

UNIVERSITY OF
Southampton

Web Proxies

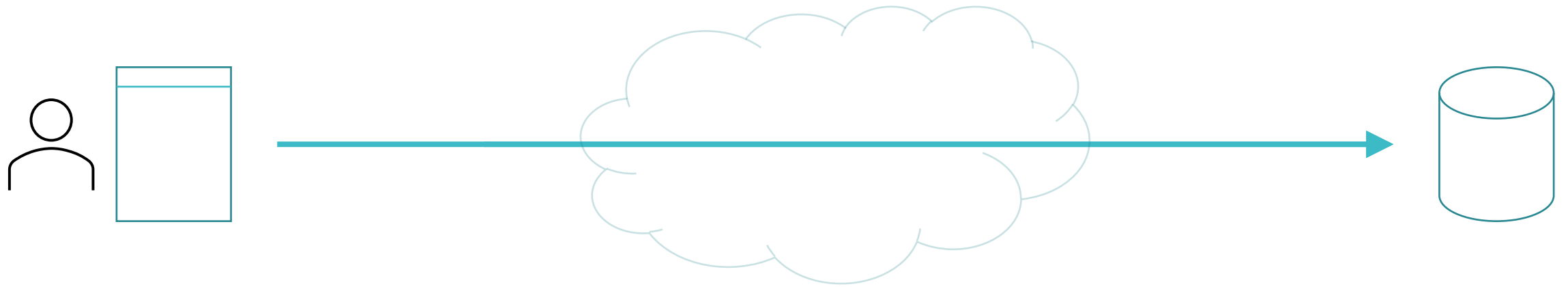
COMP3220 Web Infrastructure

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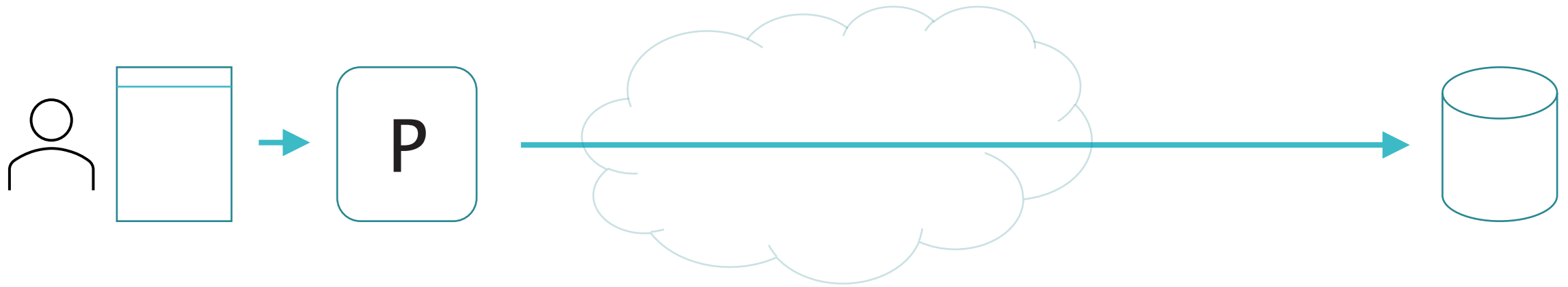
Web Proxy Architecture

- A web proxy is a network service
- They receive web requests from clients and make requests on their behalf to web servers
- A web proxies behaviour differs depending on their function

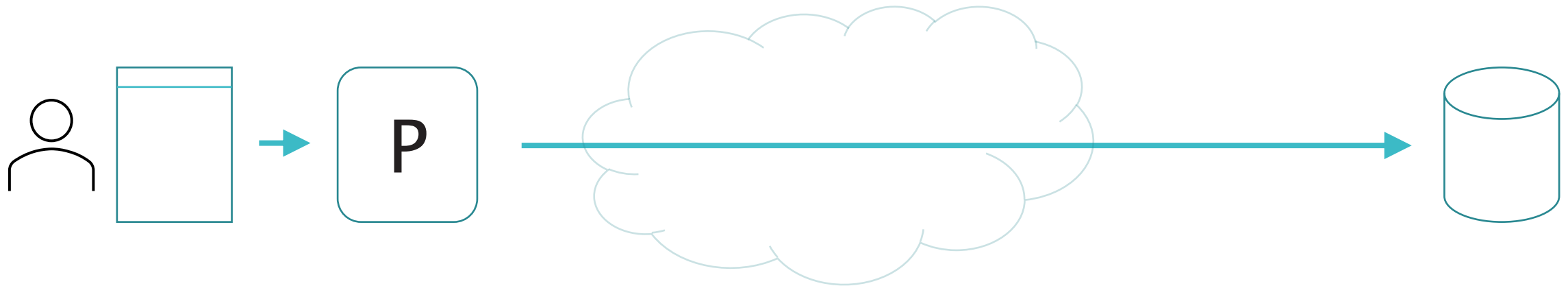
No Proxy



Forward Proxy

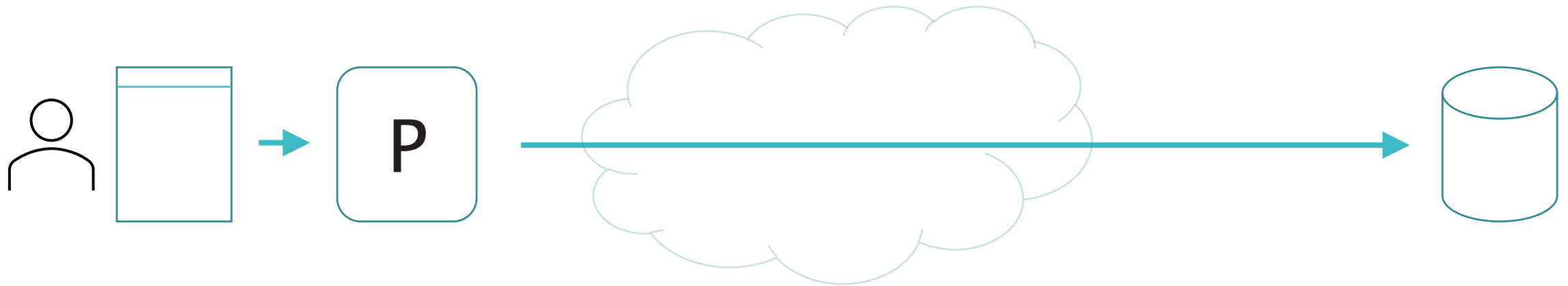


Forward Proxy - Content Filtering



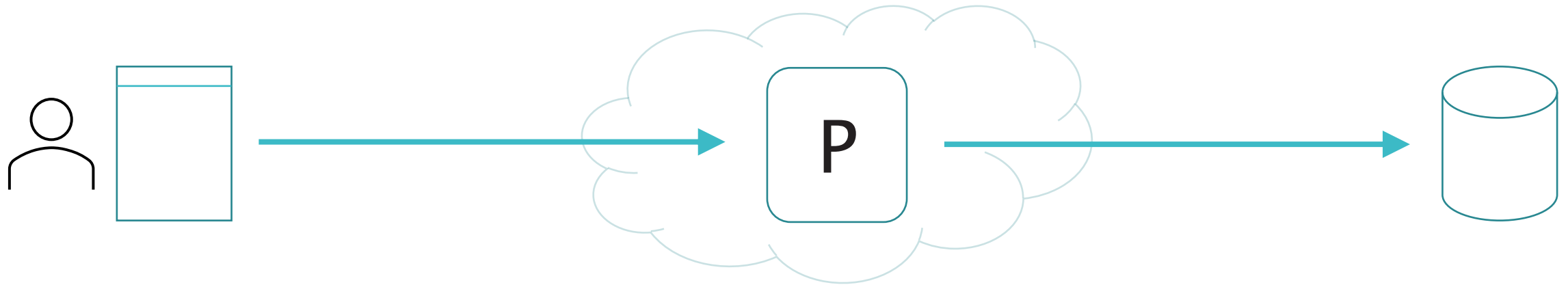
- Restricts requests that can be made via proxy
- Outgoing URLs matched against list of blocked sites
- Response can be scanned
 - Unwanted content
 - Malware

Forward Proxy - Content Translation

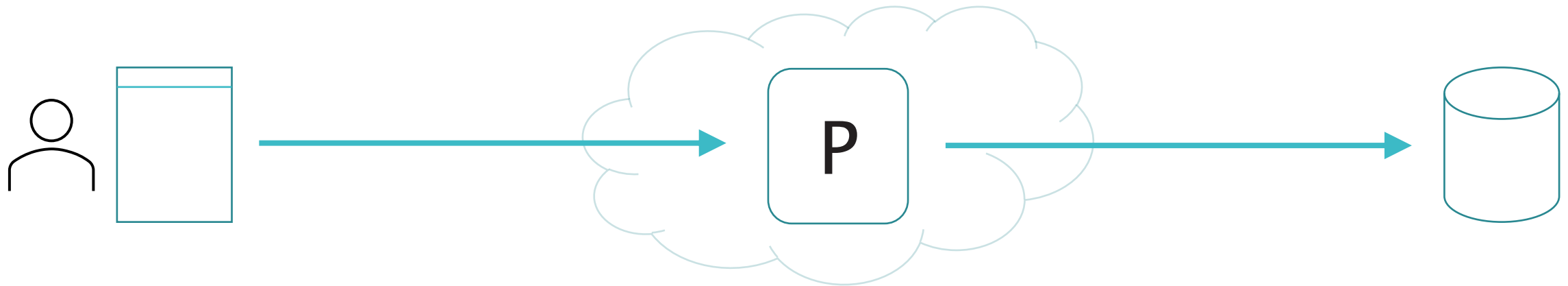


- Transform responses
- Reduce bandwidth usage by client
 - Commonly used by mobile phone networks
 - Recompress images at lower resolution
 - Minimising html, css and javascript
- Inject content into web pages eg adverts

Open Forward Proxy

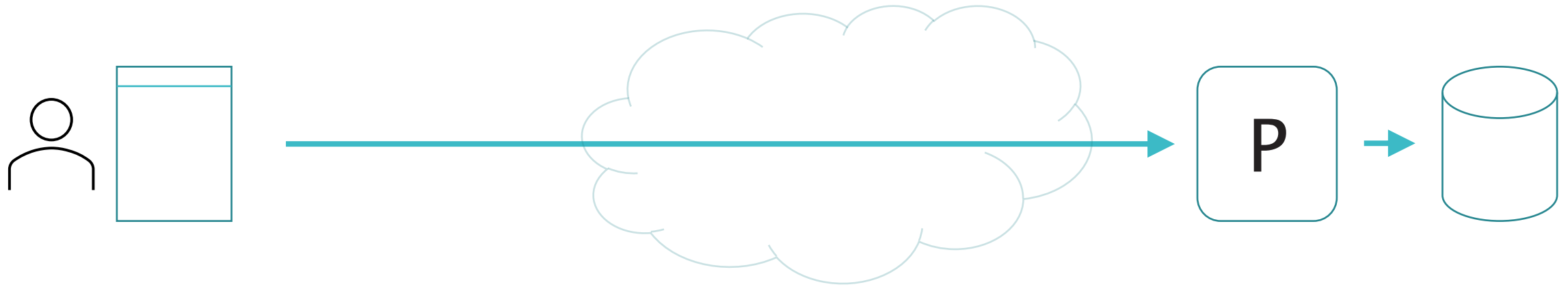


Open Forward Proxy - Access Services Anonymously

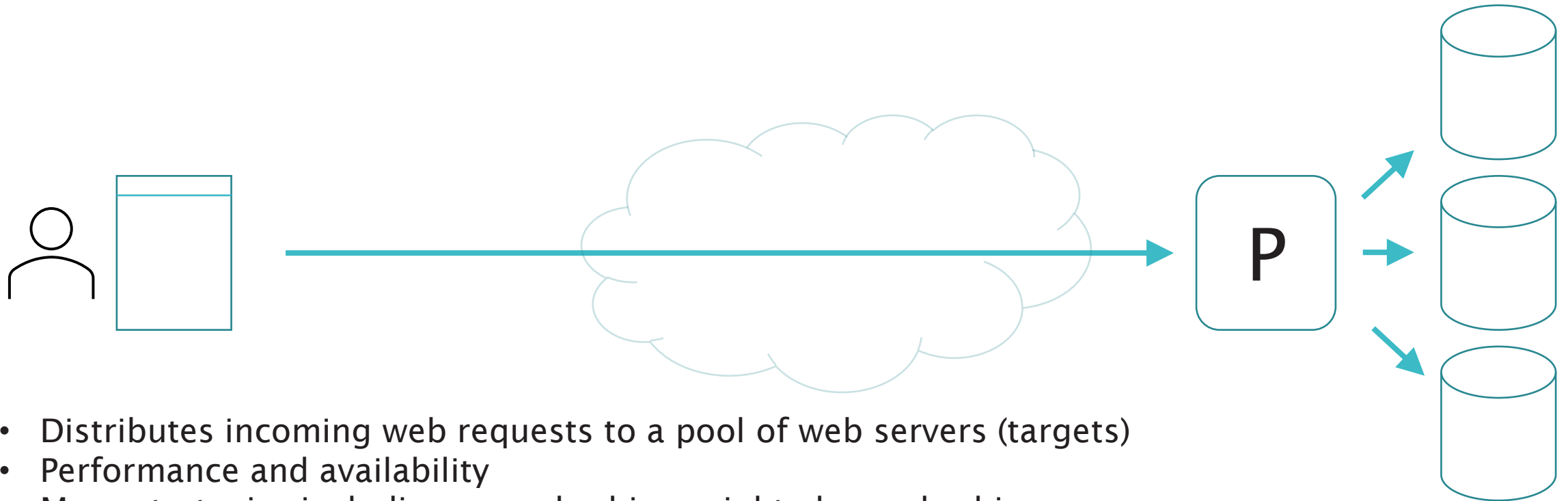


- Client accessing website via proxy:
 - Masks their IP address
 - Modifies their location (via GeoIP)
- Improve anonymity
- Defeat geo-blocking

Reverse Proxy

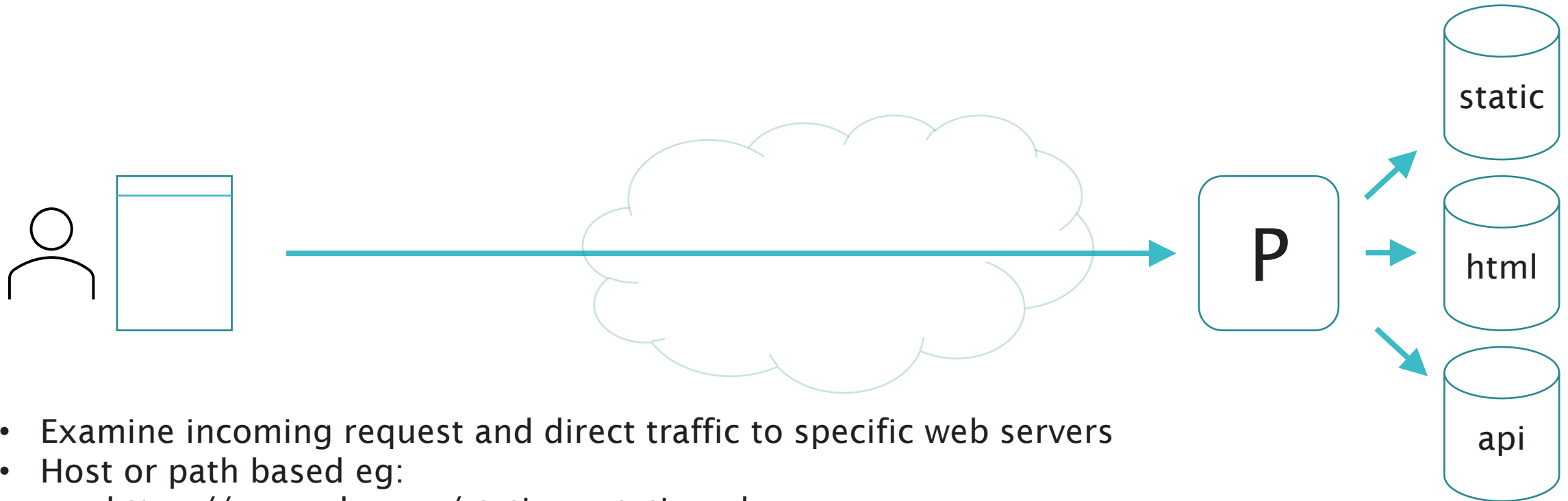


Reverse Proxy - Load-balancing



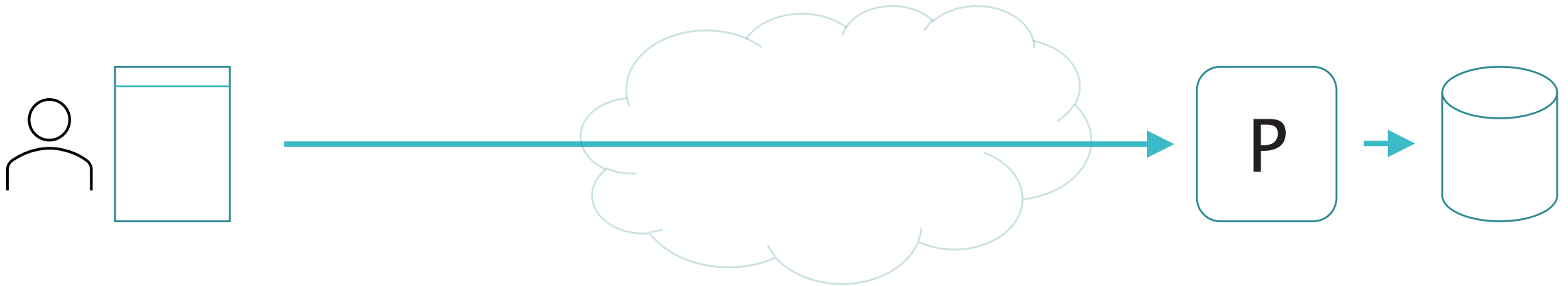
- Distributes incoming web requests to a pool of web servers (targets)
- Performance and availability
- Many strategies including: round robin, weighted round robin
- Health checks ensure resilience

Reverse Proxy - Content Switching



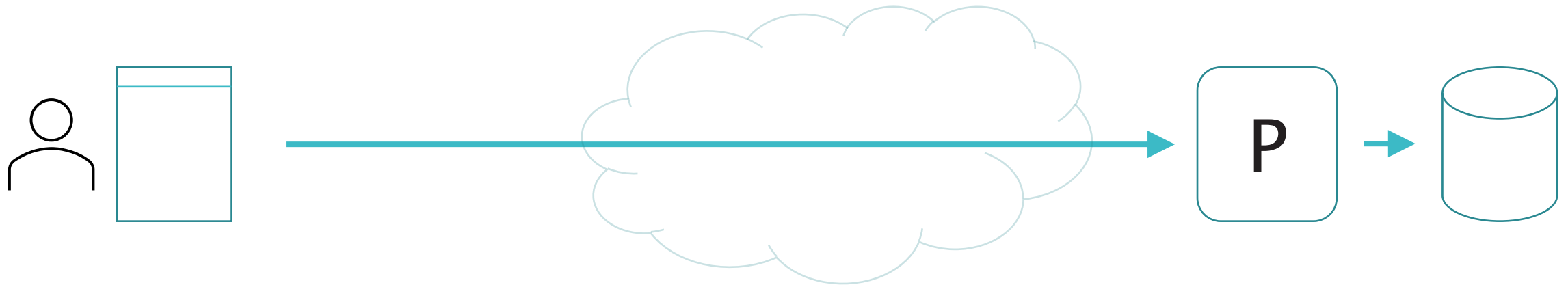
- Examine incoming request and direct traffic to specific web servers
- Host or path based eg:
 - `https://example.com/static` -> static webserver
- Incoming IP address, cookie or user-agent

Reverse Proxy – Protocol Translation



- HTTPS SSL/TLS off-loading (OSI Layer 6)
 - Incoming web requests over https, internal communications via http
- HTTP/2 to HTTP/1.x (OSI Layer 7)
- IPv6 <-> IPv4 (OSI Layer 3)

Reverse Proxy – Monitoring and filtering



- Monitor incoming requests
 - Access logs / statistics
- Filter incoming requests
 - Check security credentials (eg valid API tokens)
 - Rate limit requests
 - Intrusion detection and handling DDoS attacks
 - Applying security policies (WAF)

Learning outcomes

- Many different types of proxies are deployed on the Web
- Different proxies are deployed for different purposes