Extended Stress tests for asvin.io

GOALS

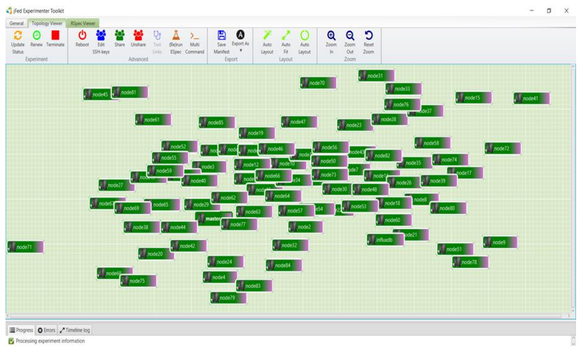
- Evaluation of performance, reliability, scalability and resilience of the platform in high traffic with controlled network bandwidth and latency
- Examine the feasibility of Physical Unclonable Functions (PUF), Homomorphic and Functional encryptions
- Find and fix the pain points of the asvin platform

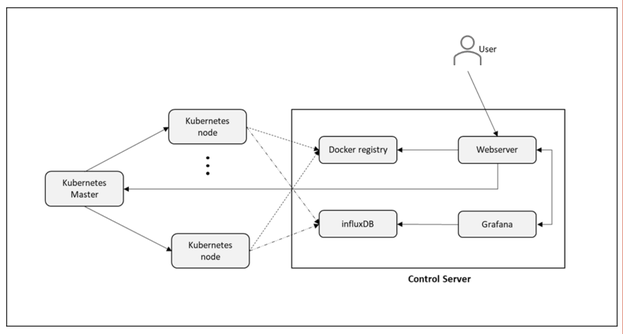
CHALLENGES

- Accurately simulate an IoT device
- Collect, analyze and visualize the enormous data generated by IoT devices
- Find the correct network and experiment configurations
- Load capability of physical nodes in virtual wall testbed

DEMO SETUP

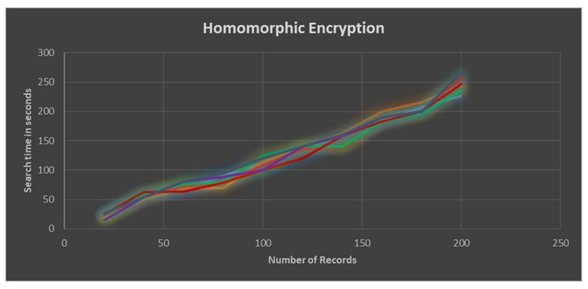
- Provision and manage experiment using jFed
- Setup Kubernetes cluster utilizing ESpec
- Start and scale the experiment using control/monitor server
- Scheduled firmware update rollouts on asvin platform
- Collect data on influxDB server and analyze using Grafana dashboard

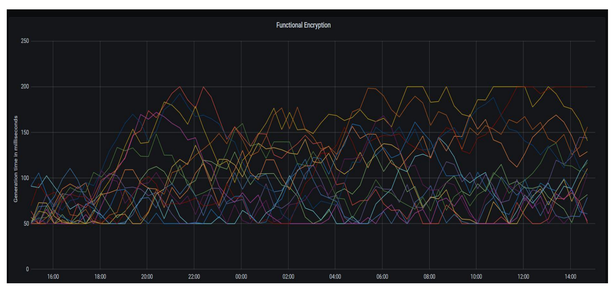




RESULTS

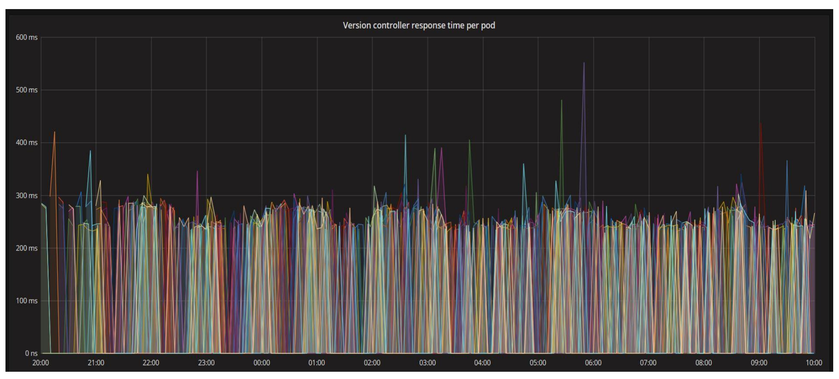
- The asvin platform performed exceptionally well in stressed conditions.
- The device registrations on the Blockchain, rollout management on Customer platform and firmware distributing on IPFS were smooth and seamless.
- The SRAM based PUF solution is reliable for generating secured keys for cryptographic applications. The Homomorphic and functional encryptions need improvements.

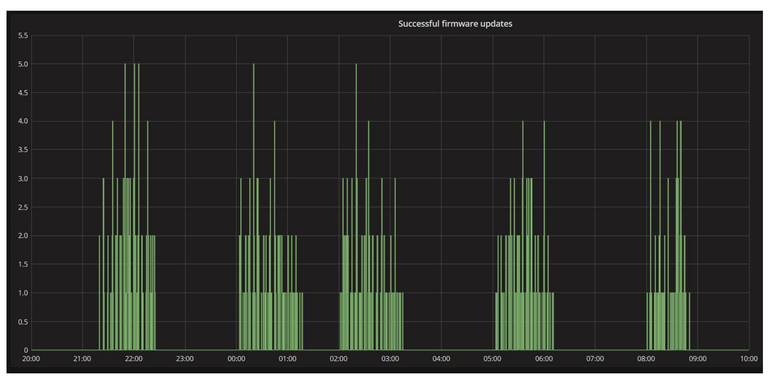


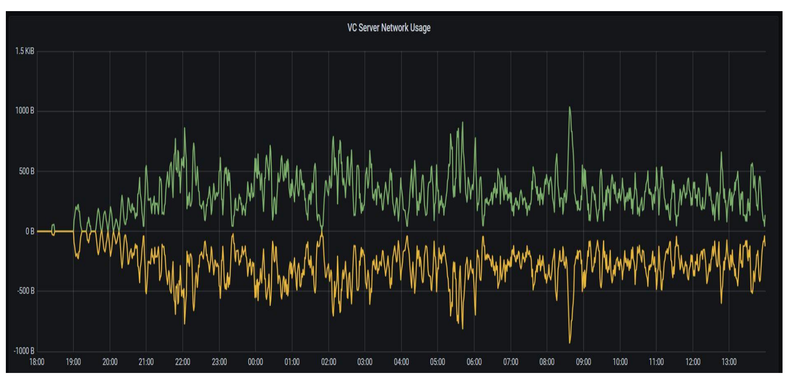


MORE RESULTS

- Impressive response times despite high number of requests per second
- Number of successful firmware updates.
- The server network bandwidth usage shows high robustness of the platform architecture







CONCLUSIONS

- The decentralized and distributed nature of the asvin platform make it highly scalable, efficient and resilient.
- The asvin platform can handle burst of requests without congestion.
- The PUF based cryptographic solution is a value addition.
- The asvin platform effectively streamlines chain of trust for high volume of IoT devices.
- The horizontal scaling of the platform is very productive for load balancing.

POST MORTEM

- Publish our research activities and findings in highly recognized journal and present in conferences.
- Exploitation and dissemation of the results of the Fed4FIRE+ experiment to accelerate business activities.
- Fed4FIRE+ testbeds house powerful and diversified resources.
- Fed4FIRE+ stage 2 experiment has proved to be phenominal for the evaluation and validation of the asvin platform.