In-band Task Provisioning for DAP

draft-wang-ppm-dap-taskprov-01

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Motivation

DAP core protocol does not specify how task is configured.

- Out-of-band: Client may not know some task configuration parameters.
- Leader and Helper need a deployment specific mechanism for task provisioning.

In-band Task Provisioning: introduce a mechanism for all deployments that support the extension to provision DAP tasks in a standard way, without defining extra flows.
Protocol Architecture

- No need to define out of band task orchestration between leader & helper

- No task is provisioned in advance in aggregators

- TaskConfig is ignored if the participant does not support task_prov extension.
TaskConfig

Configurations described in core protocol’s *Task Configuration*.

```c
struct {
    opaque task_info<1..2^8-1>;
    Url aggregator_endpoints<1..2^16-1>;
    QueryConfig query_config;
    Time task_expiration;
    VdafConfig vdaf_config;
} TaskConfig;
```

User defined task specific information

Query specific, e.g. min_batch_size, max_batch_query_count

VDAF specific configurations, e.g. vdaf_type, etc.

```
task_id = SHA-256(task_config)
```
Client

Set `extension_type` to `task_prov`.

Set `extension_data` to `task_config`, as part of ReportMetadata.
Leader & Helper

- Opt in means the Task ID corresponds to an already provisioned task, or is unrecognized (therefore corresponds to a new task).

Leader

Reads TaskConfig from Report and opt in

Check TaskConfig is valid and derived TaskID matches received TaskID

Helper

Reads TaskConfig from ReportShare and opt in

Check TaskConfig is valid and derived TaskID matches received TaskID

Checks if all ReportShares have the same TaskConfig (therefore belongs to the same task)
Collector

- Collector is mostly oblivious to the use of task_prov

Collector → TaskConfig

Reads TaskConfig and opt in
Draft-01: https://datatracker.ietf.org/doc/draft-wang-ppm-dap-taskprov
Reference Implementation (In progress): https://github.com/cloudflare/daphne/issues/139

CALL TO ACTION

● task_prov is useful for many deployment scenarios.
● It may not be suitable for all deployments.
● Ready for adoption as a working group extension?
Changes to DAP to consider

- Additional extension points would be useful
  - AggregateInitializeReq
    - Each ReportShare includes an identical extension. We could de-duplicate by promoting to the request body.
  - CollectReq
    - Allowing the Collector to indicate support for the extension could be useful