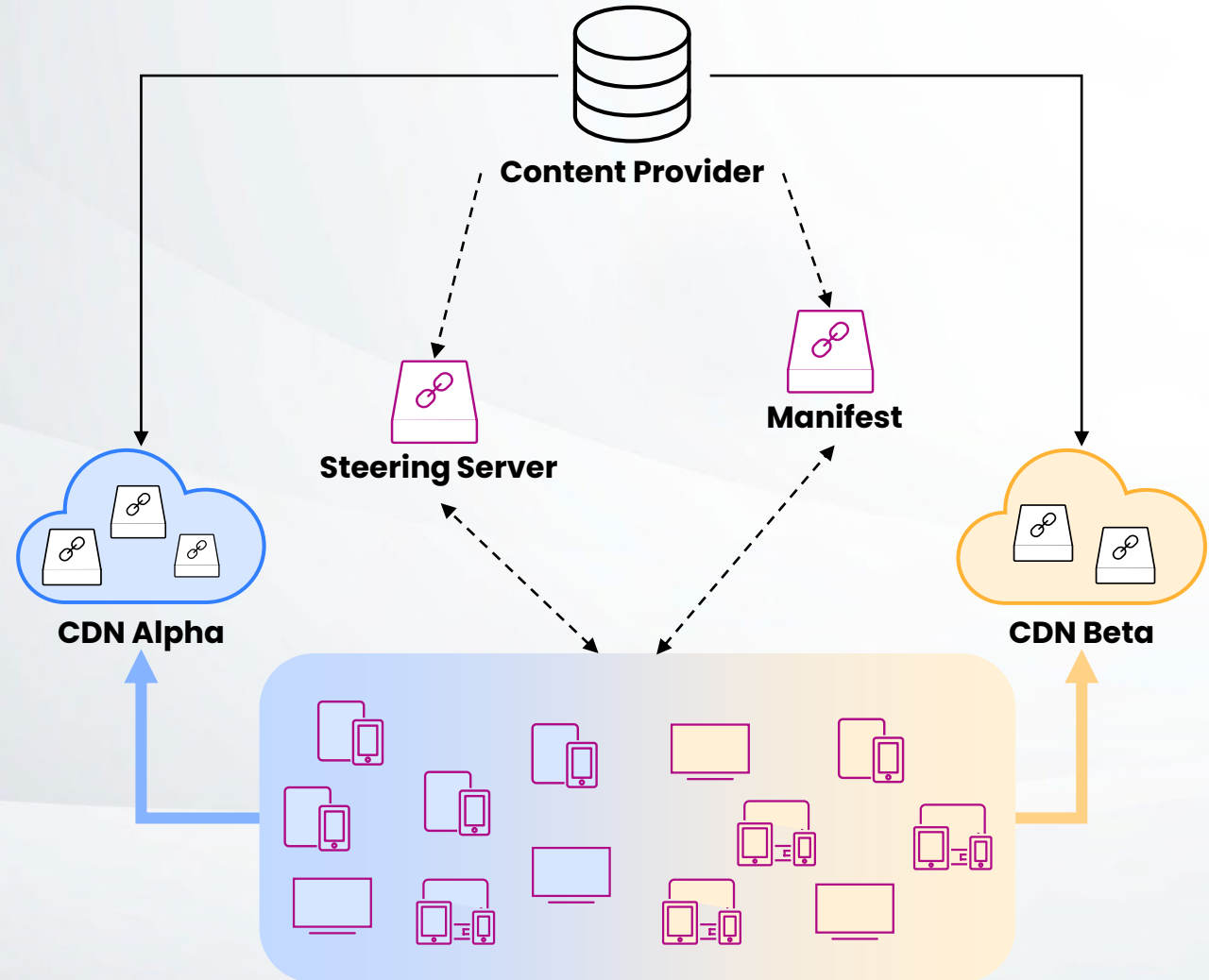


Dynamic Content Steering Services

How to Make Everyone Happy in a Multi-CDN World

Burak Kara and Gwendal Simon
February 2024

Multi-CDN World: Content Steering



HLS and **DASH** specification

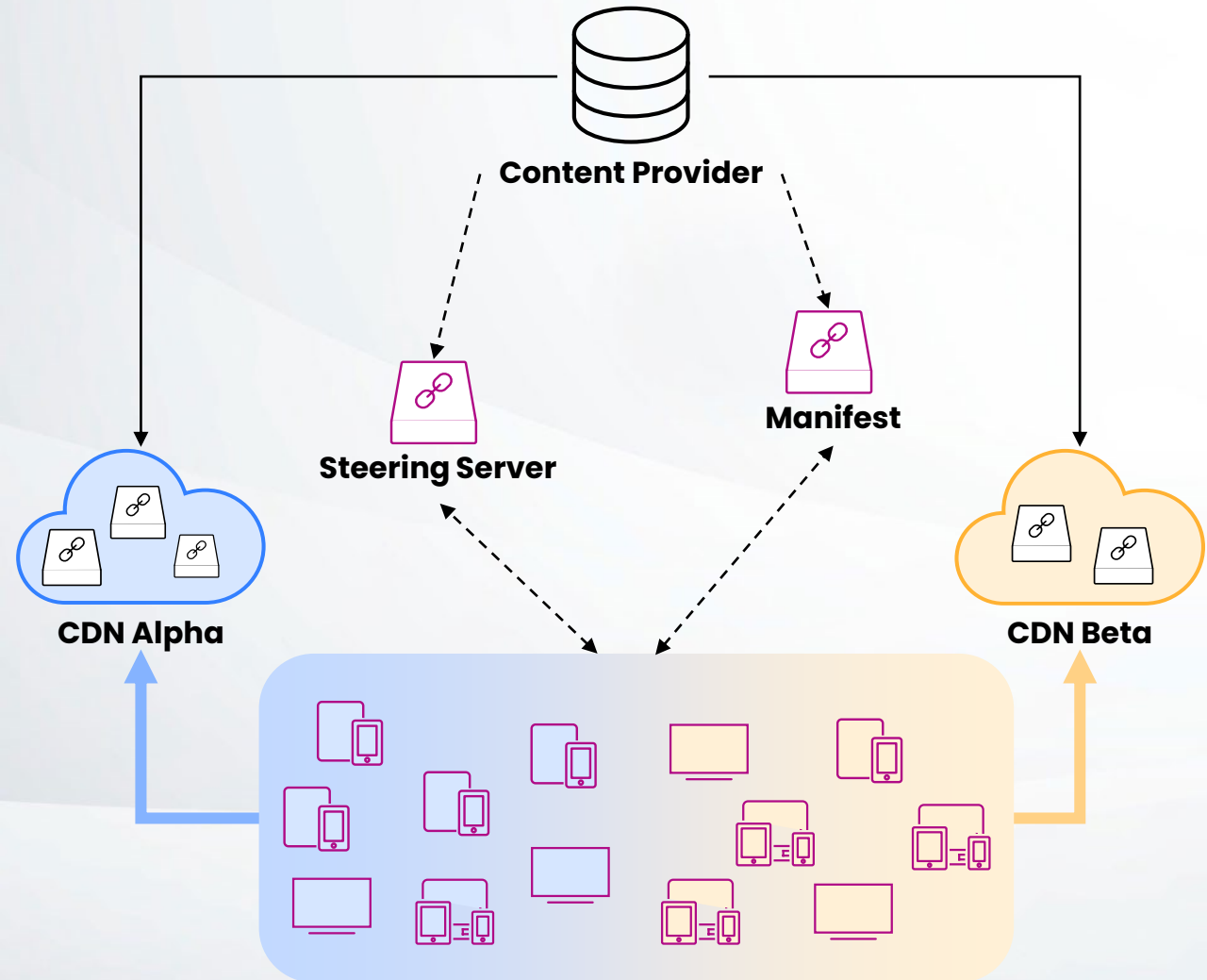
Standardized protocol between **Steering Server** and **clients**

Steering Server **instructs** the clients

- Frequently (e.g., every 5-minute)
- Based on a global objective, user QoE, device, protocol, and region

Clients may switch CDN **during video session**

Multi-CDN World: Content Steering



Client request to **Steering Server**

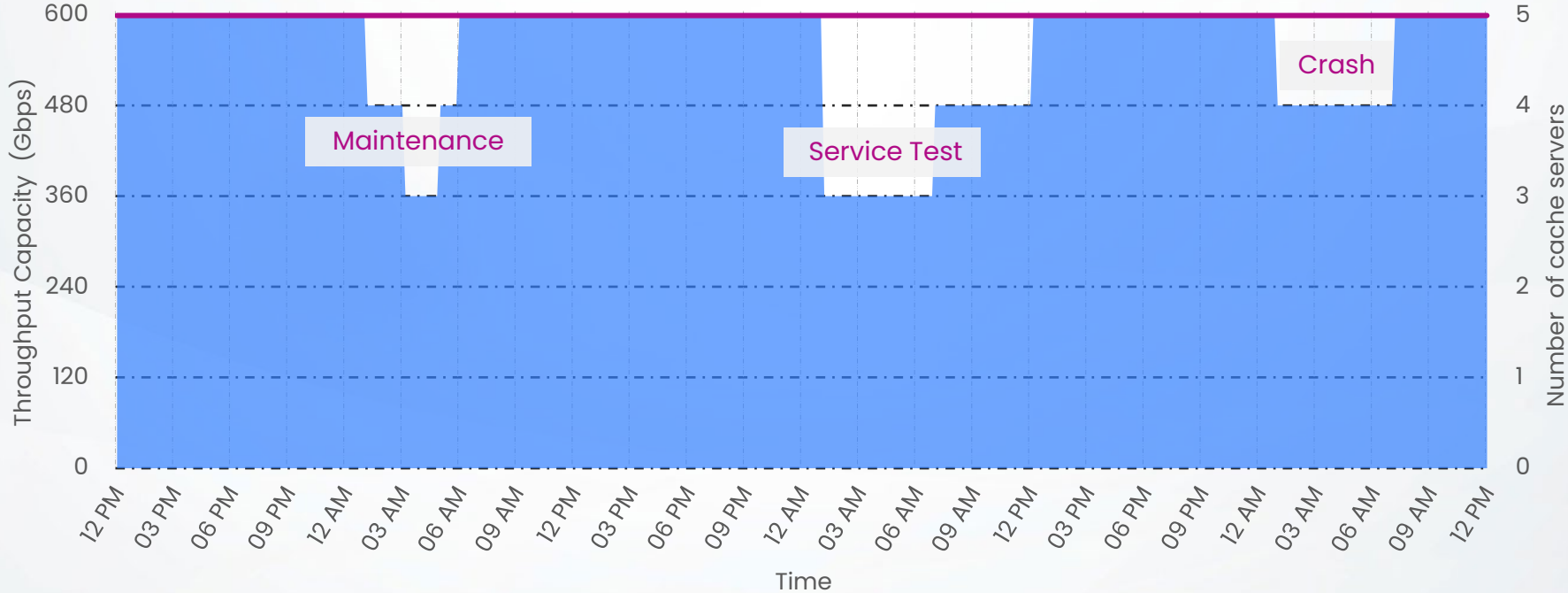
```
{  
  _DASH_throughput = 136252  
  _DASH_pathway = Alpha  
  <optional metadata>  
}
```



Steering Server response

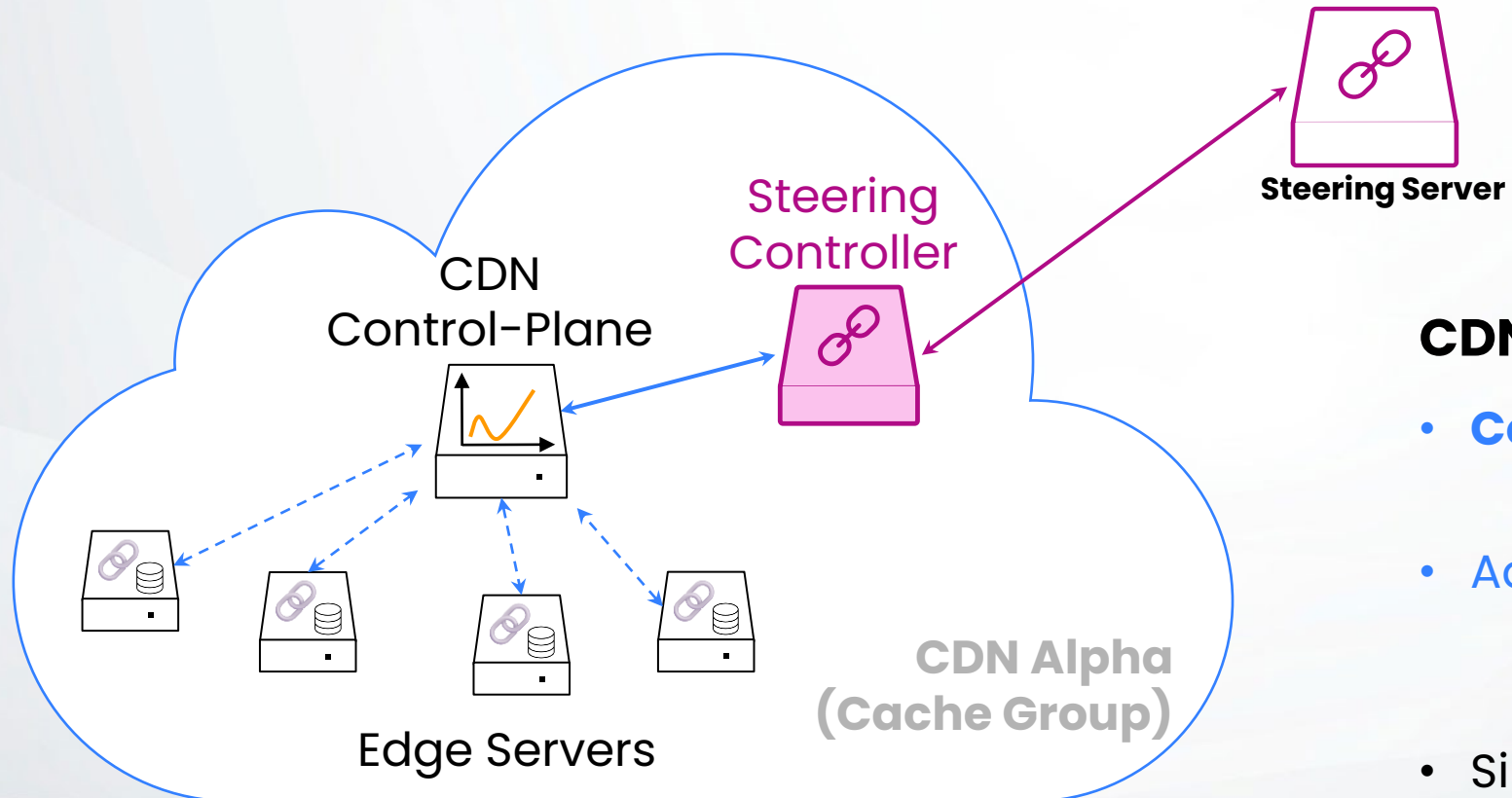
```
{  
  VERSION = 1  
  TTL = 300  
  PATHWAY-PRIORITY = [Beta, Alpha]  
  RELOAD-URI = 'https://steering.com'  
  <optional metadata for custom client>  
}
```

CDN Local Capacity



A Cache Group (a.k.a. CDN PoP) has a **variable** number of servers

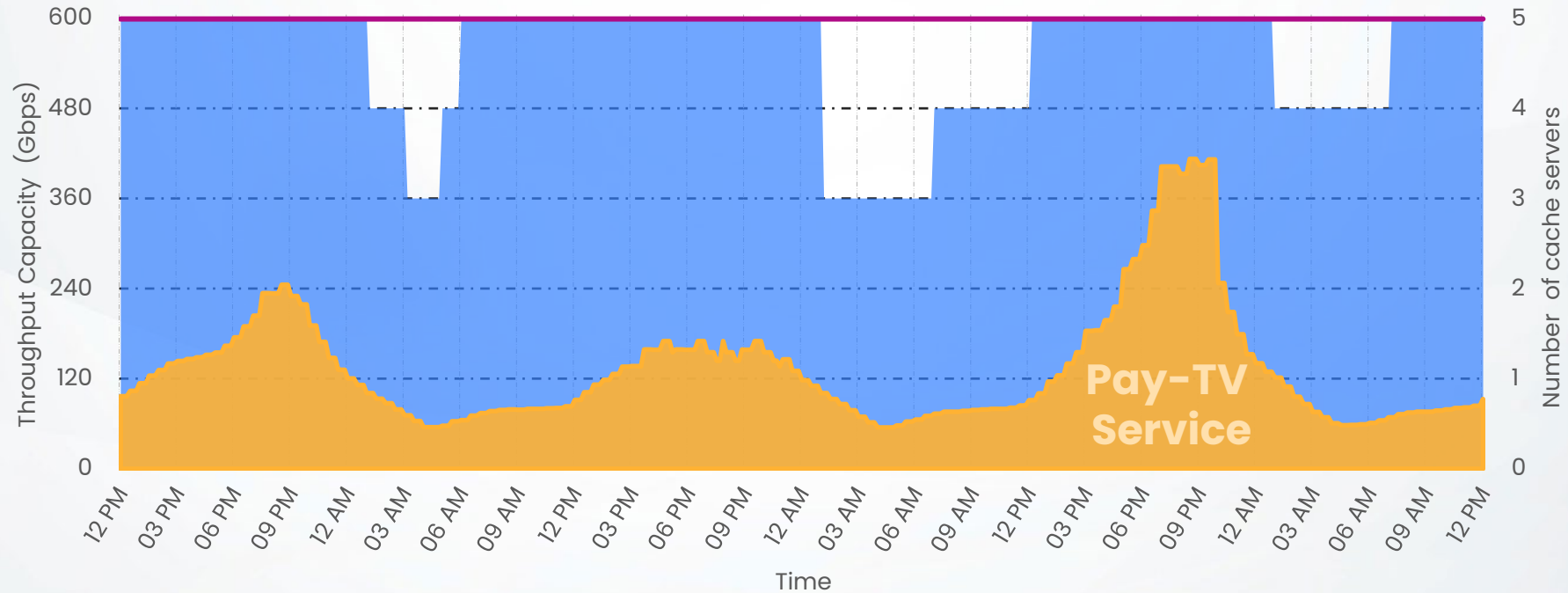
Content Steering Controller



CDN Steering Controller

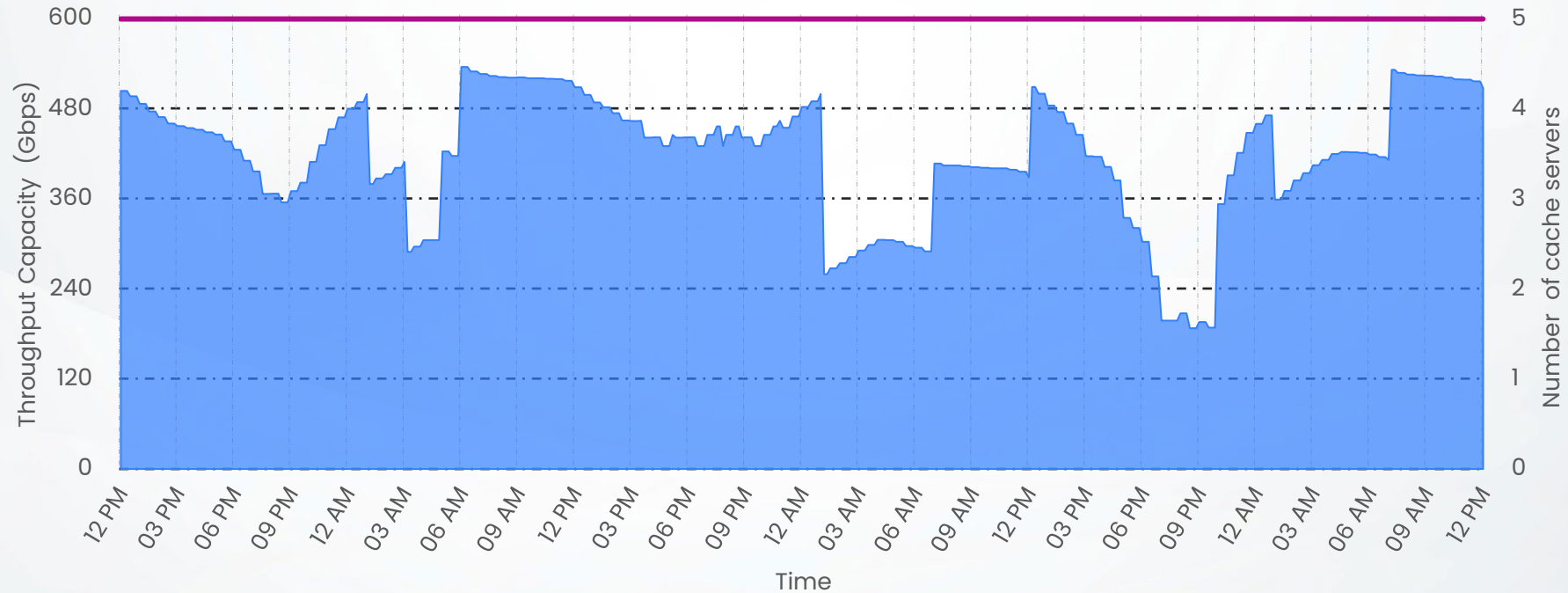
- **Communicate** with Steering Server
 - Proxy to the CDN Control-Plane
- **Advertise** footprint
 - Capacity
 - Geo/Net-Location
- Similarity with **Open Caching**
 - Controller
 - Footprint Advertisement

Use Case 1: Multi-Tenancy



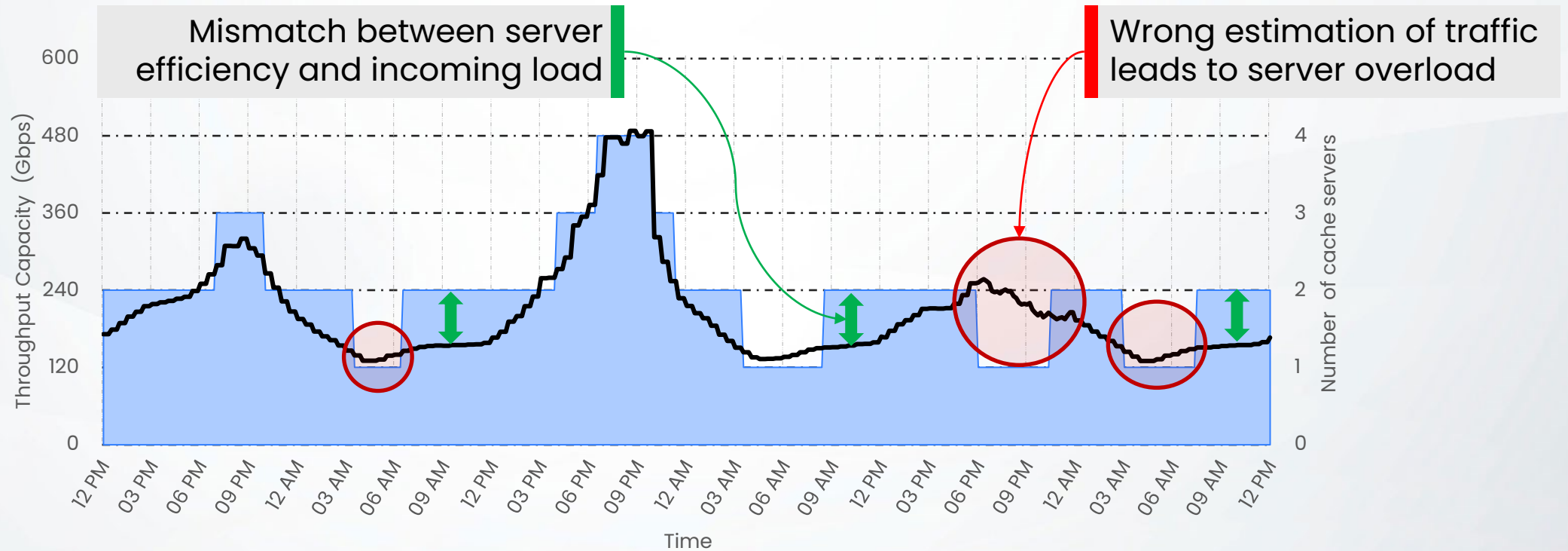
- Other tenants** use the cache group
- Some with **higher priority**

Use Case 1: Multi-Tenancy



What the Cache group capacity *actually* is!

Use Case 2: Power Efficiency



Planned **power on/off** servers to reduce energy consumption

Steering Server Negotiation

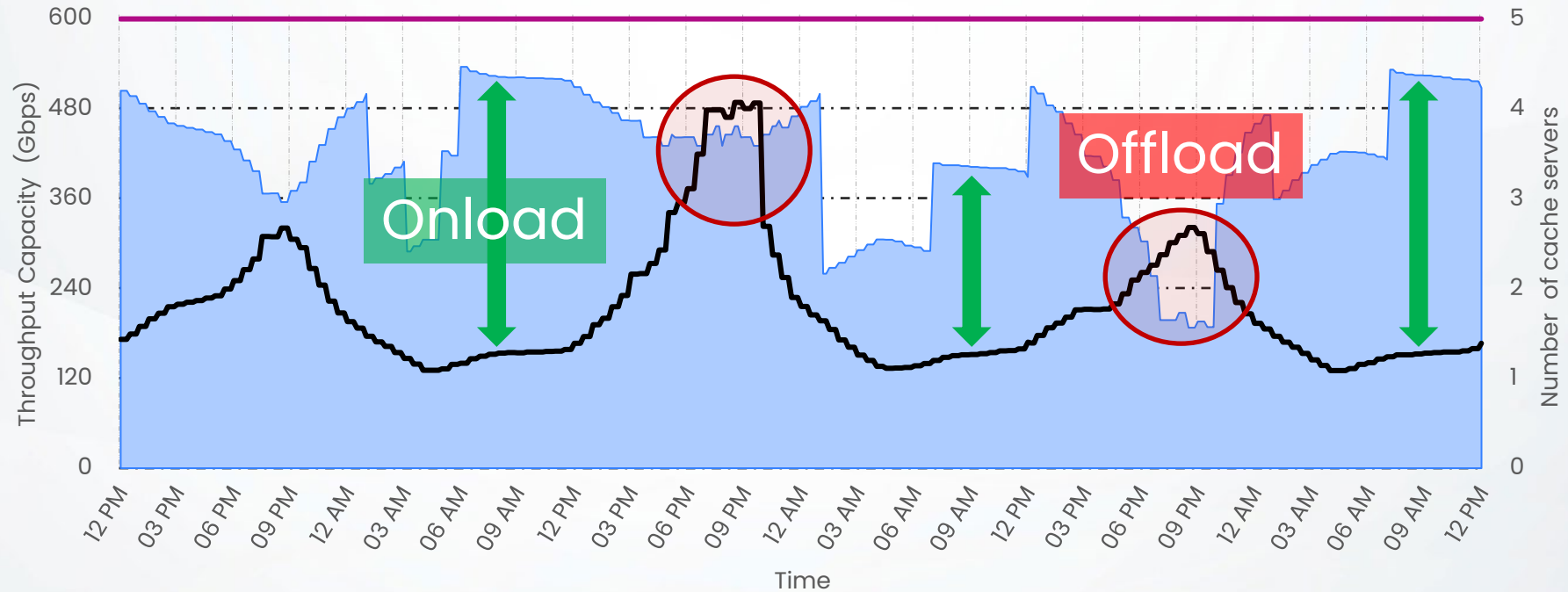
Steering Servers balance **user sessions**

CDNs to Steering Server

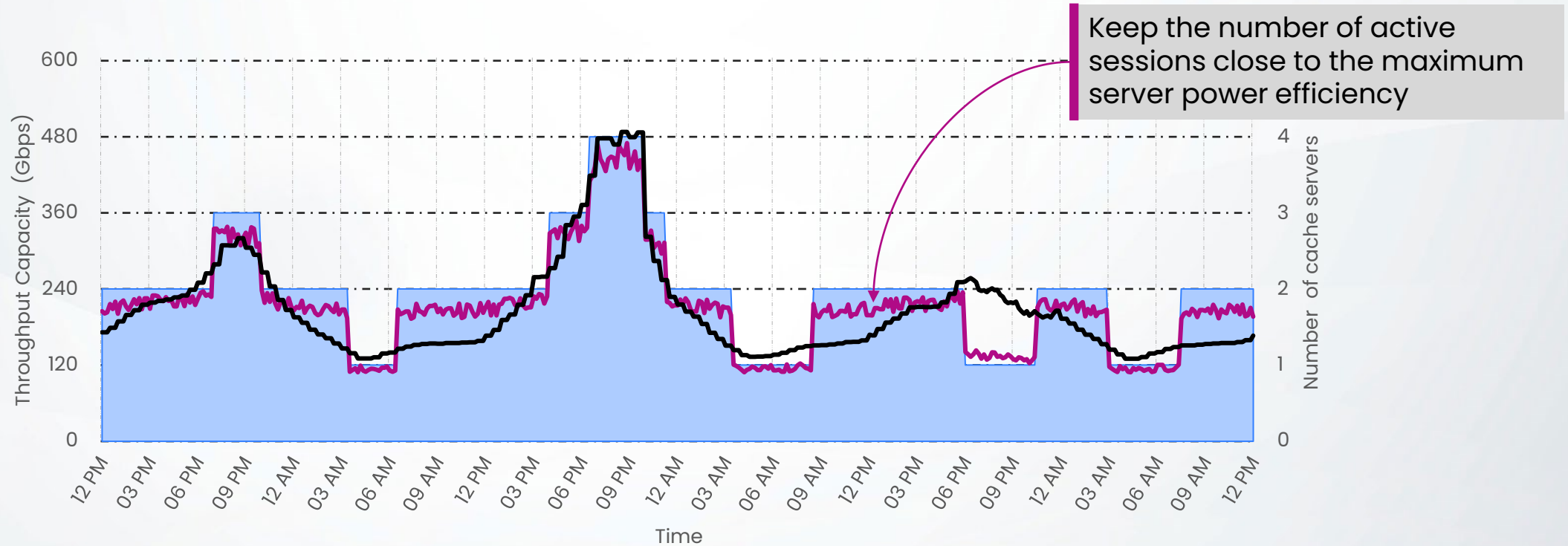
- **Give Me More** (*Onload*)
- **Give Me Less** (*Offload*)

... in unit of user sessions

Use Case 1: Multi-Tenancy

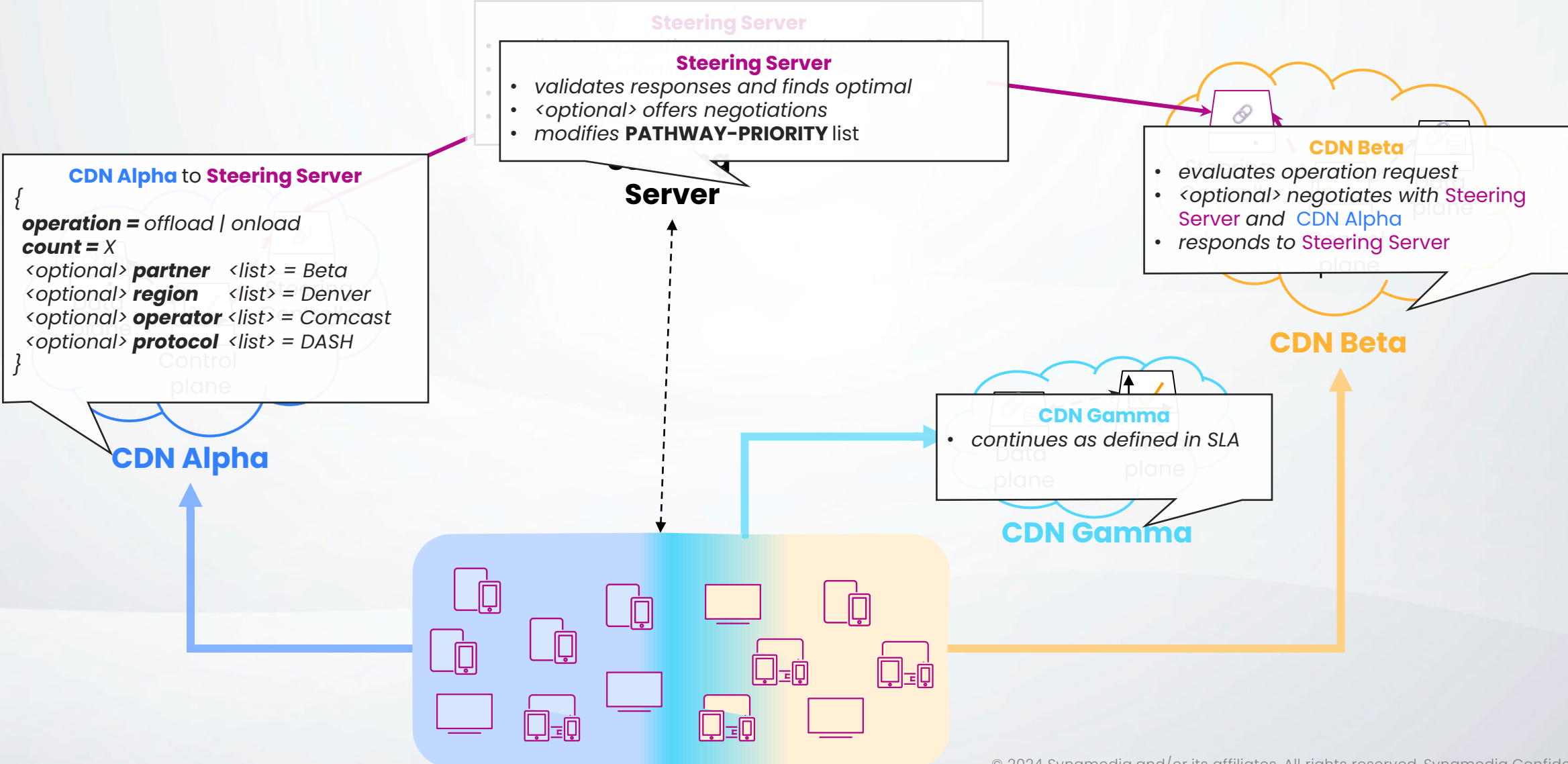


Use Case 2: Energy-Aware CDN



Active management of the number of sessions enables **higher power efficiency**

Controlling the Steering Wheel



Key Takeaway

CDNs and **Steering Server** should communicate

Unit of negotiation is the **number of user sessions**

Two simple messages

- *Onload*
- *Offload*



Synamedia
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