

FINOS

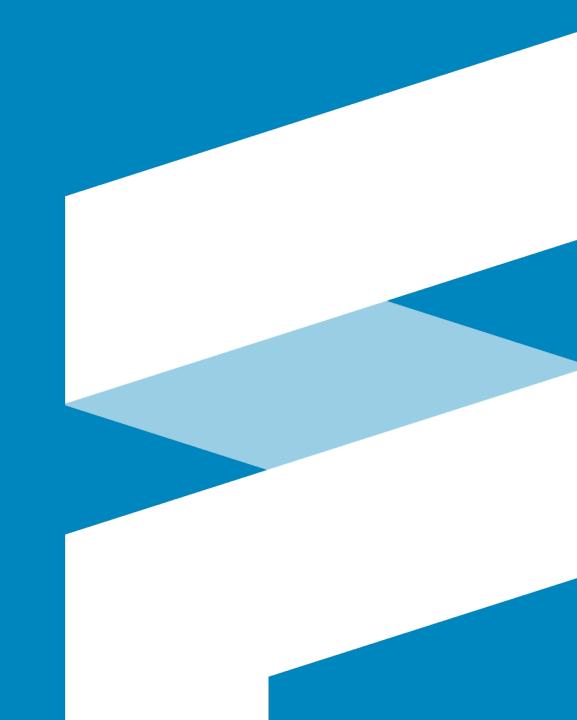
Fintech Open Source Foundation

Secure By Design: Codified Controls For Cloud Services

This talk will introduce the idea and method used by JPMorgan Chase & Co. to get cloud services approved for use in an accelerated timeline. This idea and method are now a project at FINOS and will use the collective efforts of members to build codified

FINOS Project

Financial
Delivery
Accelerator (FDX)
– Cloud Service
Certification



Where to find it:

Github:

https://github.com/finos-fdx/cloud-servicecertification

Google Group:

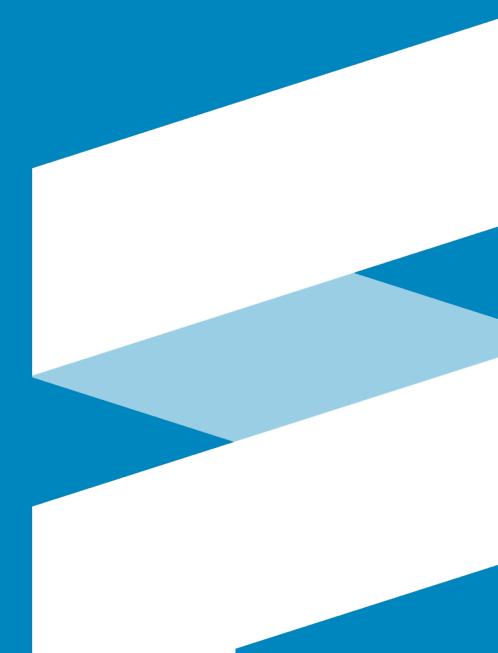
https://groups.google.com/a/finos.org/forum/#!forum/fdx-cloud-service-certification

Wiki:

https://finosfoundation.atlassian.net/wiki/spaces/ FDX/pages/904626436/ Cloud+Service+Certification+Working+Group

Using Cloud Services at a Bank

- On-premise security controls must be adjusted for cloud security models
- How to map control frameworks to cloud service implementation?
- How to change a culture of NO into a culture of Yes.

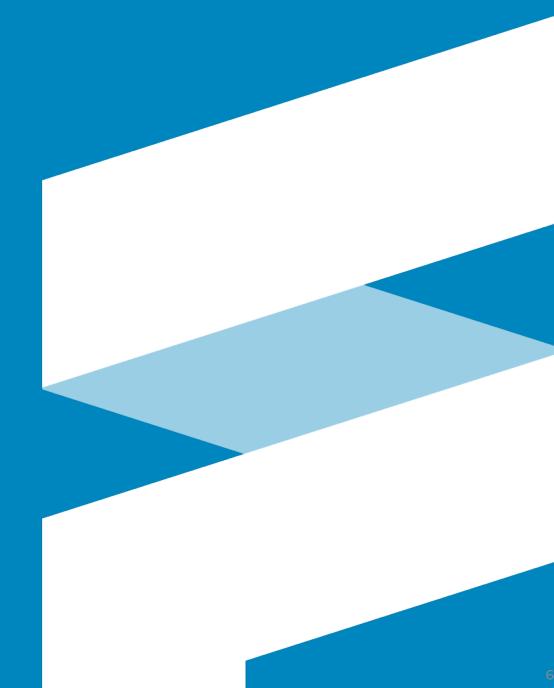


Why are accelerators needed?

- All financial institutions are re-inventing the wheel: Institutions have similar control frameworks, we are all trying to secure and stand up the same providers and services.
- This takes significant time and resources, delaying innovation: 6 18 months elapsed time, every institution is fact finding with cloud providers
- Results vary...: No guidance on how to implement controls, in-depth cloud service knowledge required to deliver this, we are not the cloud provider security experts

We built a process to solve a problem.

- How do you know your process is broken?
- Why do accelerators solve for the problem?
- What does it look like?



What artefacts make an accelerator?

- Define standard control questions for cloud service:
 Prior art here Cloud Security Alliance Cloud Controls
 Matrix (CCM), EU-CERT initiative
- Reference security document: Document to provide detailed guidance on implementation, answering standard process questions for compliance and security review
- Implementation of service to meet controls: Write infrastructure as code to stand up service and meet control objectives (Terraform or platform agnostic code)
- Test cases to prove efficacy: BDD test cases to prove efficacy of controls



Define standard control questions for cloud service

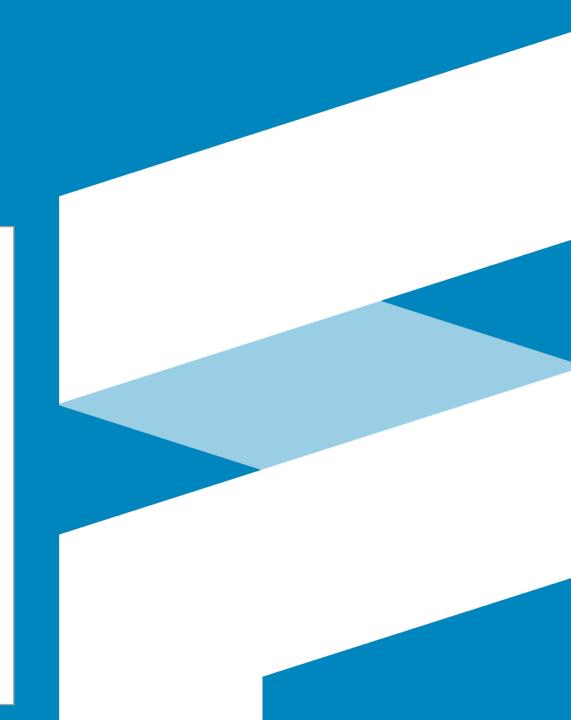
Security Domain	Control Standard	BDD Test Scenario
Encryption		
Encryption of data at-rest	Must ensure that end-to-end encryption is implemented such that data is encrypted at-rest and in-transit at all times.	Scenario: User attempts to save data without specifying encryption, should be rejected (or enforce encryption - to confirm) Scenario: User attempts to save data specifying SSE-S3 encryption, should be rejected Scenario: User attempts to save data specifying SSE-C encryption, should be rejected Scenario: User saves data to S3 bucket, validate that the cloud trail logs are updated appropriately Scenario: User creates cfn for an S3 bucket and does not reference SSE-KMS encryption, SDLC should reject the cfn Scenario: Validate encrypted objects being stored (store a known object to S3, pull HEAD object and check the KMS key ID or compare MD5 of plaintext vs ETag of the encrypted object (above and beyond - nice to have)

Reference security document

Security Domain	Control & Architectural Suggestions	References
Encryption		
Encryption of data in-transit	To support SSL connections, Amazon Redshift creates and installs an <u>AWS Certificate Manager (ACM)</u> issued SSL certificate on each cluster. The set of Certificate Authorities that you must trust in order to properly support SSL connections can be found at https://s3.amazonaws.com/redshift-downloads/redshift-ca-bundle.crt .	How to encrypt end to end: https://aws.amazon.com/blogs/big-data/encrypt-your-amazon-redshift-loads-with-amazon-s3-and-aws-kms/
	RedShift endpoints are available over HTTPS at a selection of regions. Best practice:	To make client side encryption work follow this pattern https://docs.aws.amazon.com/AmazonS3/latest/dev/ UsingClientSideEncryption.html
	Set the "require_SSL" parameter to "true" in the parameter group that is associated with the cluster. For workloads that require FIPS-140-2 SSL compliance an additional step is required to set parameter "use_fips_ssl" to "true"	3. https://docs.aws.amazon.com/acm/latest/userguide/import-certificate.html

Implementation of service to meet controls

```
"AWSTemplateFormatVersion": "2010-09-09",
"Description": "Amazon DynamoDB Template",
"Metadata": {
 "AWS::CloudFormation::Interface": {
  "ParameterGroups": [
     "Label": {
     "default": "DynamoDB Table Settings"
     "Parameters": |
      "pTableName".
      "pSSESpecification".
     "pHashKevElementName",
     "pHashKevElementType".
      "pReadCapacityUnits".
      "pWriteCapacityUnits"
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   "pHashKeyElementName": {
    "default": "Partition Key Name"
   "pHashKeyElementType": {
    "default": "Partition Key Type"
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     "default": "Read Capacity"
   "pWriteCapacityUnits": {
     "default": "Write Capacity"
```



What is BDD?

- Changes how your project management approach defines work
- Defines in simple full sentences the needed outcome of the work
- Can be tested, like code
- Example Please?

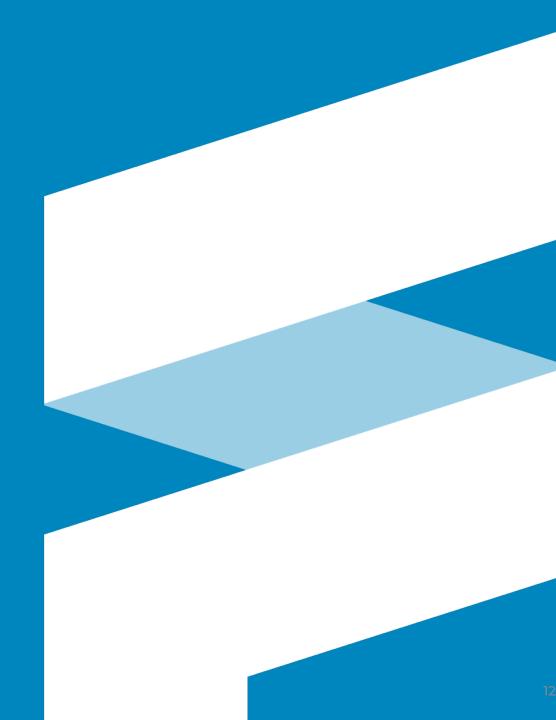


What is BDD?

Feature: Kinesis Data Streams is set up with the right security controls

Tests that Kinesis Data Streams have security controls enabled

Scenario: Connect to Kinesis over an unencrypted connection Given that I have valid AWS credentials with permissions to use Kinesis Data Streams And I have IAM permissions to read, write and modify a Kinesis Data Stream When I try to send data to Kinesis without using encryption Then it should fail



We built a tool to solve a problem.

- Why build when you can buy?
- How do you know you have a secure by design approach?
- How do you integrate BDD into your SDLC?



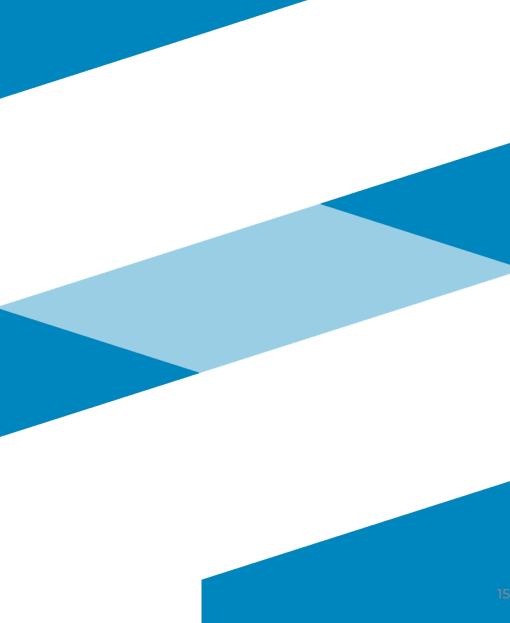
We made changes along the way

 Building it yourself is not always the best idea

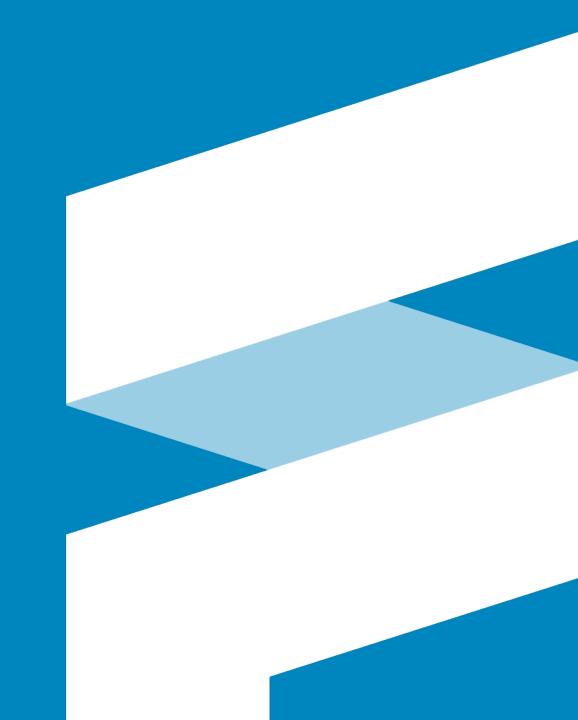


End results

- We were able to observe shorter time from use case to service approval.
- Having a structured approach enables cloud services adoption at a more rapid pace.
- Using code for controls allowed for reuse instead of reinvention.



Q&A



FINOS Project

Financial Delivery Accelerator

- Cloud Service Certification



Where is this project?

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Google Group: https://groups.google.com/a/finos.org/forum/#!forum/fdx-cloud-service-certification

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Value for the Community

Current State before this project

- Majority of cloud security incidents due to misconfiguration: Services are not secure by default, configuration is often complex, nuanced and difficult to validate.
- All financial institutions are re-inventing the wheel: Institutions have similar control frameworks, we are all trying to secure and stand up the same providers and services.
- This takes significant time and resources, delaying innovation: 6 18 months elapsed time, every institution is fact finding with cloud providers
- Results vary: No guidance on how to implement controls, in-depth cloud service knowledge required to deliver this, we are not the cloud provider security experts

Proposed State with this project

- Set quality standards across artefacts: Members of all tiers can contribute to the project and ensure a common high level of quality is delivered and in less time.
- Encourage cloud vendors to produce more industry specific content: Member Participation and public release of the Accelerators will encourage cloud vendors to project more focused and quality content for Financial Services Industry.



Activity Evolution in the Foundation

• Near-term focus of the Program:

- o Define standard set of controls to satisfy common framework requirements
- Review existing body of work control definitions and implementations with working group members, amending to meet above controls
- Release service accelerators to community, incorporating updates
- Engage other Cloud Service Providers for contribution Google, Azure



Outcomes and Impact

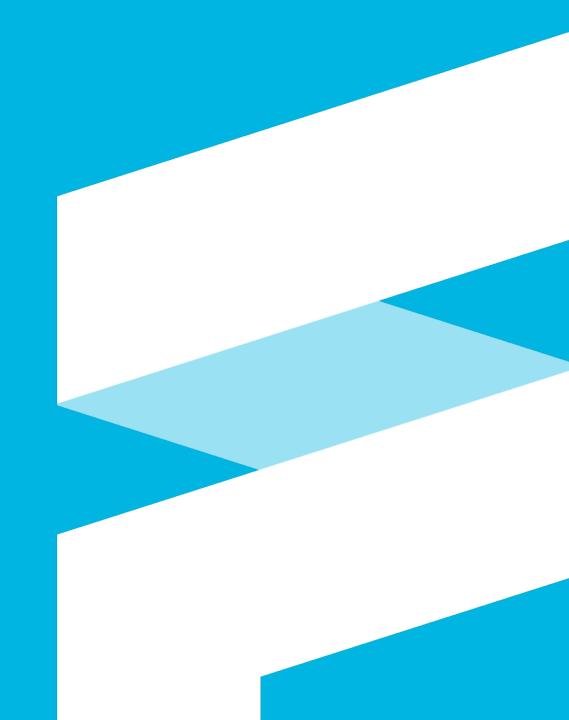
Members

- Collaboration: Request collaboration to review the existing body of work, defining standard controls and contribute with feedback regarding the best practice implementation provided
- Communication to other Financial institutions and regulators: Raise awareness with other institutions to contribute and influence cloud service providers to extend to other services.
- Participation: Present controls, sample implementations and test cases to regulators as standard approach to securely configure services?

Community at-large

- Awareness: Raise awareness of work to reduce duplication, applying pressure to Cloud Service
 Providers in order to provide standardised details for future service offerings
- Collaboration: Extended contributions would be appreciated, incorporating amendments to sample implementation of controls

Q&A



Presentation Completion

Thank you for your attendance.

