eICP—extended Internet Cache Protocol

(draft-zhang-ppsp-eicp-00.txt)

Presenter: Christian Schmidt

IETF-81, Quebec, July 2011

Overview

- Motivation
- PPSP – Peer Protocol Cache Usage
- eICP - Extended Internet Cache Protocol
- ICP—Internet Cache Protocol
- Three ways to extend ICP
  - *Embedding PPSP in ICP*
  - *PPSP and ICP Co-existing in caches communication*
  - *Using PPSP to replace ICP*
- Conclusion

Motivation

- P2P traffic, e.g. used for PPSP produce a big part of the network traffic
- Current version of Internet caches is not able to cache P2P traffic (same content with different URLs)
- Especially for PPSP network with high number of mobile subscribers, network storage and distribution is important.
- Is it possible to use Internet caches for PPSP traffic and what modification (cache function and ICP) is needed.
- Is it possible to enhance ICP with PPSP peer protocol specific functions for optimization?

PPSP Peer Protocol Cache usage

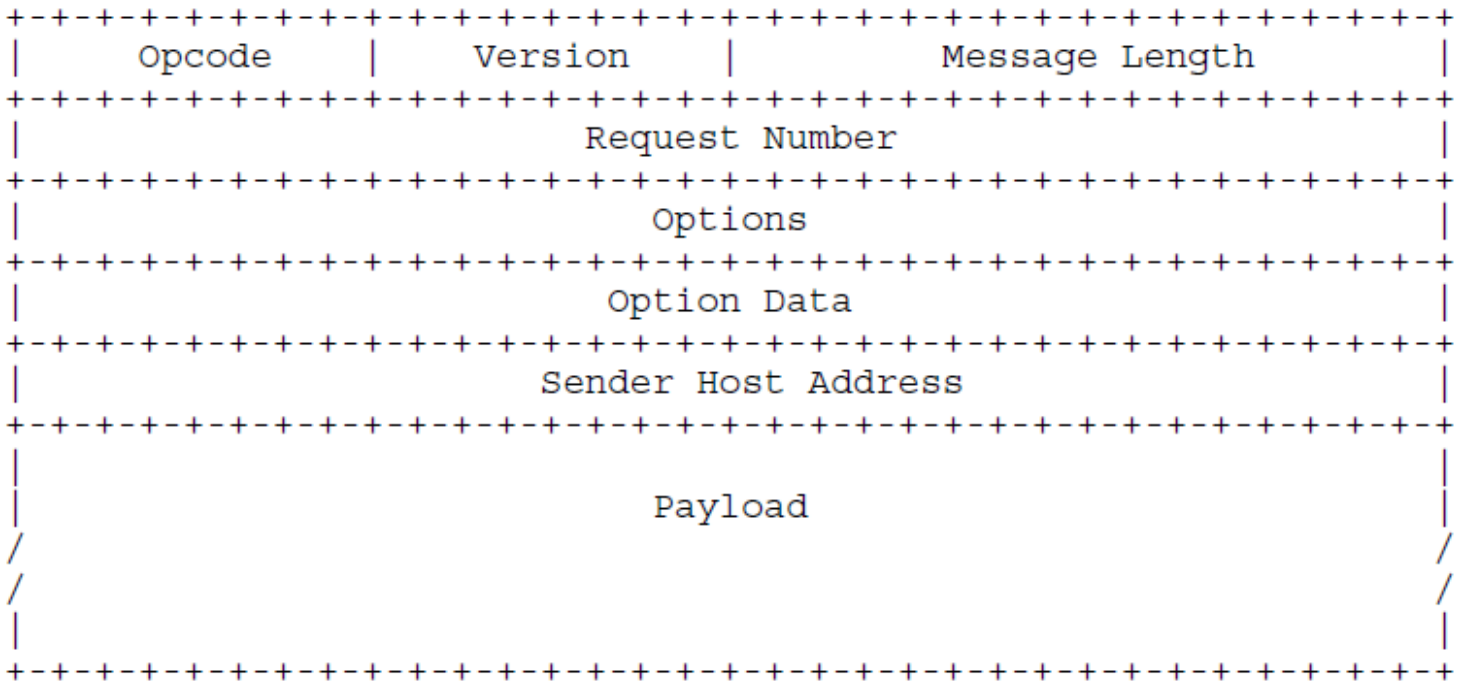
- Peer Protocol allows for information to be shared directly between peers
  - bitmap indication, which chunks a peer possesses
  - required chunk Ids or requested streams
  - list of alternative peers
  - transport protocol negotiation
- Can this be used for cache/cache communication and would it be useful?

eICP—extended Internet Cache Protocol

- **How to cache p2p related information (e.g. identify identical content) with minor changes to internet caches?**
- **What are the benefits of the other PPSP related enhancements for common cache functions?**
- **How to extend the ICP protocol to provide this additional functions?**
  - *Embedding PPSP in ICP*
  - *PPSP and ICP Co-existing in caches communication*
  - *Using PPSP to replace ICP*
- **Do we need an IPv6 version of ICP?**

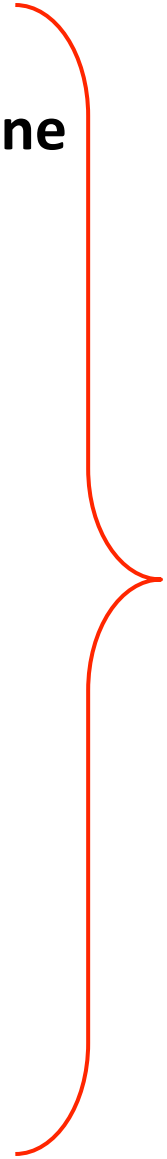
ICP—Internet Cache Protocol

- A lightweight message format used for communicating among Web caches.
- Is used to exchange hints about the existence of URLs in neighbor caches (e.g. query (URL), response: success)
- Locates an object location by its URL.



Popularity of ICP

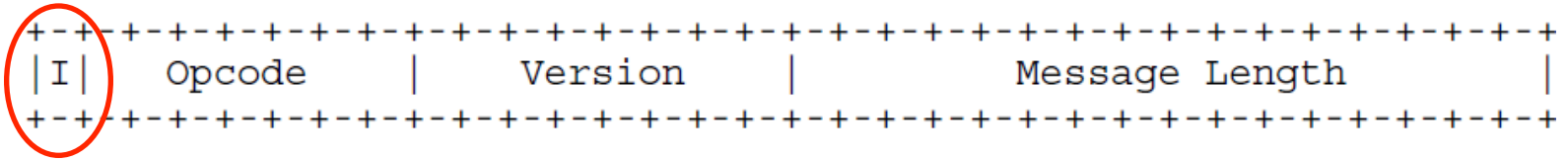
- CACHEbox
- Cisco CacheEngine/Cisco Content Engine
- DeleGate
- Harvest project
- Traffic Server
- Mirror Image
- MOWS
- NetCache
- Netscape Proxy Server
- Novell BorderManager FastCache
- ProxySG
- Squid
- SkyCache



All these web proxies support ICP.

Embedding PPSP in ICP

- Use an identifier to indicate if the protocol is an original ICP protocol or a new one with PPSP embedded in.



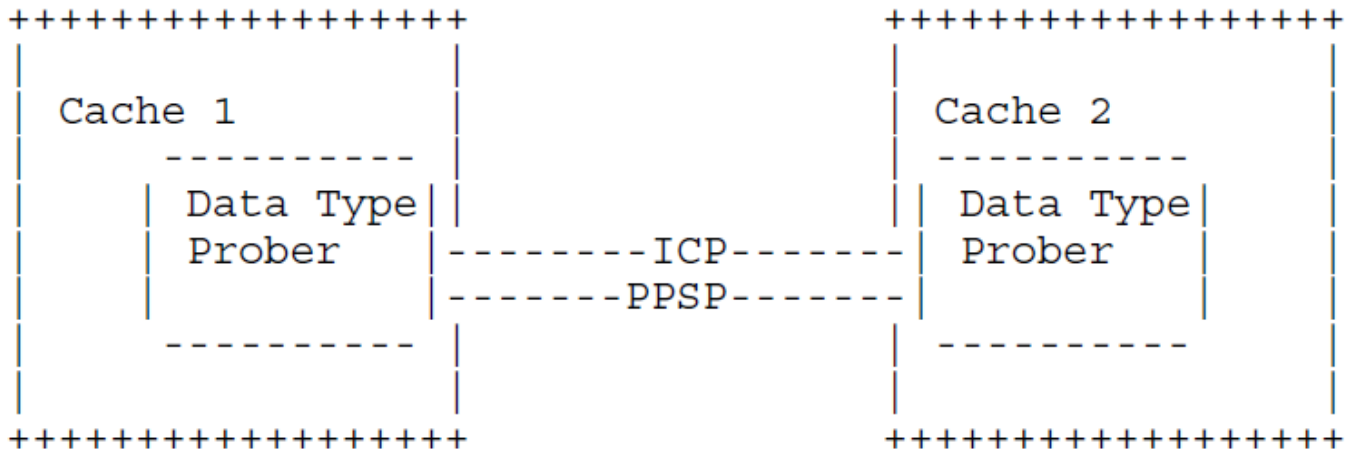
- Extend the Opcode by using the unused values to express the PPSP information. When identifier indicates the cached data should be chunks, these new Opcodes will be activated.

Value	Name
5	FIND
6	CHUN_AVAILABILITY
7	PROPERTY_QUERY
8	TRANSPORT_NEGOTIATION
12	SUCCESSFUL(OK)
13	INVALID_SYNTAX
14	VERSION_NOT_SUPPORTED
15	MESSAGE_NOT_SUPPORTED
16	MESSAGE_FORBIDDEN

- When using PPSP message, the specific response message should carry Chunk IDs in its body instead of URLs in the ICP format.

PPSP and ICP Co-existing in caches communication

- Caches may need a functional entity, namely a Data Type Prober, to identify the form of the data (document/chunk).



- Each cache needs to inform the Data Type Prober the data it caches, when communication occurs, the Data Type Prober will decide the message type according to the type of cached data.

Using PPSP to replace ICP

- Just use PPSP protocol to make caches exchange their information.
- Introducing a new member—"TYPE" to PPSP message field to indicate the type of cached data.
- Extending the existing PPSP protocol by adding ICP Opcodes in its method field.
- When TYPE indicates that the cached data would be a document, these Opcodes will be activated, otherwise it is just a normal PPSP protocol.

Conclusion

Purpose: Usage of internet caches for PPSP

Major open points:

- How to cache p2p related traffic (identify identical content)?
- What further enhancements for caches are reasonable.
- What kind of solution is best suited?

How to proceed?