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Serverless Workflow: Key to Wide Serverless Adoption

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Agenda

- **CNCF Serverless Function Workflow Model**
- **How to Use Workflow Model to Describe Serverless Application Use Cases**
- **Comparison of CNCF Function Workflow vs AWS Step Function**
- **Product Information Link on Serverless Workflow**
- **Q&A**

Function Workflow Model

A Function Workflow can be naturally modeled as a state machine. There are three key components

➤ List of Events (trigger the function execution):

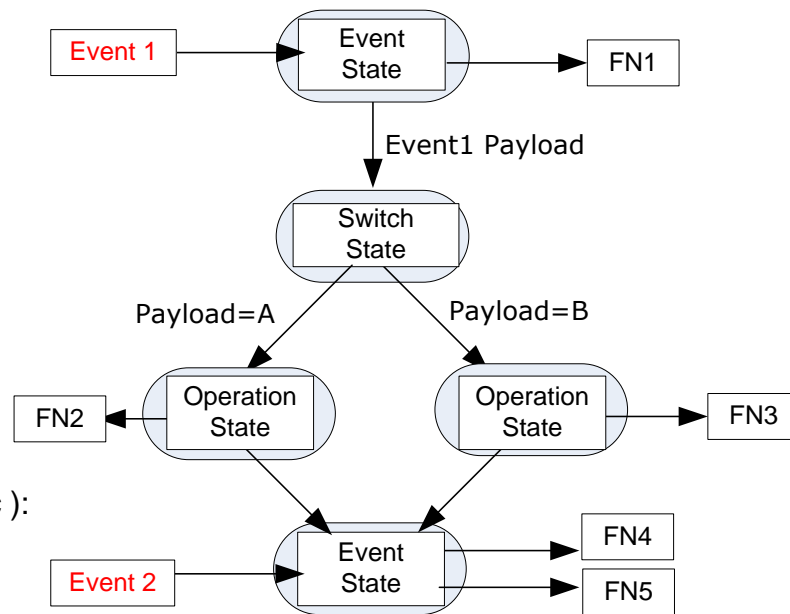
For example: Storage event, Web Request event, DB Access event, Email event, etc.

➤ List of States (build the workflow structure):

- event-state
- operation-state
- switch-state
- delay-state
- parallel-state
- end-state with success or failure status

➤ Functions associated with a state (executes the business logic):

- Directives for parallel/sequential execution of functions
- Directives for Retry
- Directives for information passing/filtering



IoT Home Monitoring Use Case



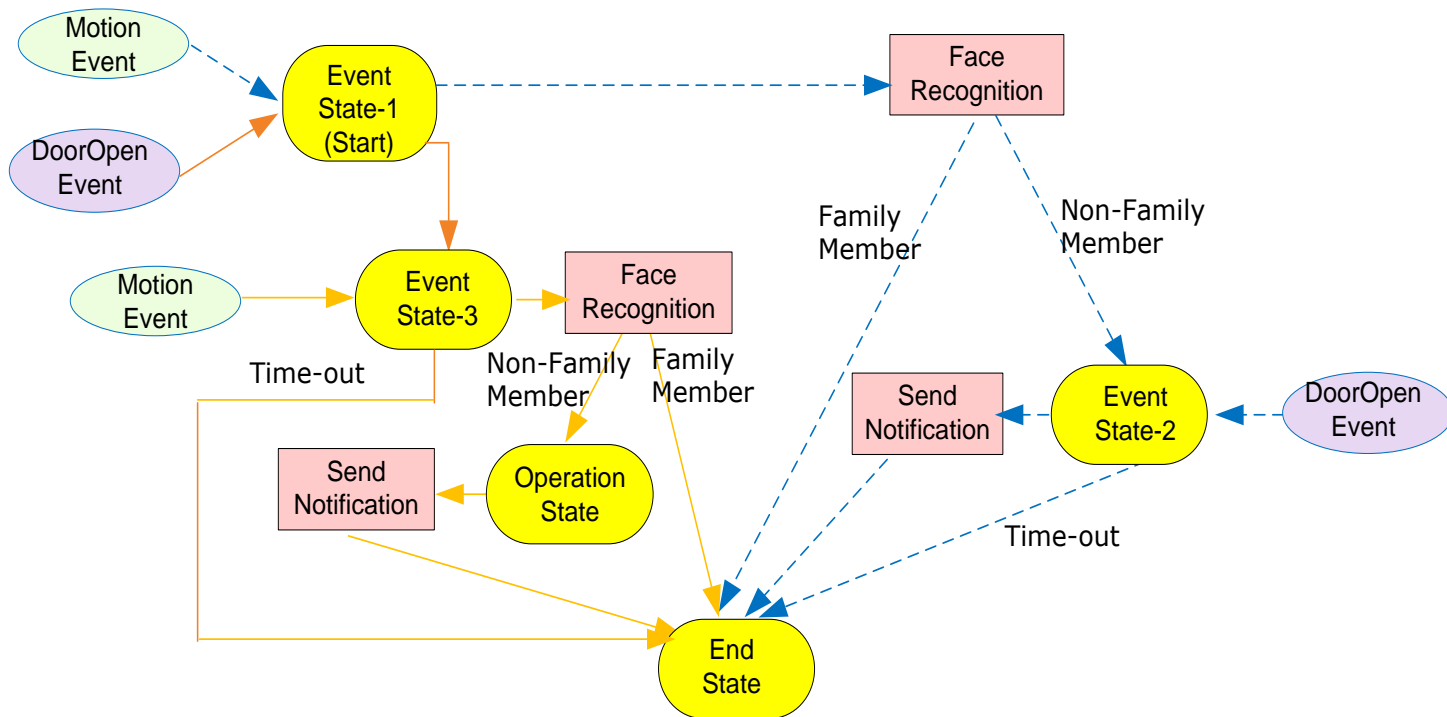
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Application Workflow Specification



How to Specify Workflow States



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```
"STATE-NAME": {  
  "type": state type  
  "start": a Boolean value to specify whether it is a start state  
  "events": [  
    { "event-expression": a Boolean expression of events, e.g. "Event1 and Event2"  
      "timeout": the timeout period waiting for the events, transition to end state  
      "action-mode": functions are executed in sequence or in parallel  
      "actions": the list of functions to be performed.  
      "next-state": the next state to transition to after all the functions are successfully executed.  
    }  
  ]  
}
```

How to Specify Function Retry



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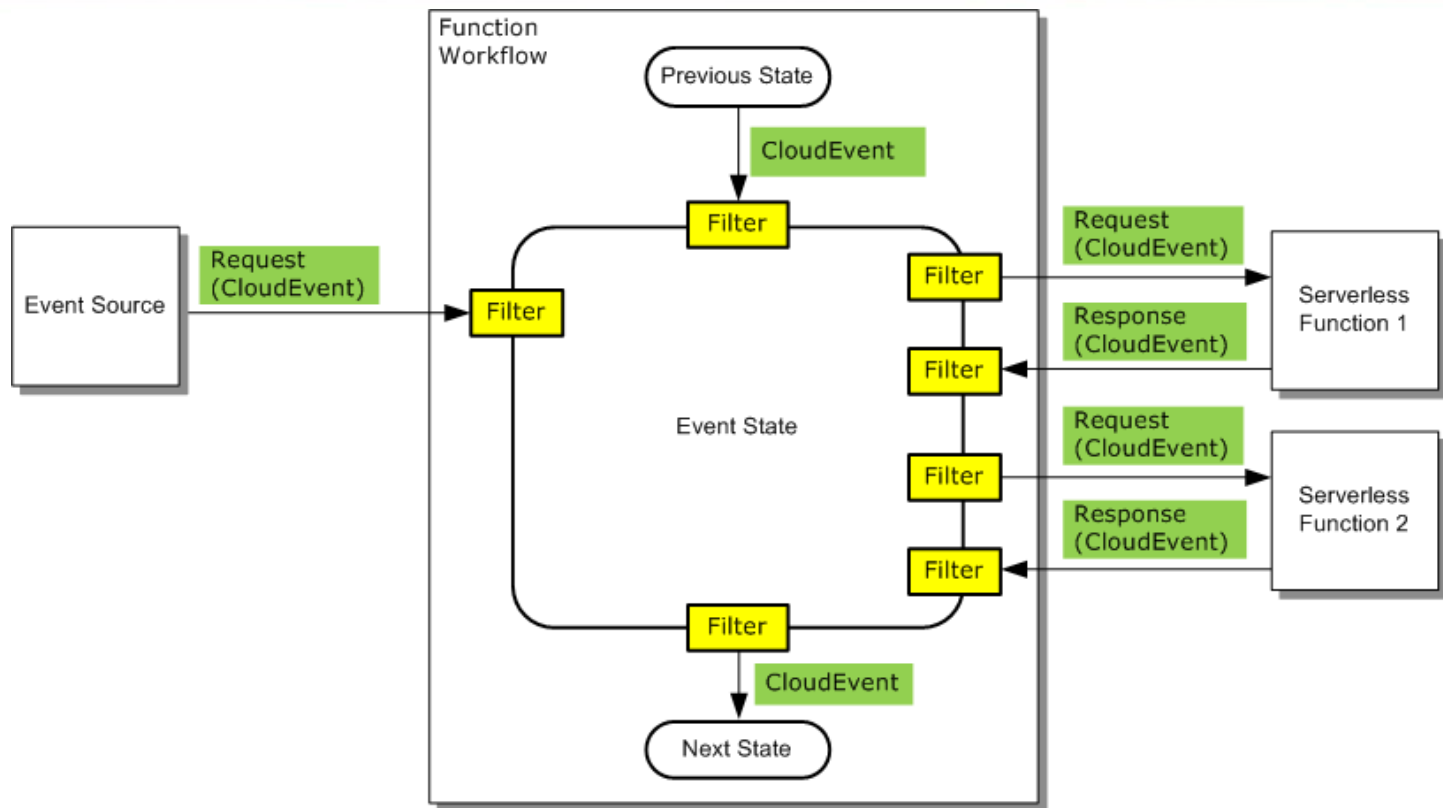
```
{
  "function": the function that must be invoked
  "timeout": the amount of time to wait for the completion of the function
  "retry": [
    { "match": the matching value for the retry (function response/timeout)
      "retry-interval": the interval between the time that the error response is
                        received to the time the retry is started
      "max-retry": the maximum number of retry attempts
      "next-state": the next state to transition to when exceeding max-retry limit
    }
  ]
}
```

How to Specify Pass/Filter of Information



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Travel Booking Use Case



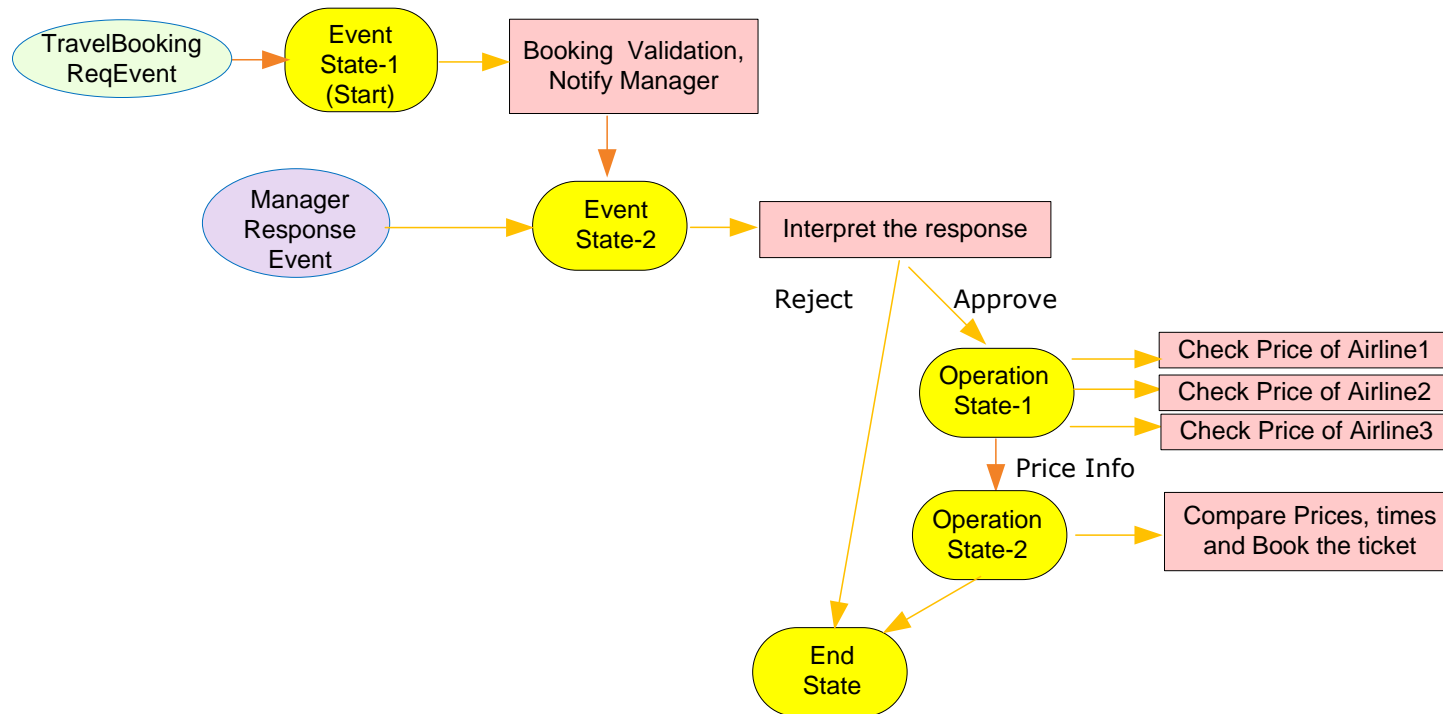
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Application Workflow Specification



Loan Application Use Case



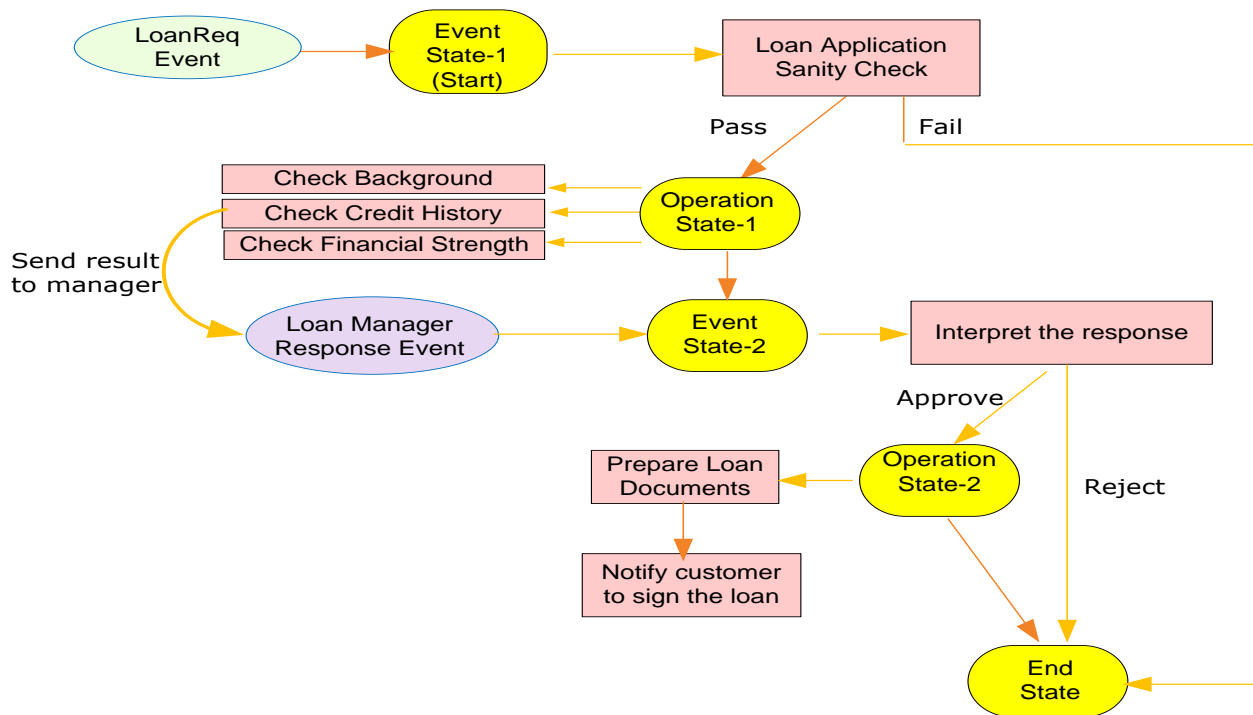
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Video Streaming Use Case



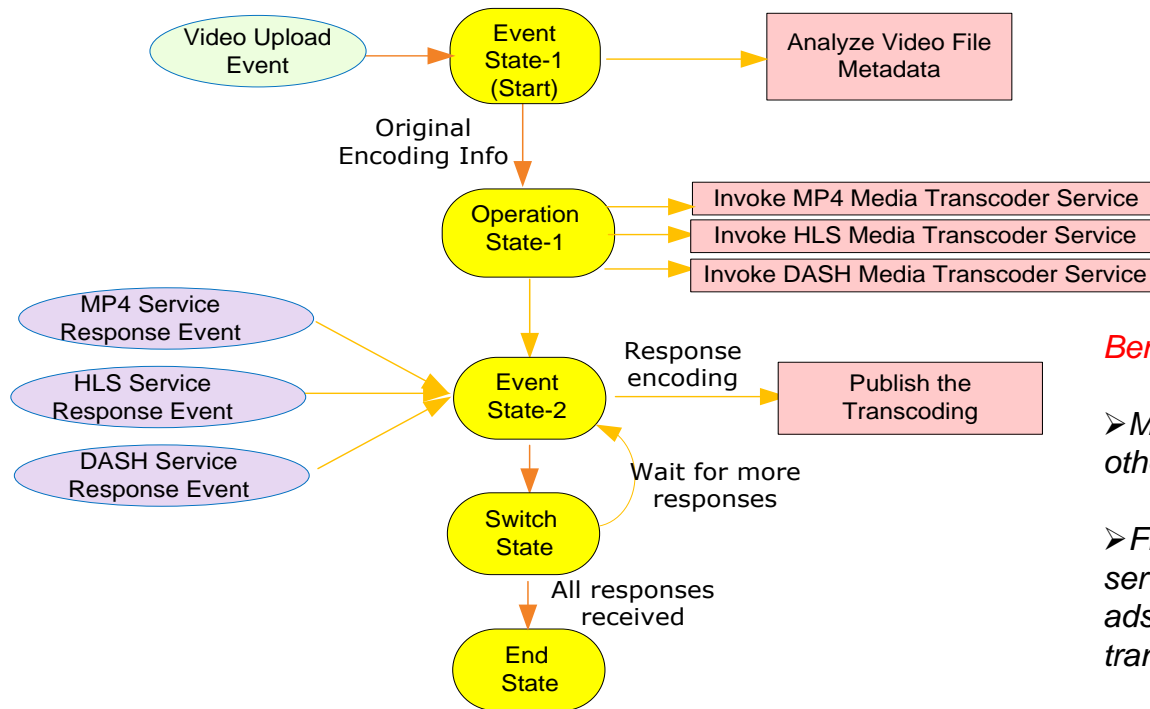
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Application Workflow Specification



Benefit of Breaking an Application into a Workflow

➤ *Modify/replace/add a function without impacting other functions or other steps.*

➤ *Flexibility to add a new step to provide new service, such as creating thumbnails, inserting ads in the video stream, inserting a video transcription, etc.*

CNCF Workflow vs AWS Step Function

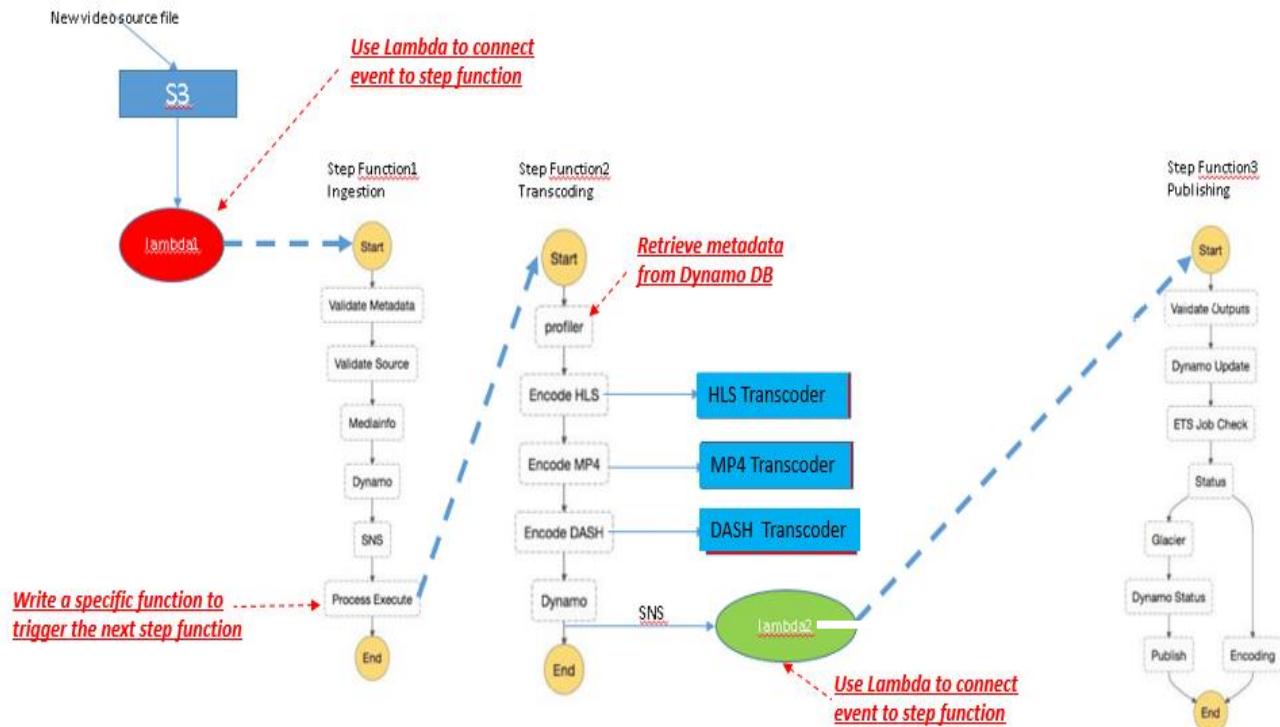


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AWS Step Function Flow



- Step Function can not handle event. User needs to configure extra lambda function to connect an event to a step function and needs to coordinate these configurations manually
- Customer needs to provision Dynamo DB and use it to pass info from one Step Function to the next step function
- Configure multiple Lambda Functions and Step Functions vs one CNCF Workflow

Information Links

1. <https://github.com/cncf/wg-serverless/tree/master/workflow/spec>
2. <https://www.huaweicloud.com/en-us/product/functiongraph.html>
3. <https://aws.amazon.com/step-functions/>

Thank You!



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Questions?