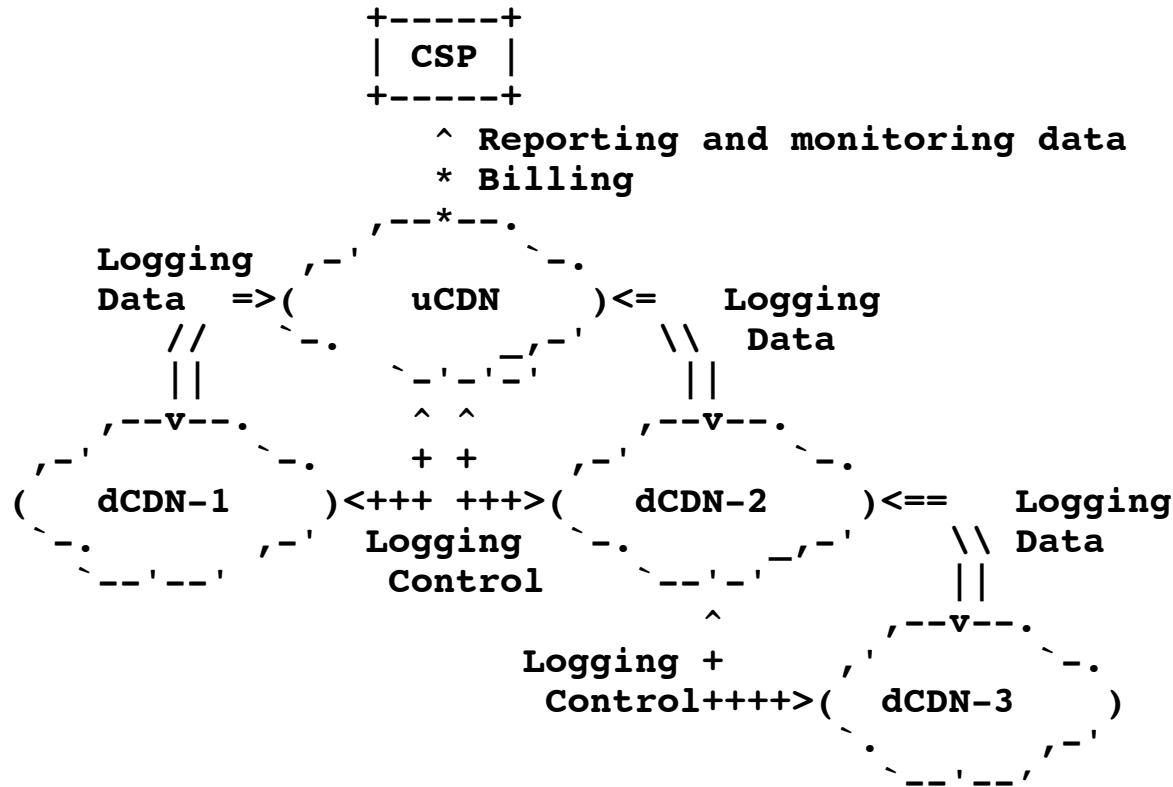# draft-ietf-bertrand-cdni-logging-02
IETF85 – Atlanta
WG CDNi
(10 mn)

G. Bertrand, **E. Stephan**, P. Grochocki (Orange),

R. Peterkofsky (Skytide),

F. Le Faucheur (Cisco)

Work Overview

- Updated twice since it was presentation in Paris;
- 3 more co-authors from Skytide, Cisco, and Orange Poland added
- Included draft-lefaucheur-cdni-logging-delivery material
- Specifies the Reference Model for Logging
- Details of the overall Logging operations
- Specifies the Information Model for Logging
  - Information Elements, Logging Records
- Specifies the Logging File format and file header
- Identifies additional requirements
- Initiates the discussion of candidate protocols

Interactions in CDNI Logging Reference Model

```
                        +-----+
                        | CSP |
                        +-----+
                           ^ Reporting and monitoring data
                           * Billing
                        ,--*--.
   Logging      ,-'          `-.
   Data   =>(         uCDN       )<=   Logging
        //      `-.        _,-'   \\    Data
        ||         `-'-'-'         ||
    ,--v--.           ^ ^       ,--v--.
  ,-'      `-.        + +      ,-'      `-.
(    dCDN-1    )<+++ +++>(    dCDN-2      )<==    Logging
  `-.        ,-'  Logging  `-.       _,-'   \\ Data
    `--'--'       Control      `--'-'        ||
                                  ^        ,--v--.
             Logging +          ,'      `-.
              Control++++>(    dCDN-3      )
                           `.          ,-'
                             `--'--'

<====> CDNI Logging Interface
<++++> CDNI Control Interface
***> outside the scope of CDNI
```

Figure 1: Interactions in CDNI Logging Reference Model

Interactions in CDNI Logging Reference Model

- For logging information needed by uCDN
  - Specification by the uCDN of the logging to be performed by the dCDN
    - fields, records (mostly information on the delivery)
    - over the control interface
  - Generation and collection by the dCDN of logging information
    - info and event requested by uCDN
    - performed internally by dCDN
  - Communication by the dCDN to the uCDN of the logging information over the logging interface

- For logging information needed by dCDN
  - Specification by the dCDN of the logging to be performed by the uCDN
    - mostly for monitoring of acquisition process
  - Generation and collection by the uCDN of logging information
  - Communication by the uCDN to the uCDN of the logging information

Logging Control

Logging Control proposed to occurs over the Control Interface (instead of Metadata interface):

- fairly static information which matches the role of the Control Interface

- Logging Control information is primarily intended to be consumed CDNI Logging entity in dCDN

- surrogates within a given CDN typically need not be aware of the Logging Control

- Control interface is expected to support granularity of content

CDNI Logging
in the overall Logging Chain

```
          Log Consuming      Log Consuming
               App                App
              /\                  /\
               |                   |
          Rectification--------
            /\
             |
          Filtering
            /\
             |
        Collection                          uCDN
         /\        /\
          |         |
              Generation

CDNI Logging -----------------------------------------------
exchange
   /\
    |
Rectification        Rectification---------
          /\                  /\
           |                   |
         Filtering
          /\
           |
     Collection                             dCDN
      /\        /\
       |         |
  Generation  Generation
```
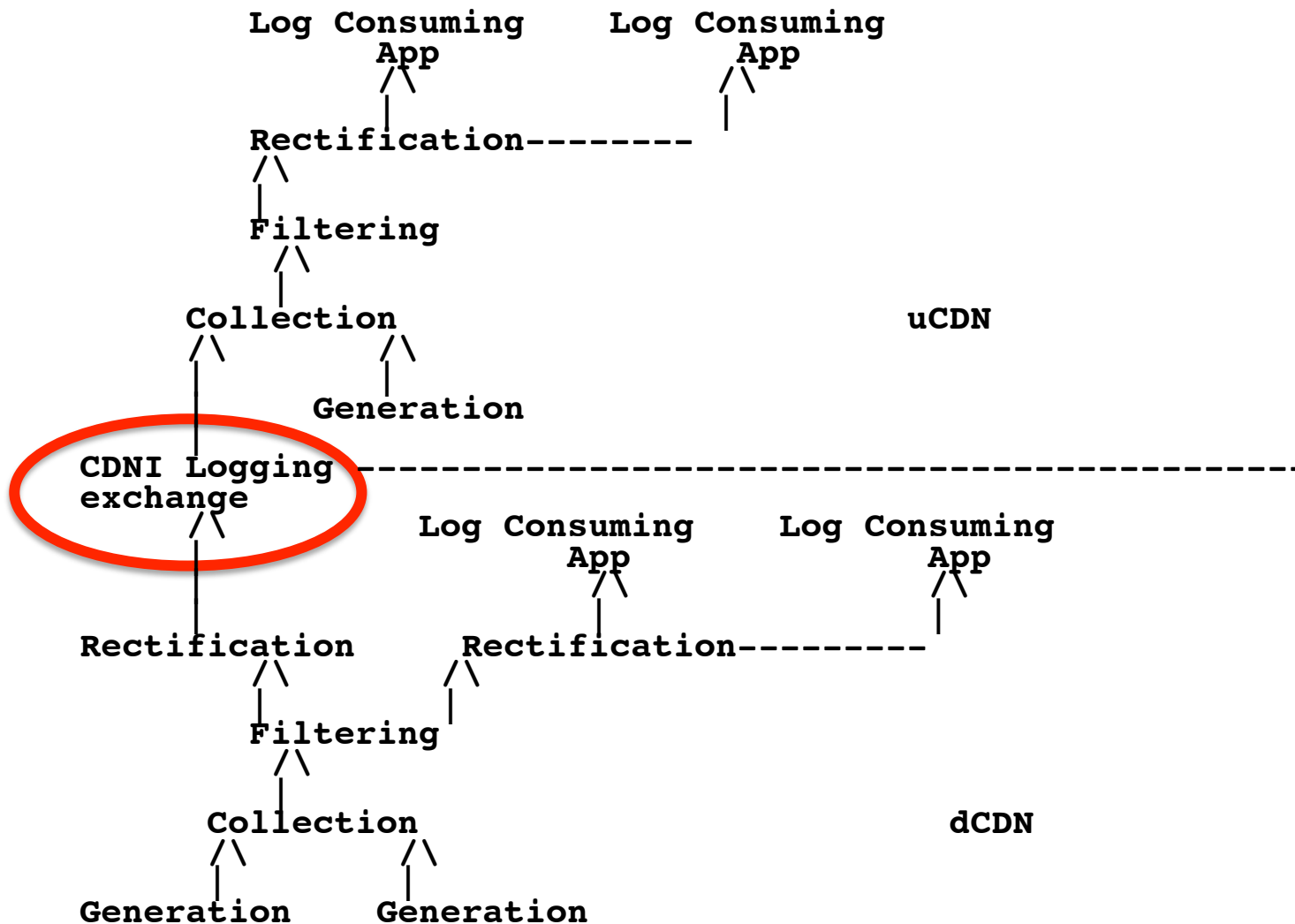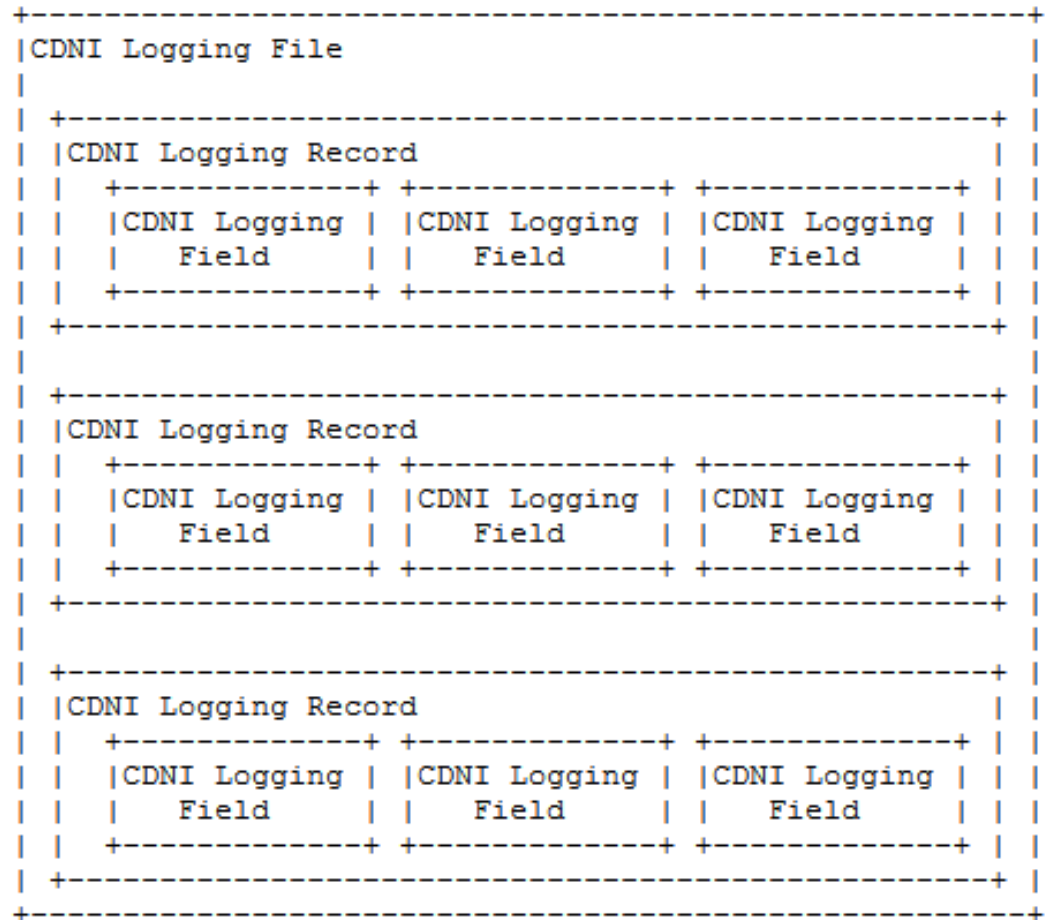
Figure 3: CDNI Logging in the overall Logging Chain

CDNI Logging Information Structure and Transport

- CDNI Logging Record = set of CDNI Logging Fields
- This doc defines non-real-time transport, which involves grouping of CDNI Records into a CDNI Log File + File Transport
- In the Future, real-time transport may be defined, which may involve direct real-time transport of CDNI Logging Records

```
+--------------------------------------------------------------+
||CDNI Logging File                                            ||
||                                                             ||
|| +----------------------------------------------------------+ |
|| |CDNI Logging Record                                       | |
|| |  +-------------+ +-------------+ +-------------+         | |
|| |  |CDNI Logging | |CDNI Logging | |CDNI Logging |        | |
|| |  |   Field     | |   Field     | |   Field     |        | |
|| |  +-------------+ +-------------+ +-------------+         | |
|| +----------------------------------------------------------+ |
||                                                             ||
||                                                             ||
|| +----------------------------------------------------------+ |
|| |CDNI Logging Record                                       | |
|| |  +-------------+ +-------------+ +-------------+         | |
|| |  |CDNI Logging | |CDNI Logging | |CDNI Logging |        | |
|| |  |   Field     | |   Field     | |   Field     |        | |
|| |  +-------------+ +-------------+ +-------------+         | |
|| +----------------------------------------------------------+ |
||                                                             ||
||                                                             ||
|| +----------------------------------------------------------+ |
|| |CDNI Logging Record                                       | |
|| |  +-------------+ +-------------+ +-------------+         | |
|| |  |CDNI Logging | |CDNI Logging | |CDNI Logging |        | |
|| |  |   Field     | |   Field     | |   Field     |        | |
|| |  +-------------+ +-------------+ +-------------+         | |
|| +----------------------------------------------------------+ |
+--------------------------------------------------------------+
```

CDNI Logging Fields

- Start-time
- End-time
- Duration
- Client-IP
- Client-port
- Destination-IP
- Destination-port
- Operation
- URI_full
- URI_part
- Protocol

- Request-method
- Bytes-Sent
- Headers-Sent
- Bytes-received
- Referrer
- User-Agent
- Cookie
- Byte-Range
- Cache-control
- Record-digest
- CCID
- SID

This lists the Generic Fields.
There are also a few Delivery-specific and Acquisition-specific fields

CDNI Logging Fields

- The document currently:
  - specifies the semantics of each field
  - Does not yet specifies the syntax (only shows Apache format as an example)

Logging Records & triggers

- Content Delivery
  - Trigger: Arrival of the content request
  - Information to record
    - Acceptance/rejection of request
    - Start, end, success, failure of delivery, …
- Content Acquisition in dCDN (resp in uCDN)
  - Trigger: Emission (resp. reception) of a content acquisition request
  - Information to record
    - Reception (resp. emission) of the acceptance/rejection of the query
    - Start, end, success, failure of acquisition
- Content Invalidation and Purging
  - Trigger: Reception of a content invalidation/purging request
  - Information to record
    - Arrival, acceptation/rejection of request
    - Start, end, success, failure of purging

CDNI Logging File format

- Header:
  - Format, Fields, Log-ID, Log Timestamp, Log-ID
- Body:
  - Series of Logging Records
- Footer fields:
  - Log Digest

Next Step

- We propose this document be adopted as WG document:

  - Reflects draft-lefaucheur-cdni-logging-delivery content
  - Defines the information and the events to be captured
  - Identifies 2 main cases which might not be satisfied with one protocol:
    - File based transfer of the Logging information
    - Need to push information for real time monitoring

  - Key decisions remaining need WG input and control:
    - Refining of the data model
    - Selection of the Logging protocol
    - Selection of the mandatory fields and records

Background

Additional requirements

- Reliability: Logging data is sensitive as it provides the raw material for producing bills, etc. Therefore, the protocol delivering the Logging data must be reliable to avoid information loss.

- Scalability: protocol must scale to support the transport of large amounts of Logging data.

- CDNs need to trust Logging information; thus, they want to know:
  - Who issued the Logging? (authentication)
  - Has the Logging has been modified by a third party? (integrity)

- Logging also contains confidential data, and therefore, it should be protected from eavesdropping (encryption).

Fields for Logging Acquisition

```
+--------------------+-----------------------------------------+
| Name               | Definition                              |
+--------------------+-----------------------------------------+
| dCDN identifier    | An element authenticating the operator of |
|                    | the dCDN as the authority requesting the  |
|                    | content to the uCDN                     |
| Caching_date       | Date at which the delivered content was   |
|                    | stored in cache                         |
| Validity_headers   | A copy of all headers related to content  |
|                    | validity: no-cache, ETag, Vary,         |
|                    | last-modified...                        |
| Lookup_duration    | Duration of the DNS resolution for resolving |
|                    | the FQDN of (uCDN's or CSP's) origin server. |
| Delay_to_first_bit | Duration of the operations from the sending |
|                    | of the content acquisition request to the |
|                    | reception of the first bit of the requested |
|                    | content.                                |
| Delay_to_last_bit  | Duration of the operations from the sending |
|                    | of the content acquisition request to the |
|                    | reception of the last bit of the requested |
|                    | content.                                |
+--------------------+-----------------------------------------+
```

Fields for Logging Delivery

```
+------------------+--------------------------------------------+
| Name             | Definition                                 |
+------------------+--------------------------------------------+
| uCDN-ID          | An element authenticating the operator of the |
|                  | uCDN as the authority having delegated the |
|                  | request to the dCDN.                       |
| Delivering-CDN-ID | An identifier (e.g., an aggregation of an IP |
|                  | address and a FQDN) of the Delivering CDN. |
|                  | The Delivering-CDN-ID might be considered as |
|                  | confidential by the dCDN.  In such case, the |
|                  | dCDN could either not provide this field to |
|                  | the uCDN or overwrite the Delivering-CDN-ID |
|                  | with its on identifier.                    |
| Cache-bytes      | The number of body bytes served from caches. |
|                  | This quantity permits the computation of the |
|                  | byte hit ratio.                            |
| Action           | The Action describes how a given request was |
|                  | treated locally: through which transport   |
|                  | protocol, with or without content          |
|                  | revalidation, with a cache hit or cache miss, |
|                  | with fresh or stale content, and (if       |
|                  | relevant) with which error.  Example with  |
|                  | Squid format [squid]: "TCP_REFRESH_FAIL_HIT" |
|                  | means that an expired copy of an object    |
|                  | requested through TCP was in the cache.    |
|                  | Squid attempted to make an If-Modified-Since |
|                  | request, but it failed.  The old (stale)   |
|                  | object was delivered to the client.        |
+------------------+--------------------------------------------+
```

File Header

Field	Description	Examples
Format	Identification of CDNI Log format.	standard_cdni_errors_http_v1
Fields	A description of the record format (list of fields).	
Log-ID	Identifier for the CDNI Log file (facilitates detection of duplicate Logs and tracking in case of aggregation).	abcdef1234
Log-Timestamp	Time, in milliseconds, the CDNI Log was generated.	[20/Feb/2012:00:29.510+0200]
Log-Origin	Identifier of the authority (e.g., dCDN or uCDN) providing the Log--ging	cdn1.cdni.example.com