RPKI Relying Party with Distributed Systems of Synchronization Nodes (draft-madi-sidrops-rp-dssn-01)

Di MA

SIDROPS @ IETF 122

Bangkok, Thailand

Motivation

- The technical requirements of RPKI relying party are listed in RFC8897.

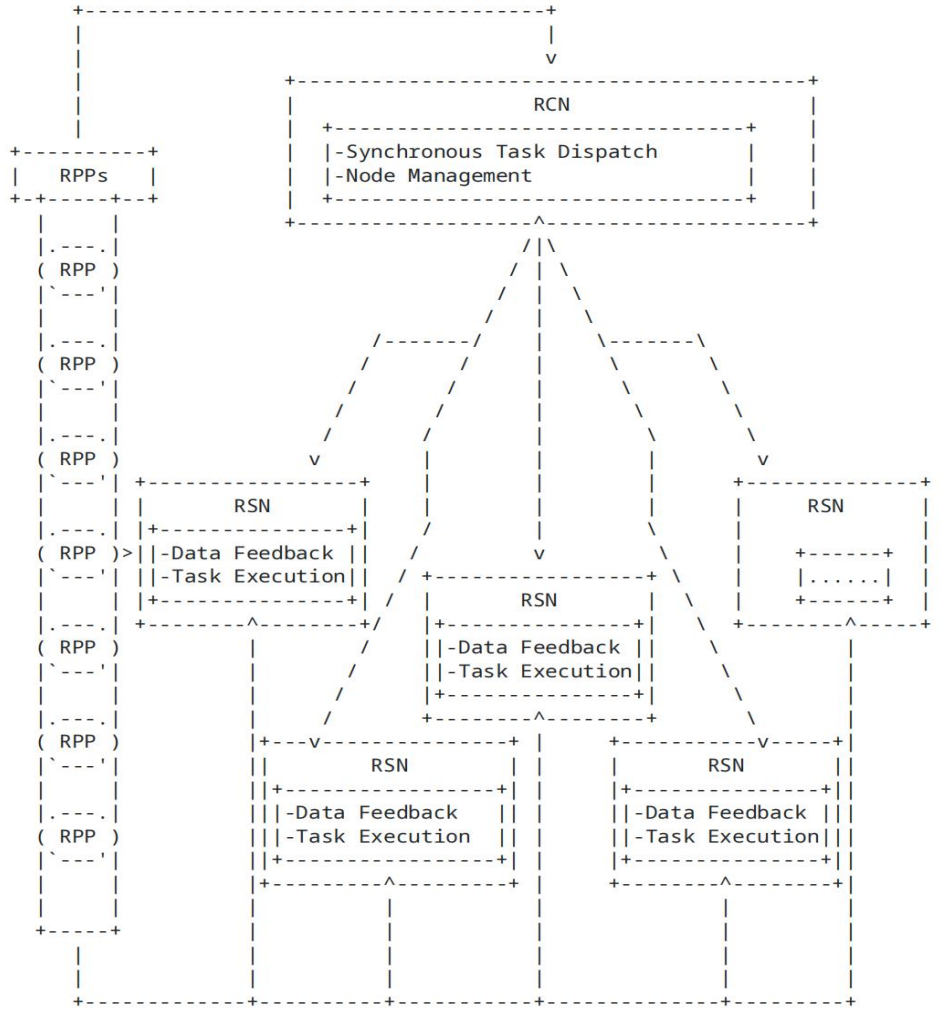
- As the RPKI-based routing information validation is globally adopted, there is an increasing number of RPKI data published by more and more RPKI repositories across the Internet.
  - A relying party system is always to be expected to timely get all the updates from global RPKI repositories.

- How to follow RFC8897 to deploy such a relying party system to make the RPKI data take effect to the routing control system is worth operational considerations.
  - Mapping logical functions to physical nodes over networks

Overview

- This document introduces a practice of establishing an RPKI relying party (***this RP***) with distributed systems of synchronization nodes over networks.

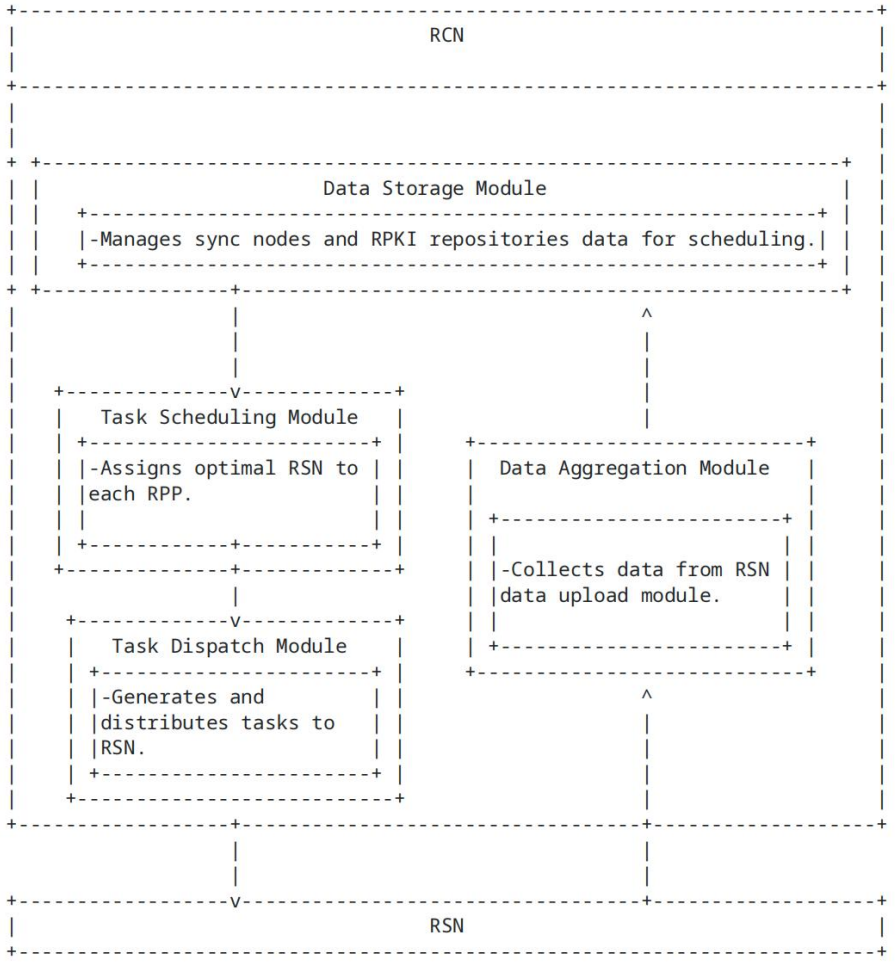
- This RP is combined with:
  - A set of RP Synchronization Nodes (RSN)
  - A single RP Console Node (RCN)



RPP: RPKI Publication Point

RP Console Node

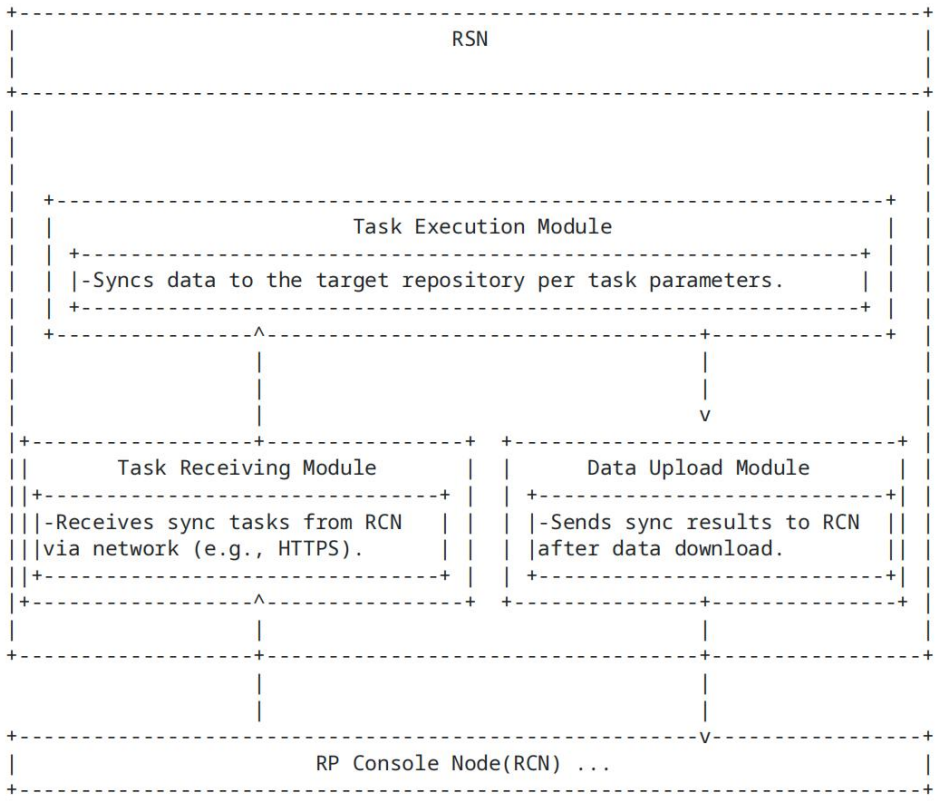
- Ascertain updates from global RPKI publication points
- Orchestrate RP Synchronization Nodes to perform the task of downloading RPKI data respectively
- Validate those data



- ✓ Data Storage Module
- ✓ Task Scheduling Module
- ✓ Task Dispatch Module
- ✓ Data Aggregation Module

RP Synchronization Nodes

- Deployed across the Internet in geographically diverse locations with respect to worldwide RPKI publication points
- Perform RPKI data pulling tasks designated by the RCN



- ✓ Task Receiving Module
- ✓ Task Execution Module
- ✓ Data Upload Module

Scheduling Algorithms

- There are six scheduling algorithms employed by this RP in various scenarios, to meet specific operational requirements.
  - Geographic location, network condition, bandwidth, CPU load vary widely and are subject to change from time to time.
- Those scheduling algorithms are optional to the operator in its discretion according to local condition/policy.

Algorithm	Pros	Cons	Scenarios
Random Task Assignment	Straightforward and fast to deploy.	Ignores node performance and task complexity, causing imbalance.	Best for low-load, balanced-performance scenarios.
Sequential Task Assignment	Fair and efficient assignment.	Lacks dynamic adaptability.	Ideal for stable synchronization tasks with balanced load.
Network-Aware Task Assignment	Network-aware, business-aligned.	Ignores node capacity and load.	Ideal for synchronization tasks with network bottlenecks.
Dynamic Task Assignment	Strong adaptability	High complexity, instability.	Ideal for dynamic synchronization and heterogeneous nodes.
RIR Region-Based Task Assignment	Location-aware efficient routing	Unreliable due to node config or CDN virtualization.	Ideal for geo-optimized network synchronization.
Designated Position Assignment	High control and flexibility.	Manual, inflexible, unscalable.	Suited for manual tuning or strict synchronization environments.

Current Deployments

- RCN located in
  - PEK
- RSN located in
  - AfriNIC Region: CAI
  - APNIC Region: PEK, SIN
  - ARIN Region: SFO
  - LACNIC Region: GRU
  - RIPE NCC Region: FRA

Clarifications

- This is an informational document that provides a current practice of deploying RP system over networks.
- This document does not bring any extra technical requirements that need to be standardized by IETF.
- We authors expect it adopted as WG item to trigger discussions on RP deployment in CDN providers or largre-scale backbone ISPs.

QUESTIONS?