3rd UCAAT User Conference on Advanced Automated Testing

ETSI World Class Standards

Sophia Antipolis, French Riviera
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TESTING ASYNCHRONOUS APIS

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PROJECTFIFO

Agenda

- The system under test – what is Project-FiFo
- The Problem
- Building the model
- Conclusion

What is Project-FiFo

- Cloud Orchestration (think Open Stack)
- Manage private and public clouds
- Based on SmartOS / Solaris Containers (aka Zones)
- OSS and Commercial Support

The system under test

What is Project-FiFo

- Self hosted
- Distributed
- Highly available
- **Eventually consistent**

The system under test

Architecture

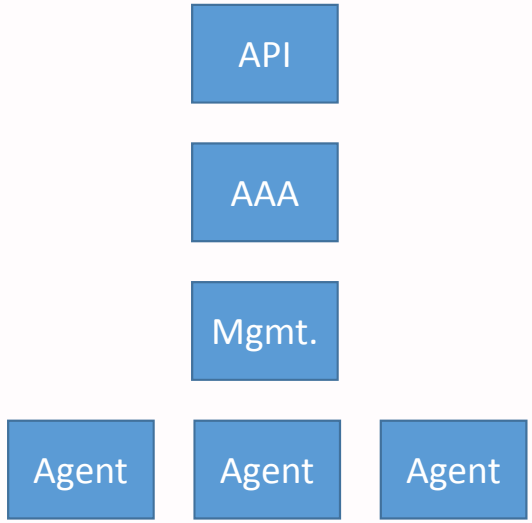
The system under test

HTTP / REST API

AAA: OAuth2, RBAC

Business logic, database, tracking

Agents to manage physical components



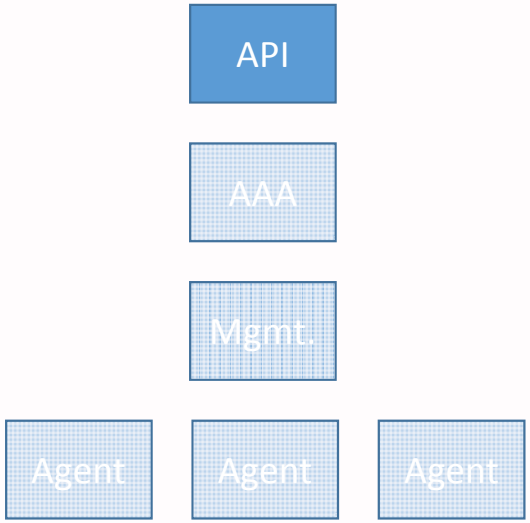
Testing

- Testing components and libraries in isolation
- Unit tests
- EQC properties
- riak_test (testing for distributed components)

The system under test

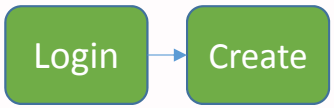
Lets test

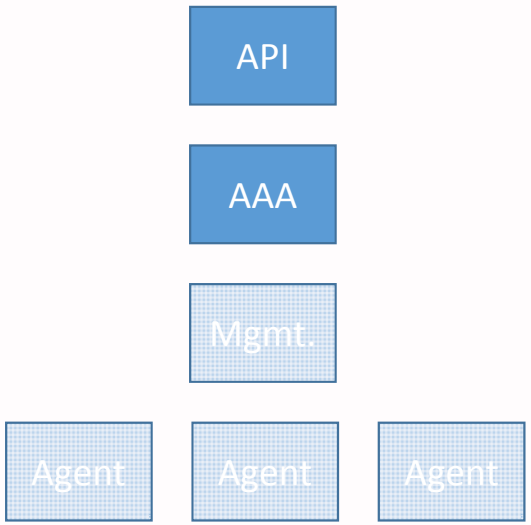
Create



The problem

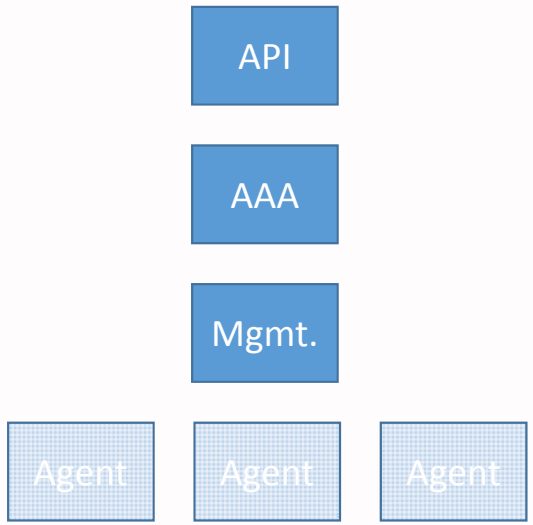
Lets test





The problem

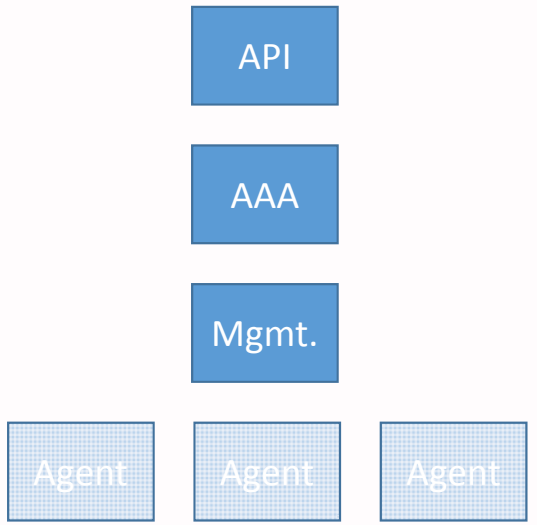
Lets test



The problem

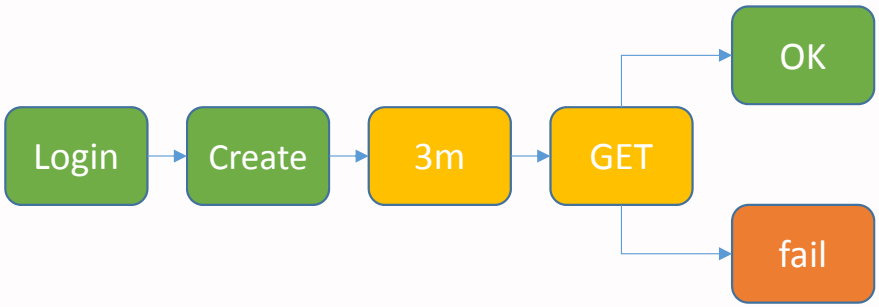
Lets test

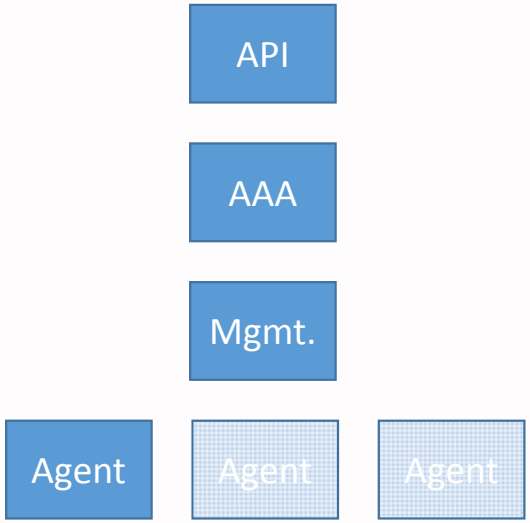
This fails, create is asynchronous



The problem

Lets test



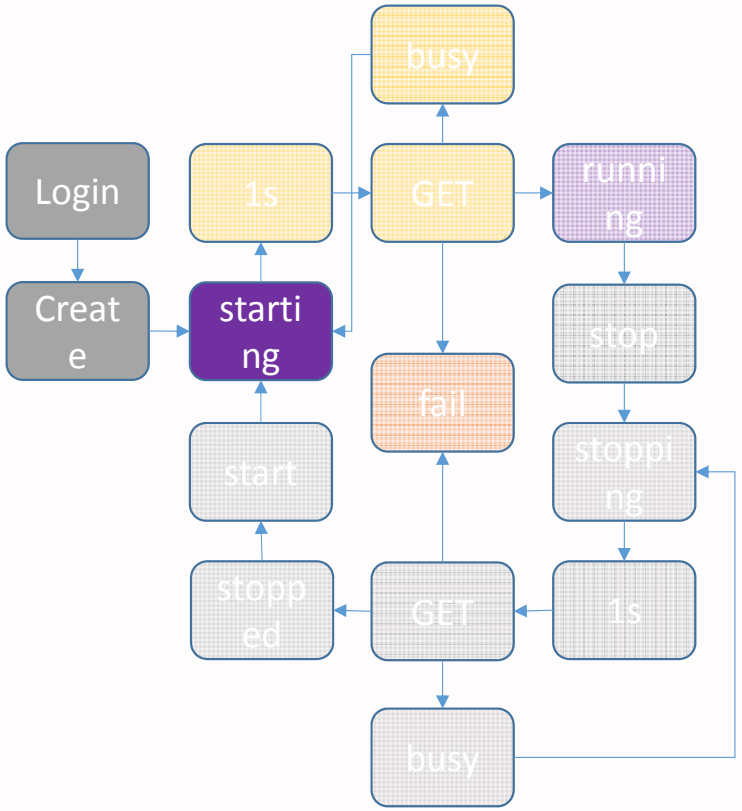


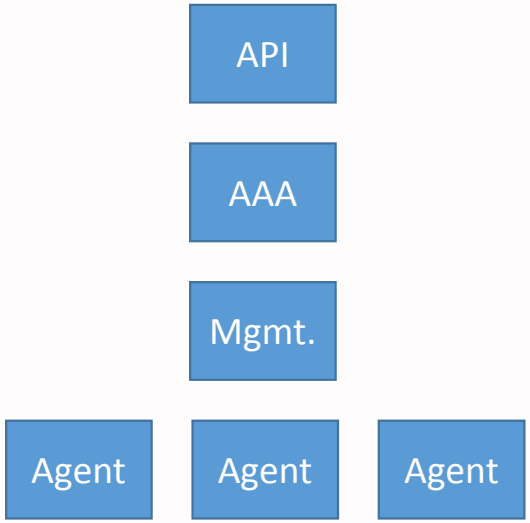
The problem

The problem

- Tests in isolation
- Limited interaction
- OS, hardware, network are part of the system
- We don’t know when a command finishes

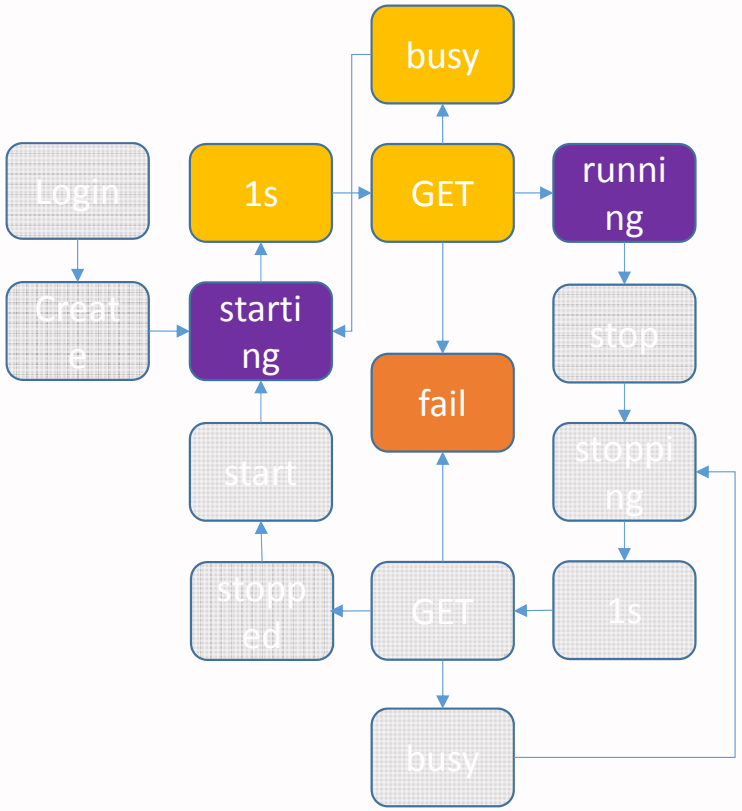
Create a VM

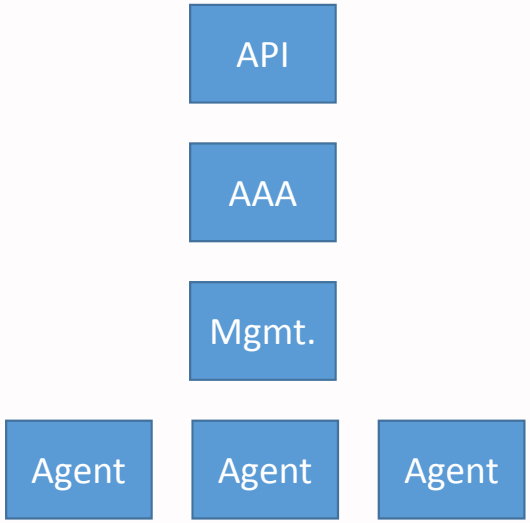




Building the model

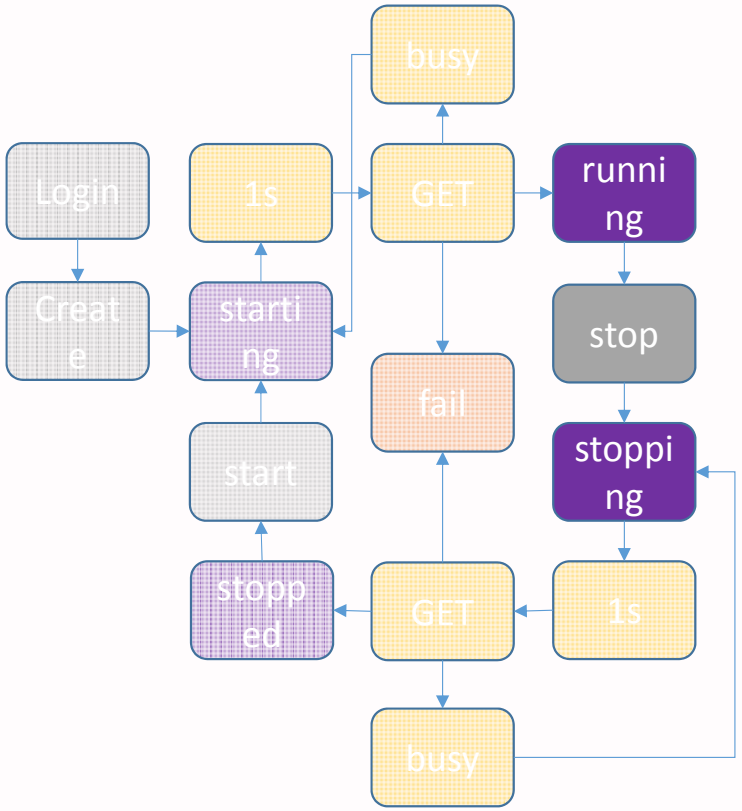
Wait for a VM to be running

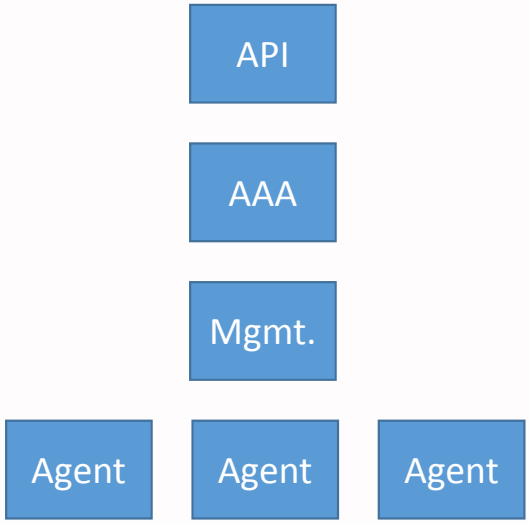




Building the model

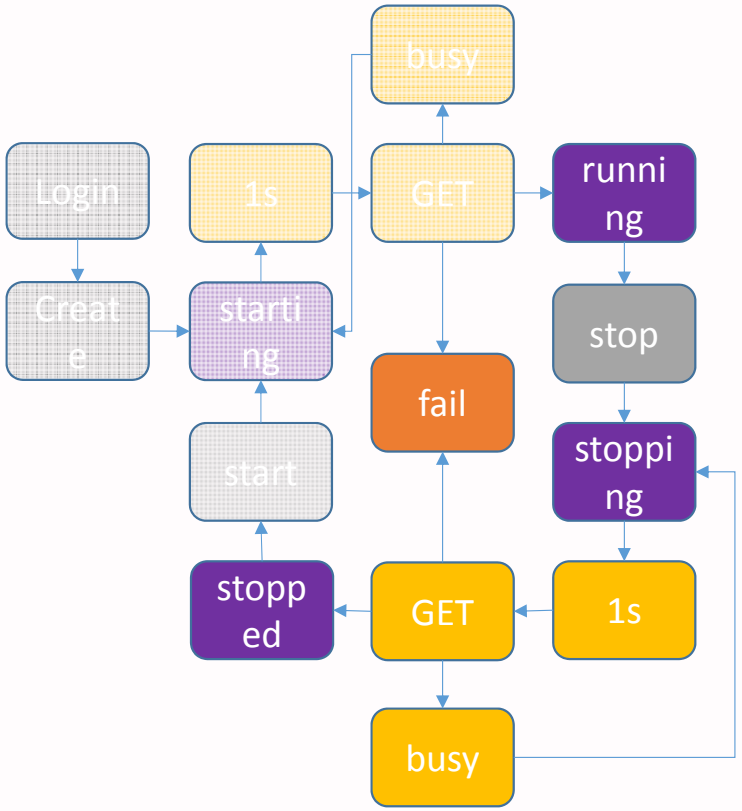
Stop a VM

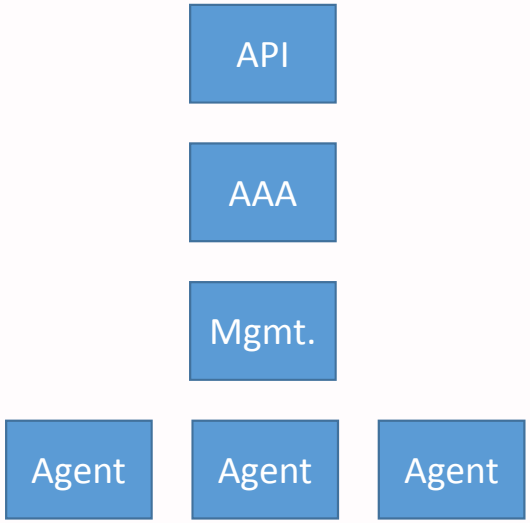




Building the model

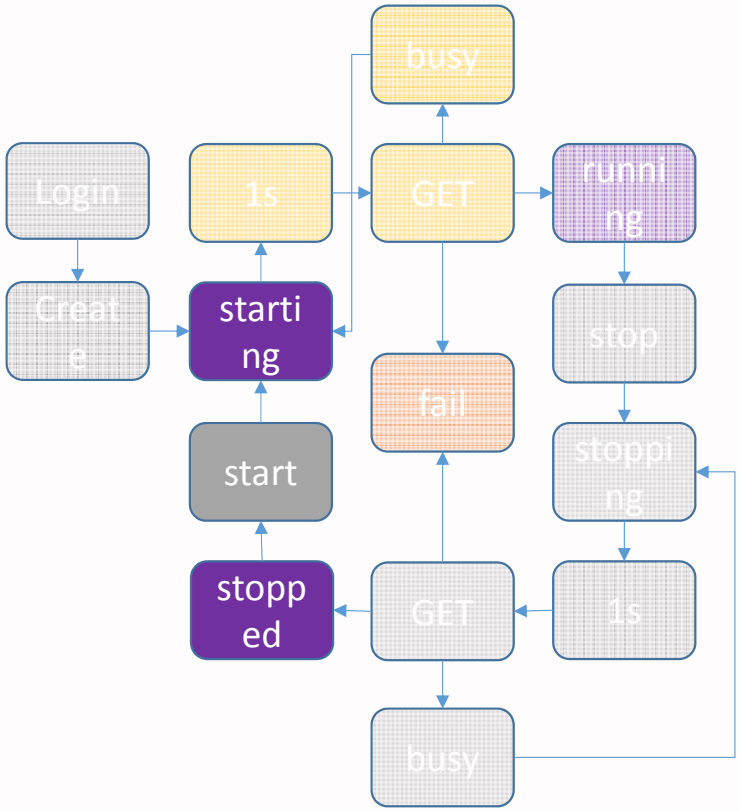
Wait for a VM to stop

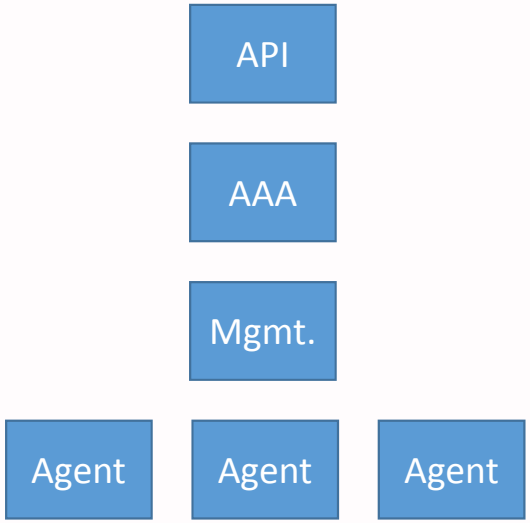




Building the model

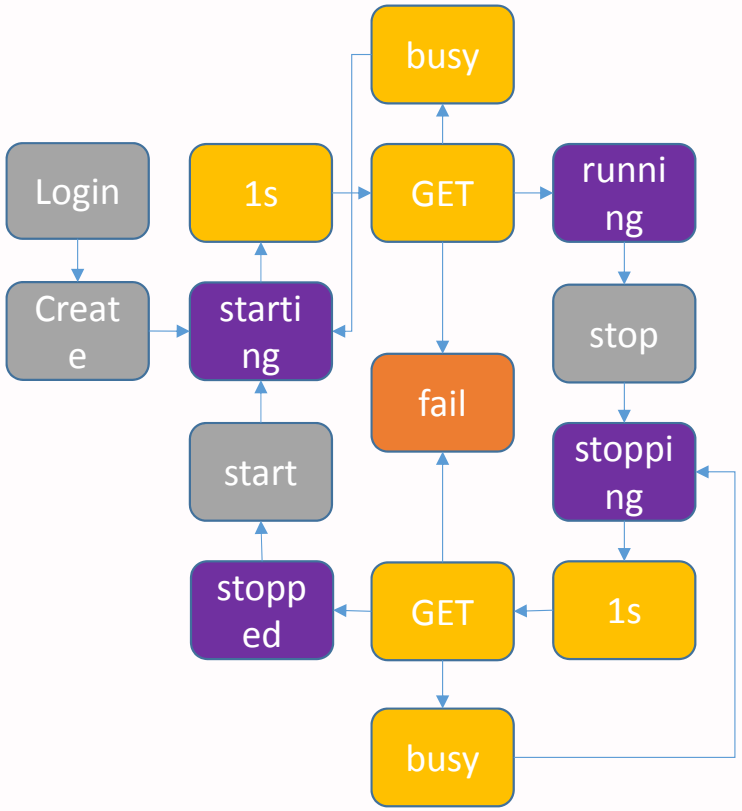
Starts VM

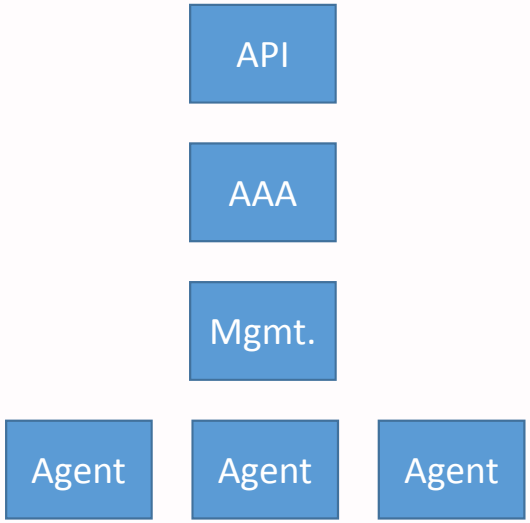




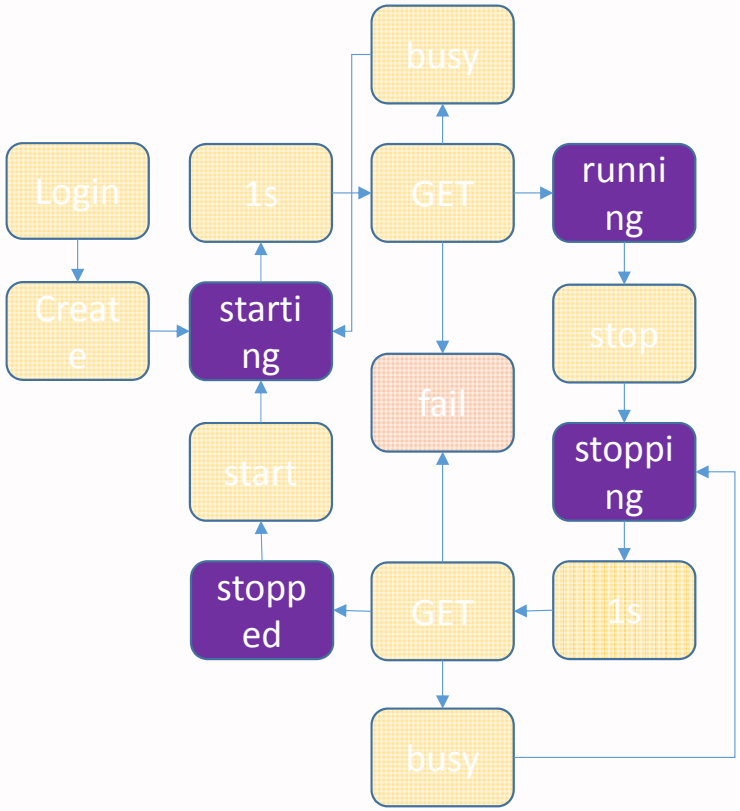
Building the model

Building the model





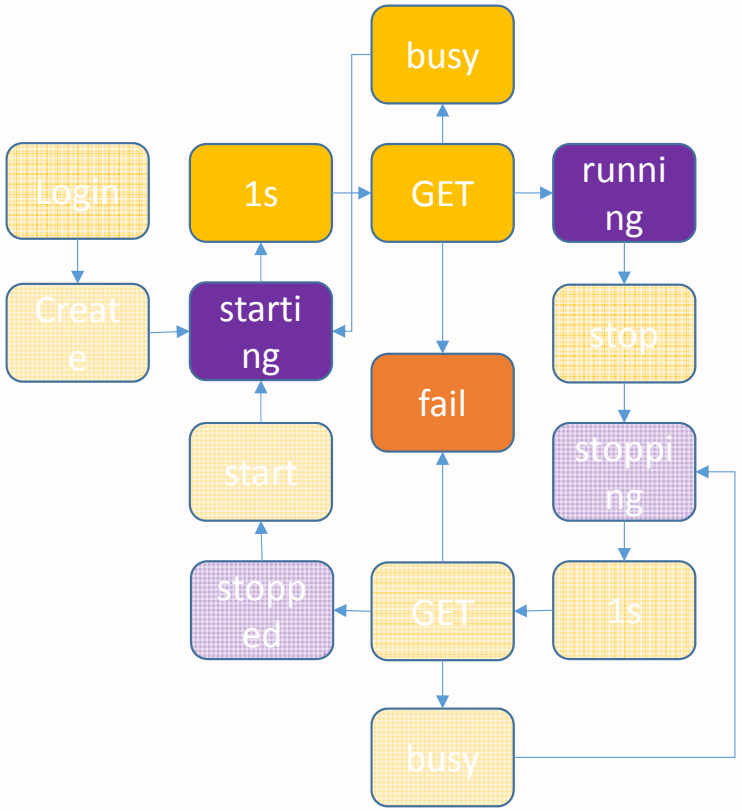
States



- VM's powering up
- Running VM's
- VM's that are being stopped
- Stopped VM's

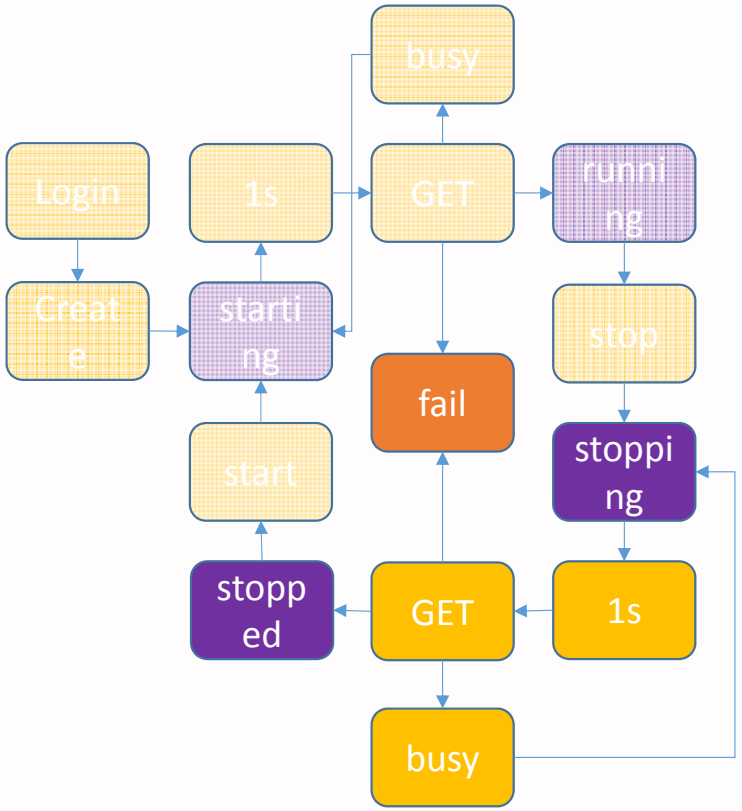
Building the model

Transitions



- Starting
  - Started -> running
  - Timeout -> failed
  - Still starting -> starting

transitions



- Stopping
  - stopped-> stopped
  - Timeout -> failed
  - Still stopping-> stopping

What do we get out of it

- Concurrent creations
- More transitions
- Concurrency of multiple users
- High test density
  - **458** LOC
  - Including the descried model
  - VM deletion
  - Permission validation (user A doesn't see / access user B's VMs)

Testing the full stack, upside

- Interactions between components
- More complex error cases can be caught
- Observe behavior in real conditions

Testing the full stack, downside

- More complex test cases
- Need to understand the system well
- Need really good logging
- Erlang observability is a big help
- Long running tests (hours not seconds)

What is next

- Extending the model
- Testing for failures
- Test automation
- Test coverage

Beyond development

- Deployment testing
  - After initial installation.
  - Validates functionality.
  - Part of customer handoff.
- Continuous testing
  - System build for concurrent use/load.
  - Never ending tests.
  - Constant validation of functionality.
  - Part of alerting/monitoring strategy.
  - Possibility to get very complex test cases.