideRequestStateMachine}"],

["AWS/States", "ExecutionsFailed", "StateMachineArn", "${SetAsideRequestStateMachine}"],

["AWS/States", "ExecutionsSucceeded", "StateMachineArn", "${SetAsideRequestStateMachine}"]

],

"period": 300,

"stat": "Sum",

"region": "${AWS::Region}",

"title": "Step Function Performance"

}

}

]

}

# RECOMMENDATION 7: Performance alarms

HighExecutionTimeAlarm:

Type: AWS::CloudWatch::Alarm

Properties:

AlarmName: !Sub '${AWS::StackName}-high-execution-time'

AlarmDescription: 'Alert when PDF generation takes too long'

MetricName: Duration

Namespace: AWS/Lambda

Statistic: Average

Period: 300

EvaluationPeriods: 2

Threshold: 120000 # 2 minutes in milliseconds

ComparisonOperator: GreaterThanThreshold

Dimensions:

- Name: FunctionName

Value: !Ref FillForm2501Function

HighErrorRateAlarm:

Type: AWS::CloudWatch::Alarm

Properties:

AlarmName: !Sub '${AWS::StackName}-high-error-rate'

AlarmDescription: 'Alert when error rate is high'

MetricName: Errors

Namespace: AWS/Lambda

Statistic: Sum

Period: 300

EvaluationPeriods: 2

Threshold: 5

ComparisonOperator: GreaterThanThreshold

Dimensions:

- Name: FunctionName

Value: !Ref FillForm2501Function

# Security groups

LambdaSecurityGroup:

Type: AWS::EC2::SecurityGroup

Properties:

GroupDescription: Security group for Lambda functions

VpcId: !Ref VPC

SecurityGroupEgress:

- IpProtocol: -1

CidrIp: 0.0.0.0/0

RedisSecurityGroup:

Type: AWS::EC2::SecurityGroup

Properties:

GroupDescription: Security group for Redis cluster

VpcId: !Ref VPC

SecurityGroupIngress:

- IpProtocol: tcp

FromPort: 6379

ToPort: 6379

SourceSecurityGroupId: !Ref LambdaSecurityGroup

# RECOMMENDATION 5: Cache subnet group

RedisSubnetGroup:

Type: AWS::ElastiCache::SubnetGroup

Properties:

Description: Subnet group for Redis cluster

SubnetIds:

- !Ref PrivateSubnet1

- !Ref PrivateSubnet2

Outputs:

WebSocketApiUrl:

Description: 'WebSocket API URL for real-time updates'

Value: !Sub 'wss://${WebSocketApi}.execute-api.${AWS::Region}.amazonaws.com/${Environment}'

Export:

Name: !Sub '${AWS::StackName}-websocket-url'

RedisEndpoint:

Description: 'Redis cluster endpoint'

Value: !GetAtt RedisCluster.RedisEndpoint.Address

Export:

Name: !Sub '${AWS::StackName}-redis-endpoint'

StateMachineArn:

Description: 'Step Function ARN for async processing'

Value: !Ref SetAsideRequestStateMachine

Export:

Name: !Sub '${AWS::StackName}-state-machine-arn'