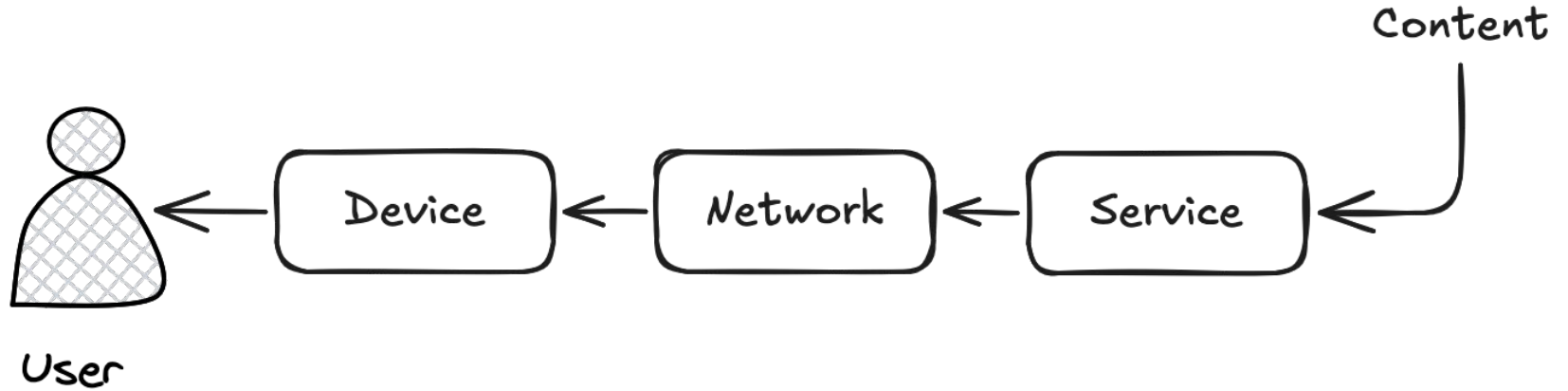


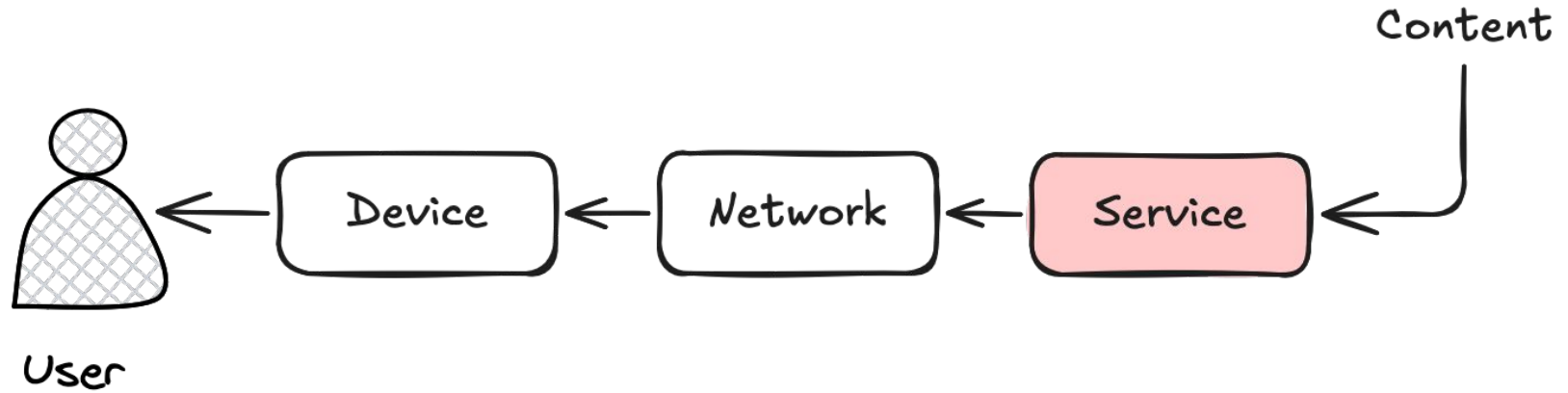
Where enforcement happens?

Dennis Jackson

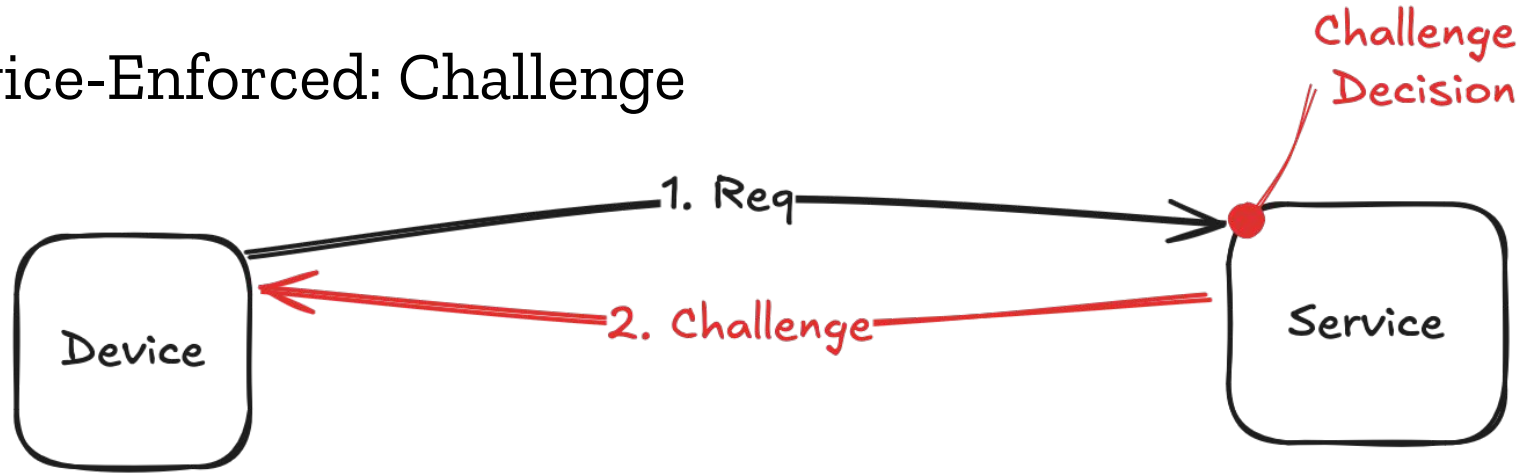
The Internet Content Pipeline



Service-Enforced

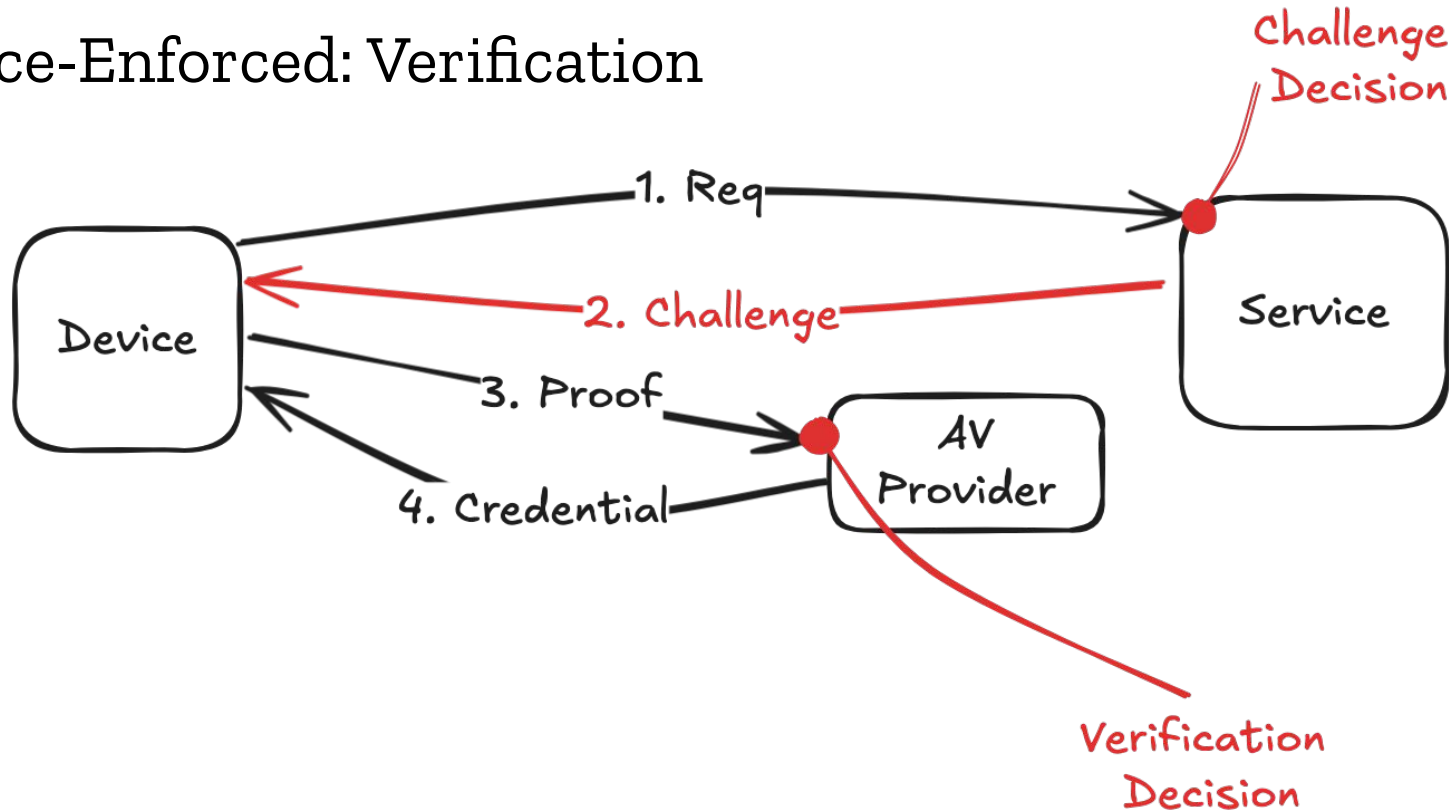


Service-Enforced: Challenge



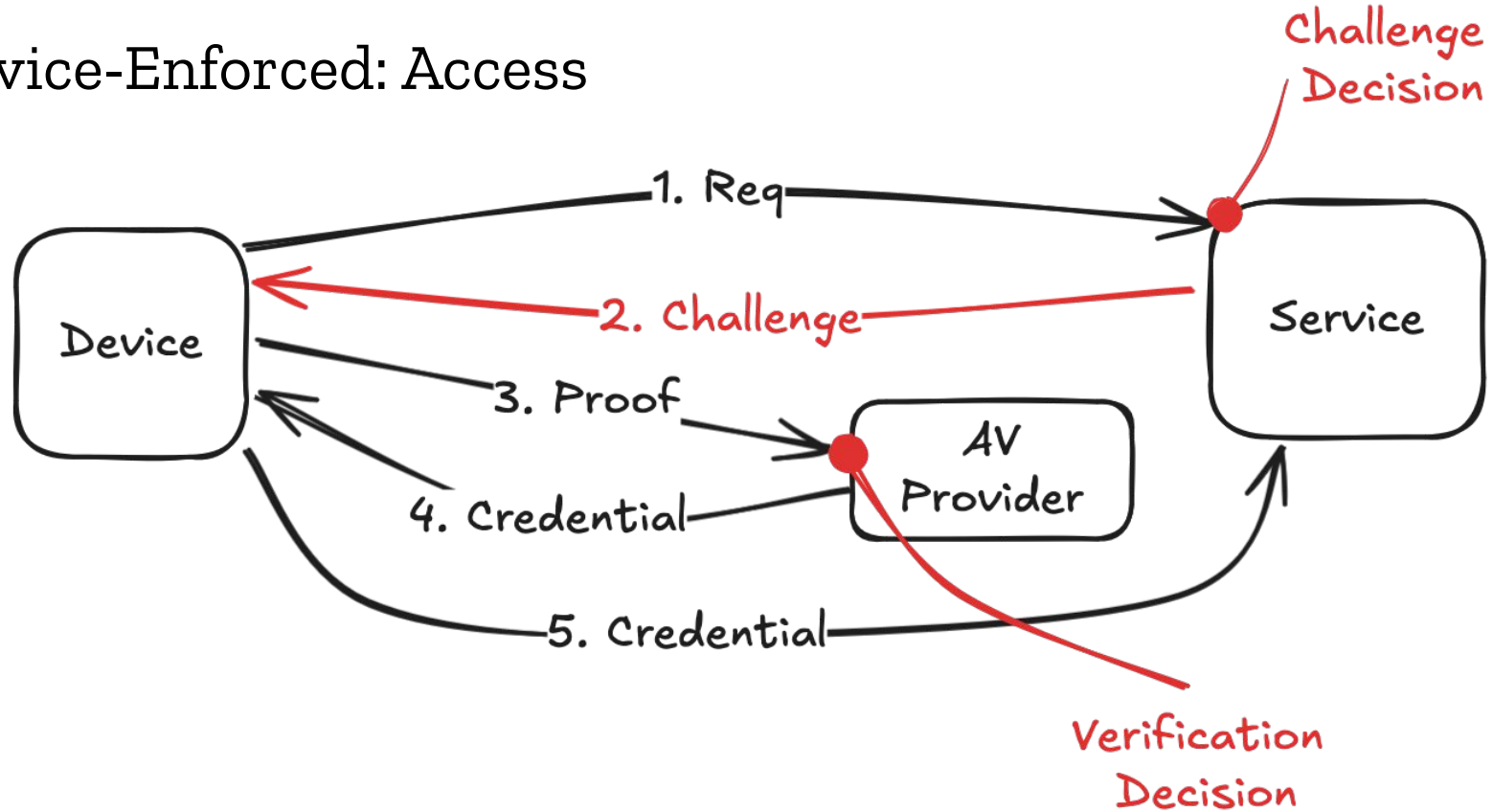
Challenge decision based on GeoIP

Service-Enforced: Verification



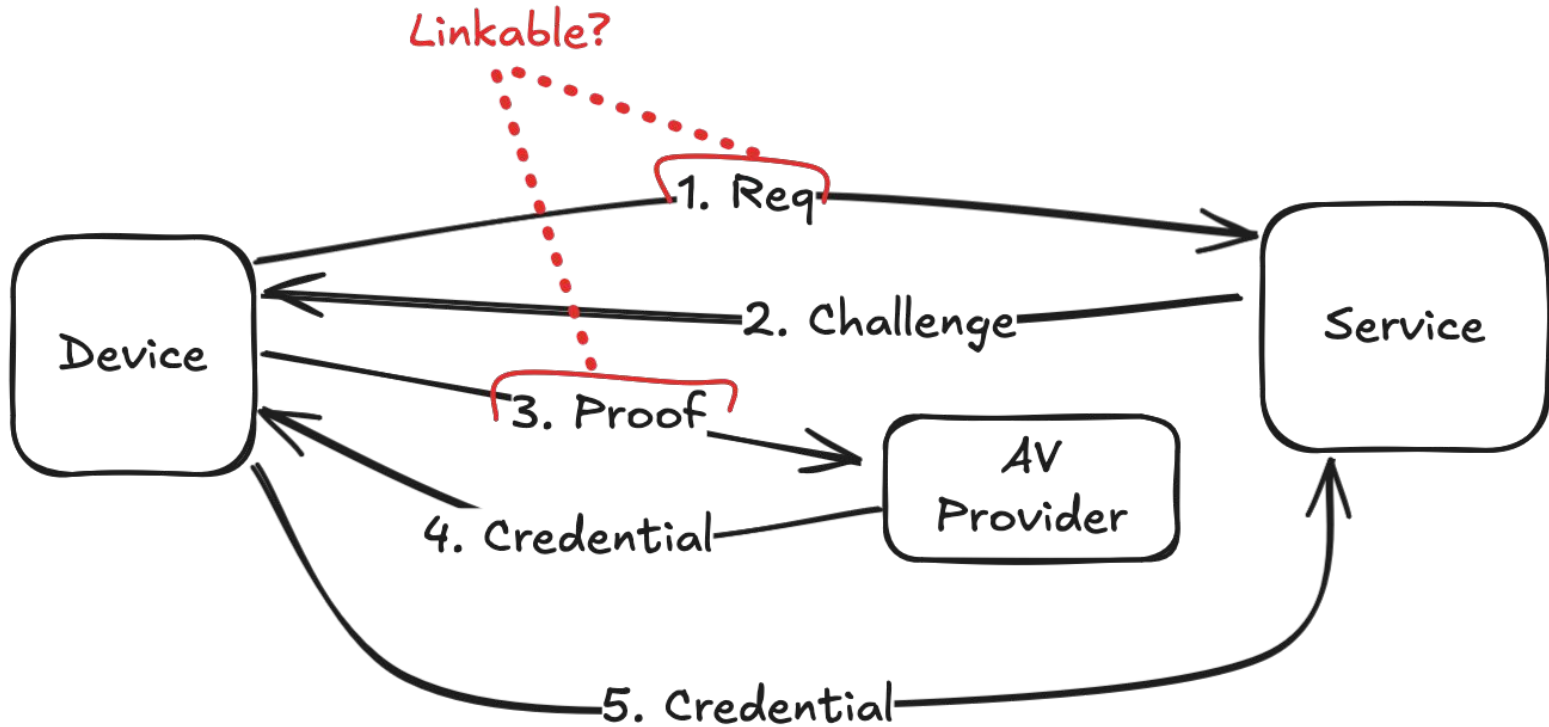
AV Providers may be first or third party

Service-Enforced: Access



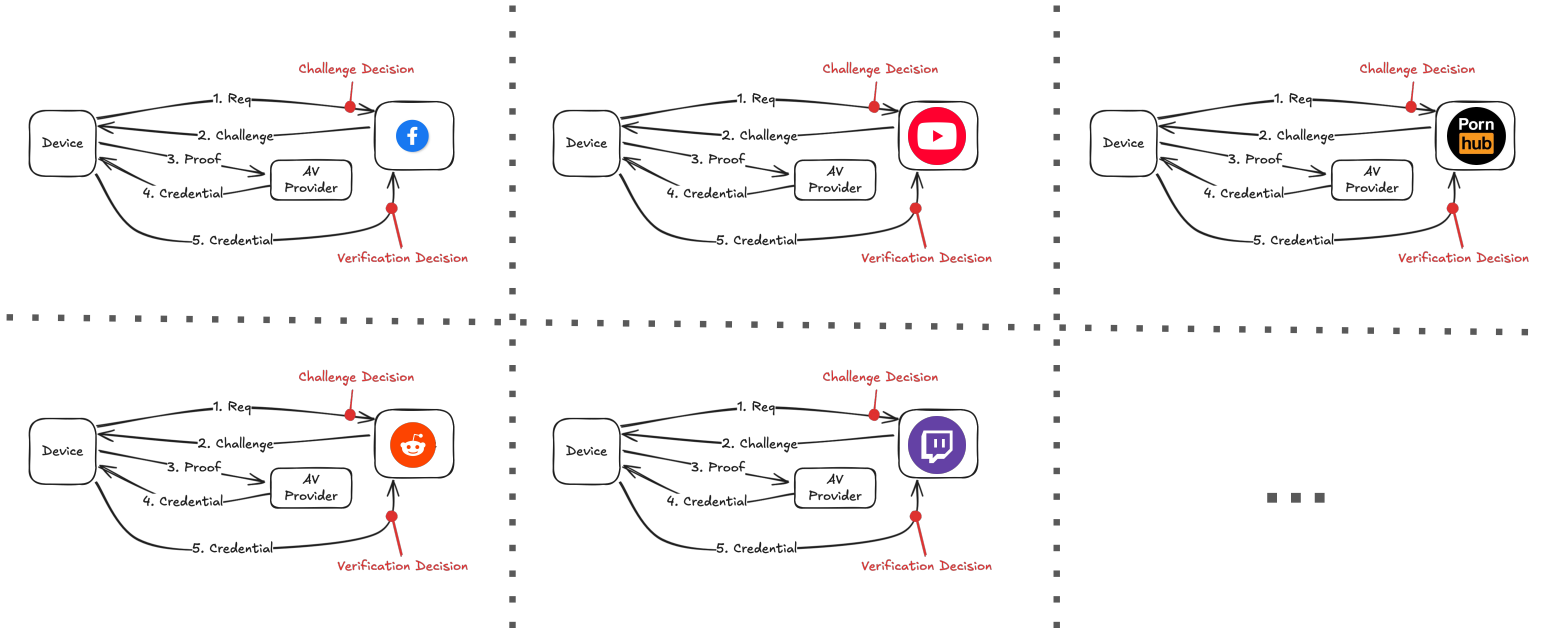
Access is typically mediated via the device

Challenge: Privacy



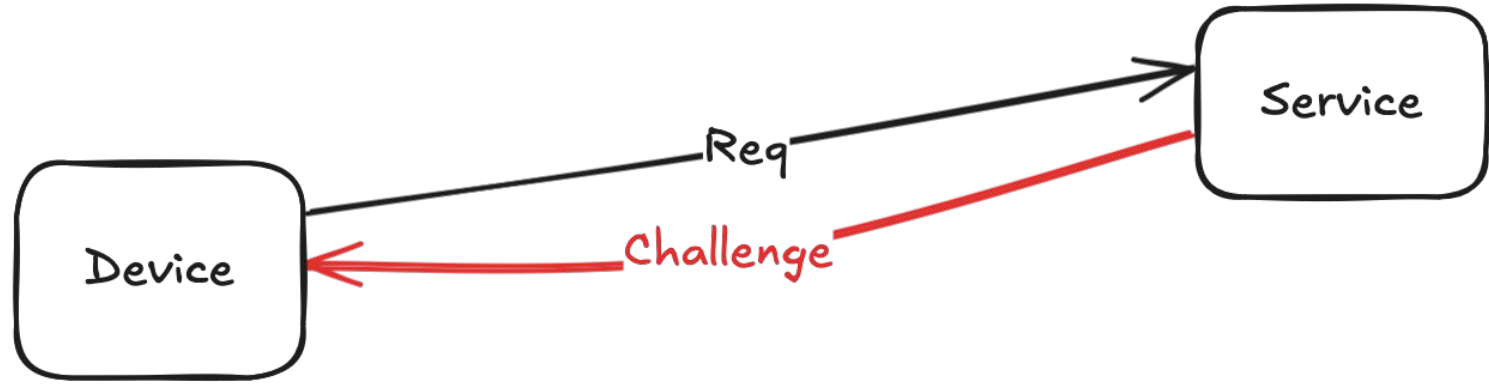
Linkable via credential or metadata?

Challenge: Frequency & Friction

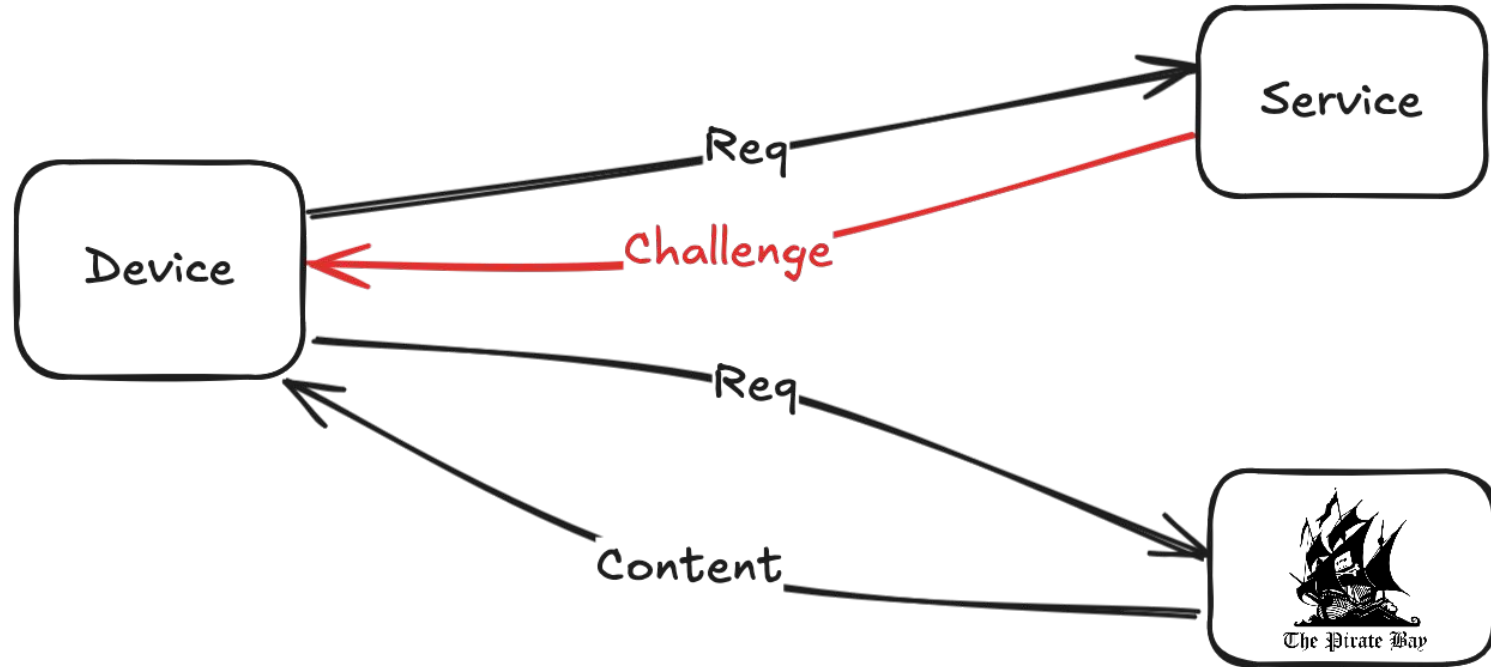


Per-Service challenges cause friction for users

Challenge: Avoidance

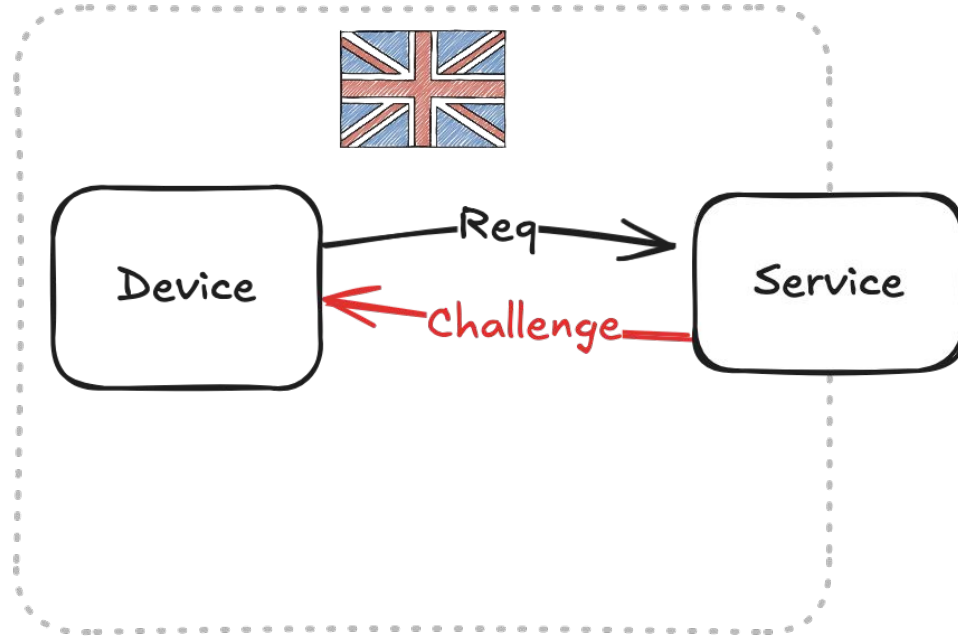


Challenge: Avoidance

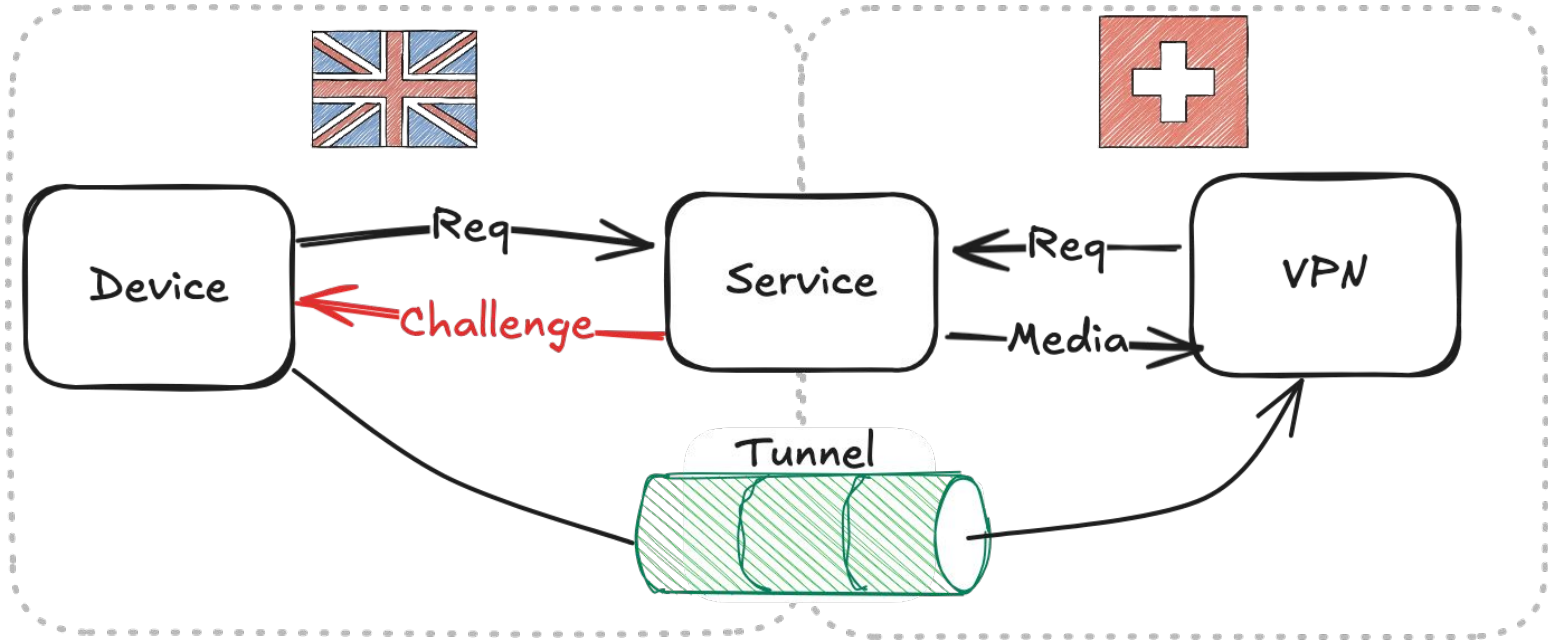


Friction & Privacy concerns may push users to non-compliant sites

Challenge: Evasion

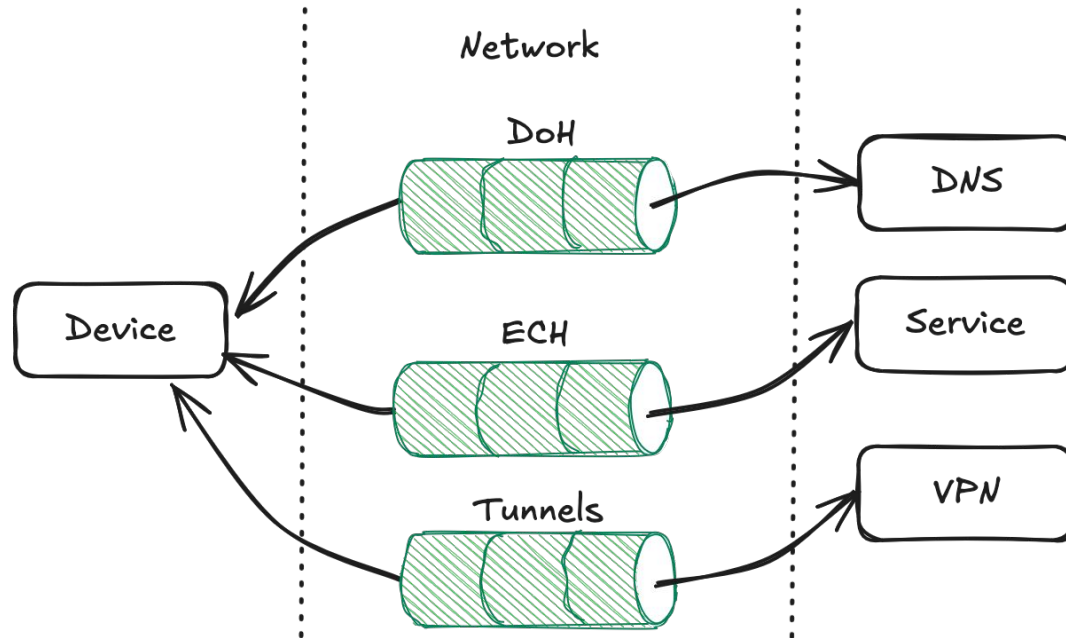


Challenge: Evasion



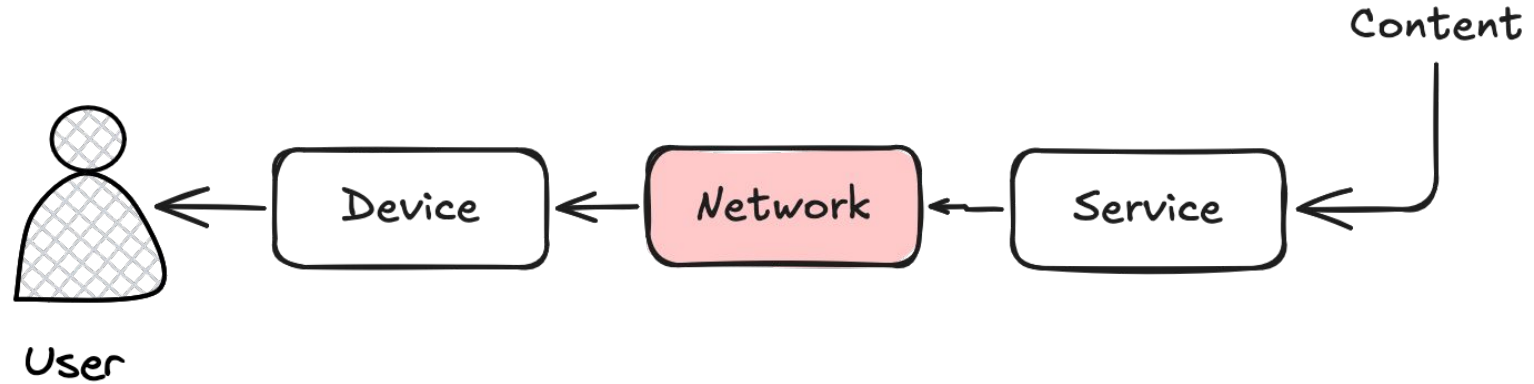
Tools like VPNs allow users to evade challenges

Challenge: Widely Deployed PETs

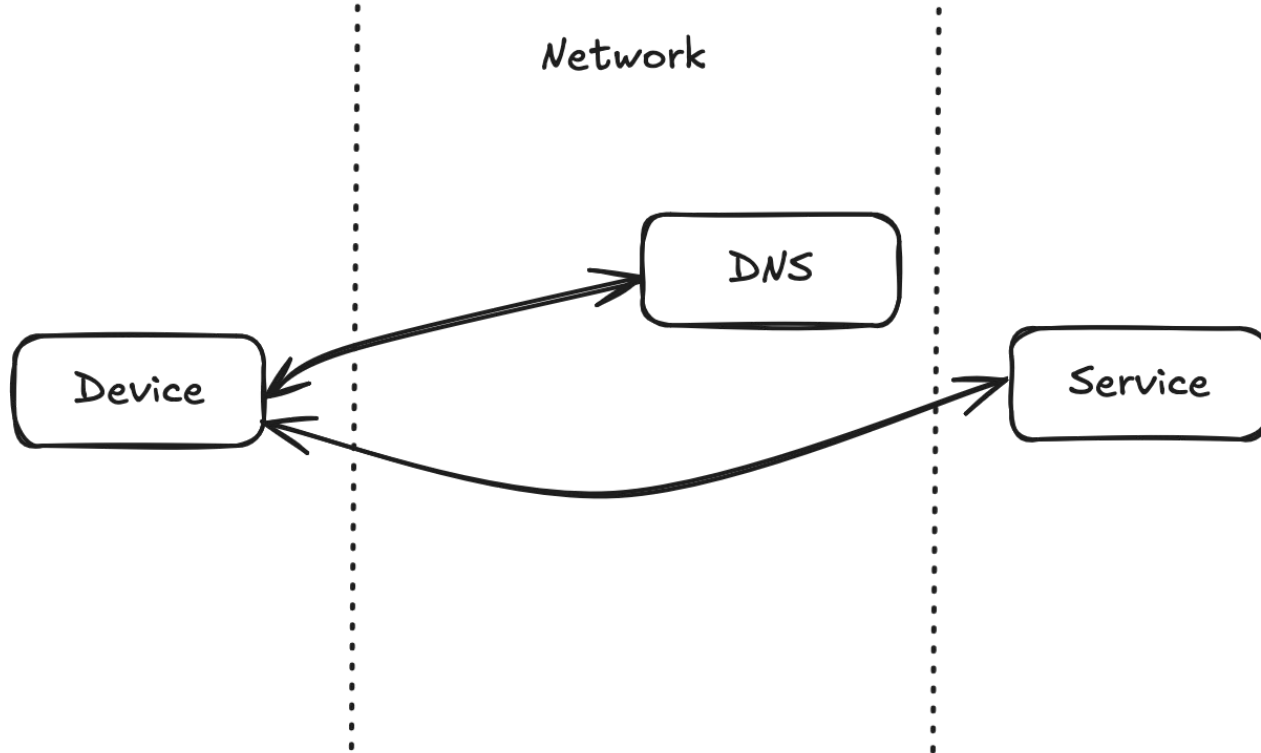


PETs avoid exposing domain names to the network

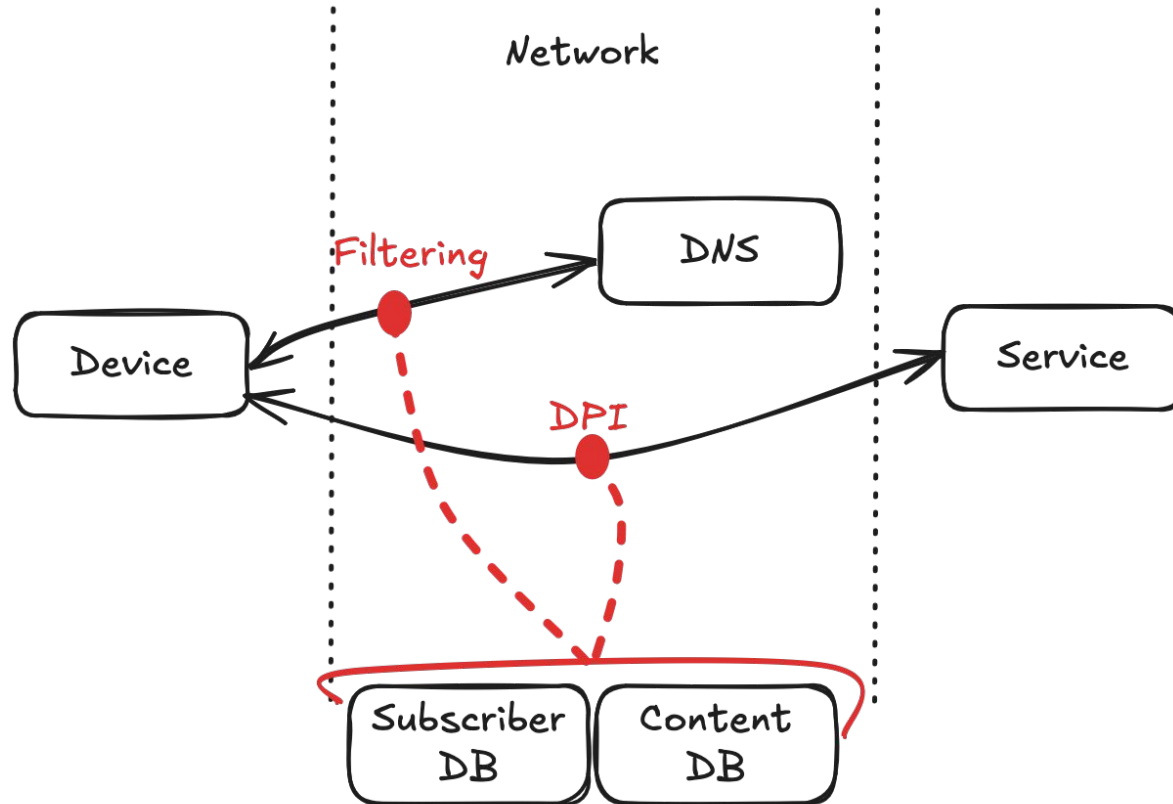
Network-Enforced



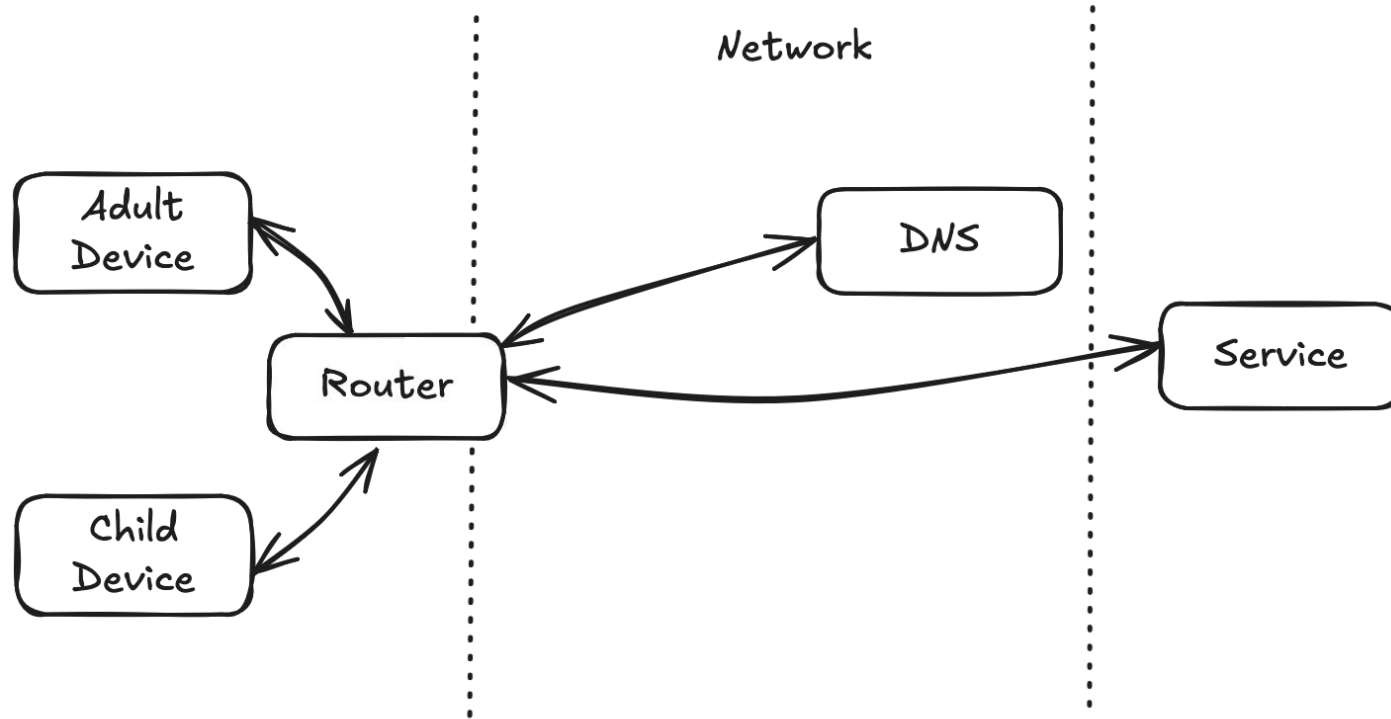
Network-Enforced



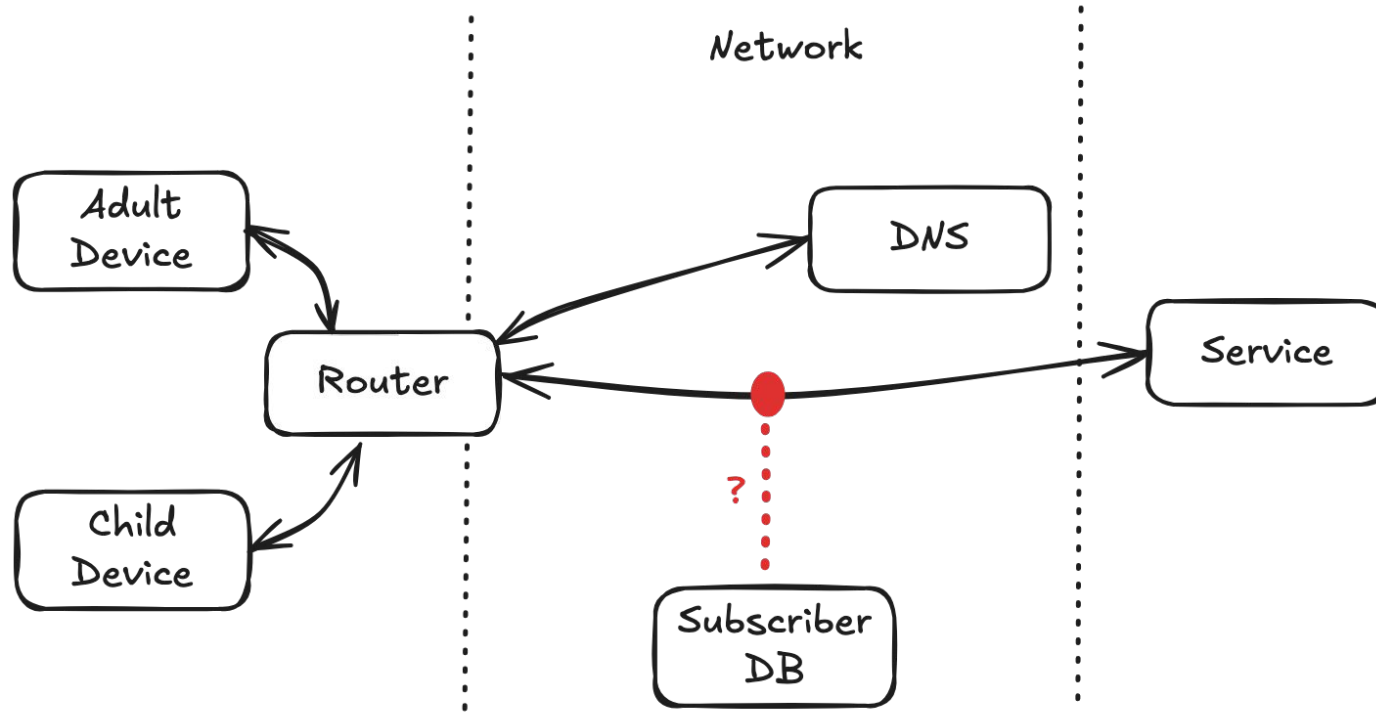
Network-Enforced



Challenge: Client Confusion

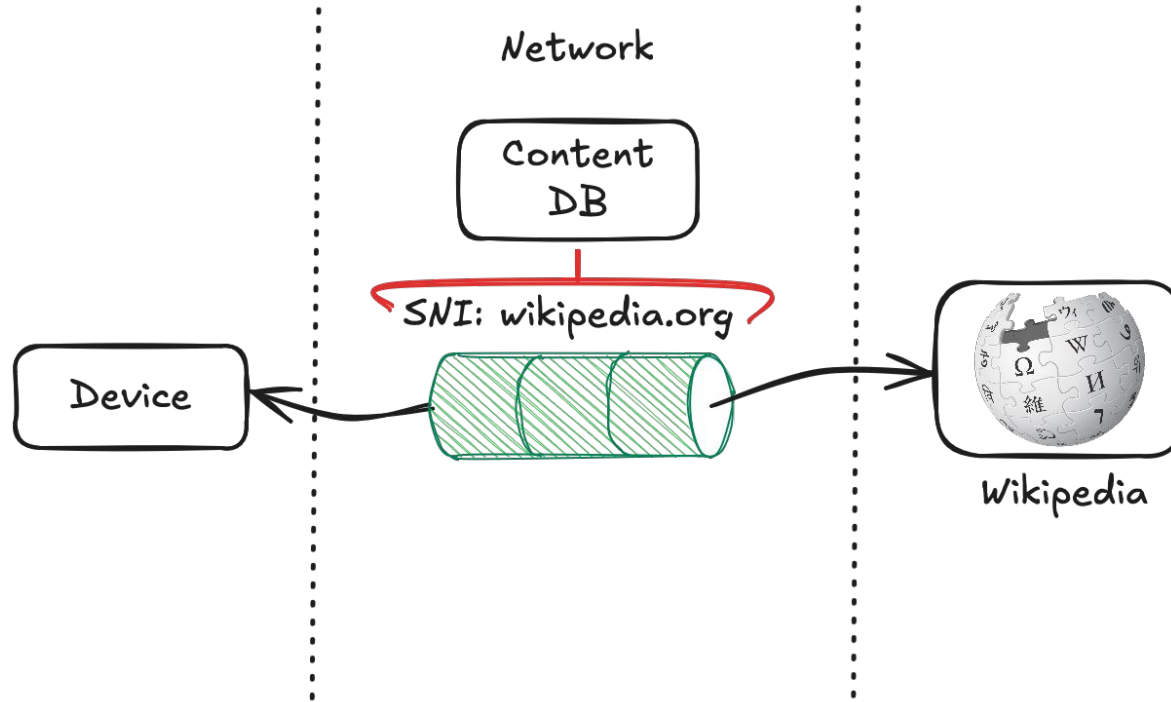


Challenge: Client Confusion



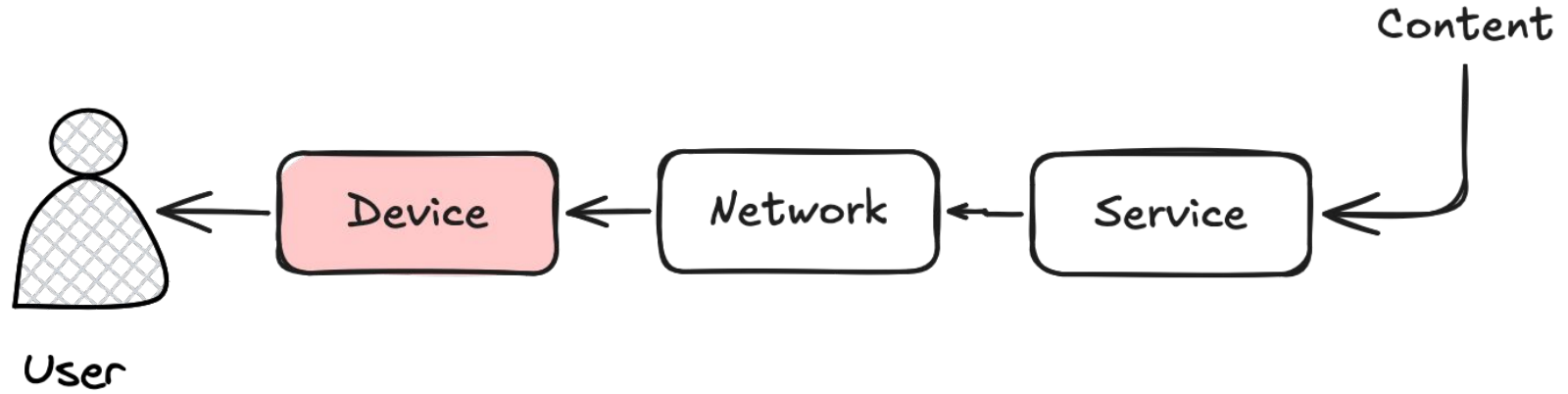
NATs conceal which devices are responsible for a particular network flow

Challenge: Content Confusion

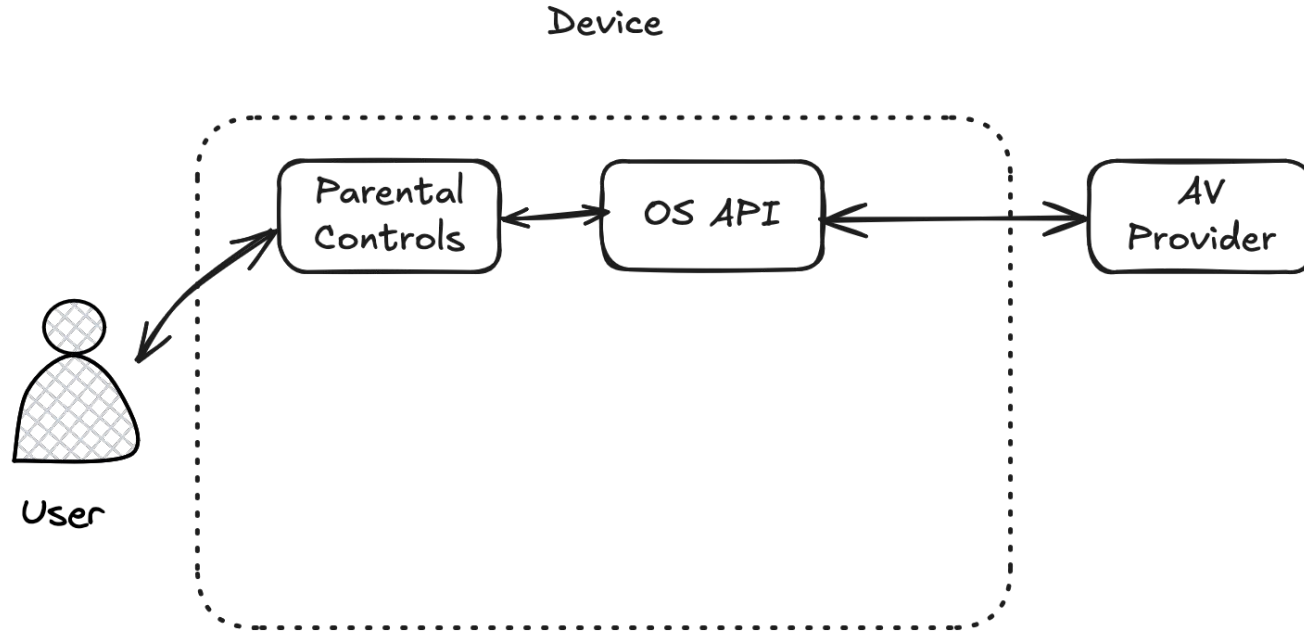


HTTPS prevents the network from identifying specific pages visited

Device-Enforced

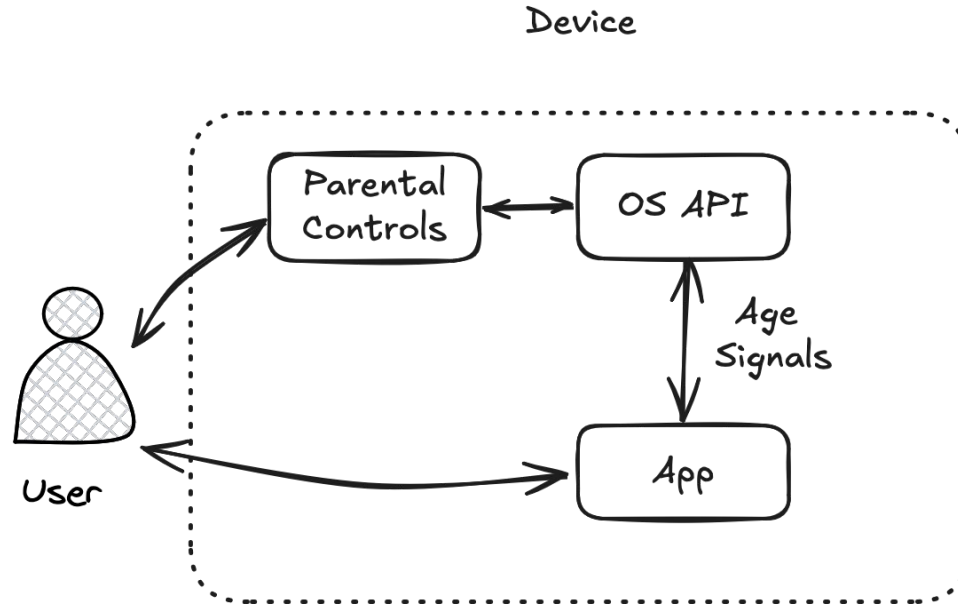


Device-Enforced: Setup



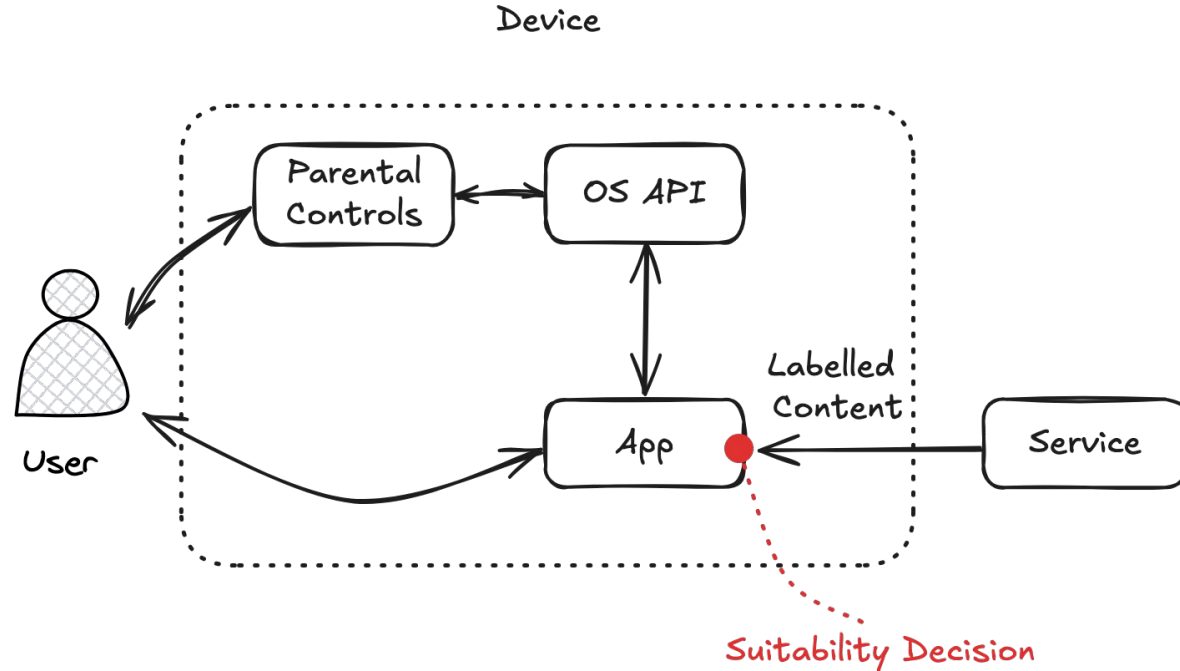
Age Verification may be handled during device setup

Device-Enforced: OS Signals



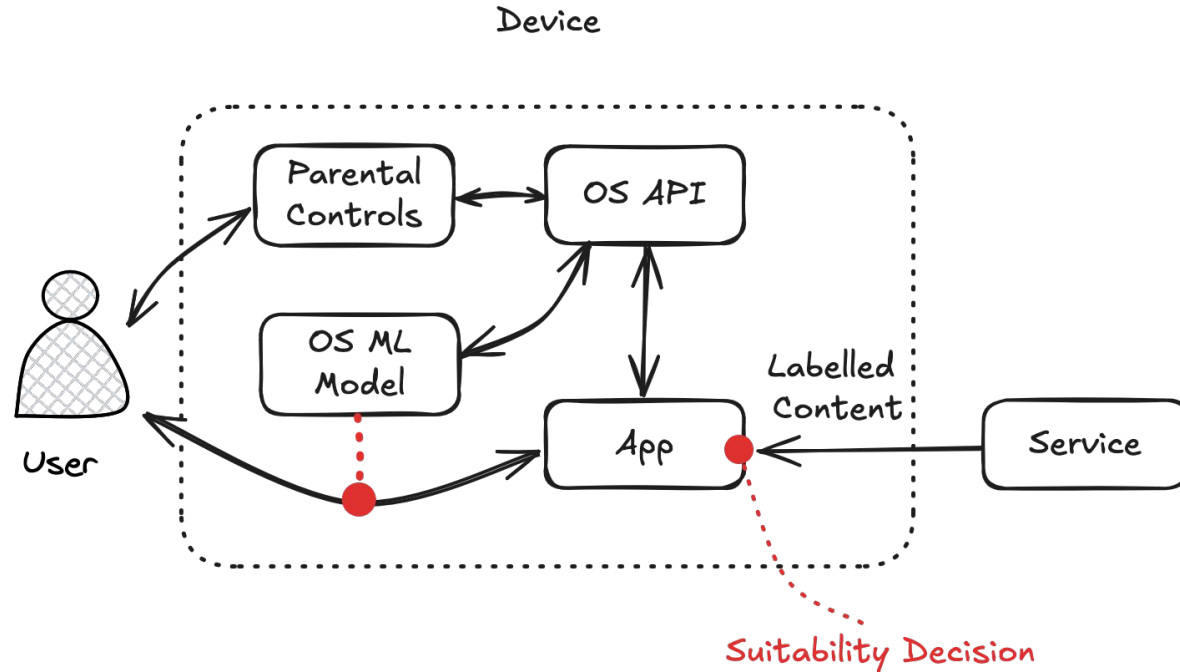
An OS API provides age signals to installed apps

Device-Enforced: Labelled Content



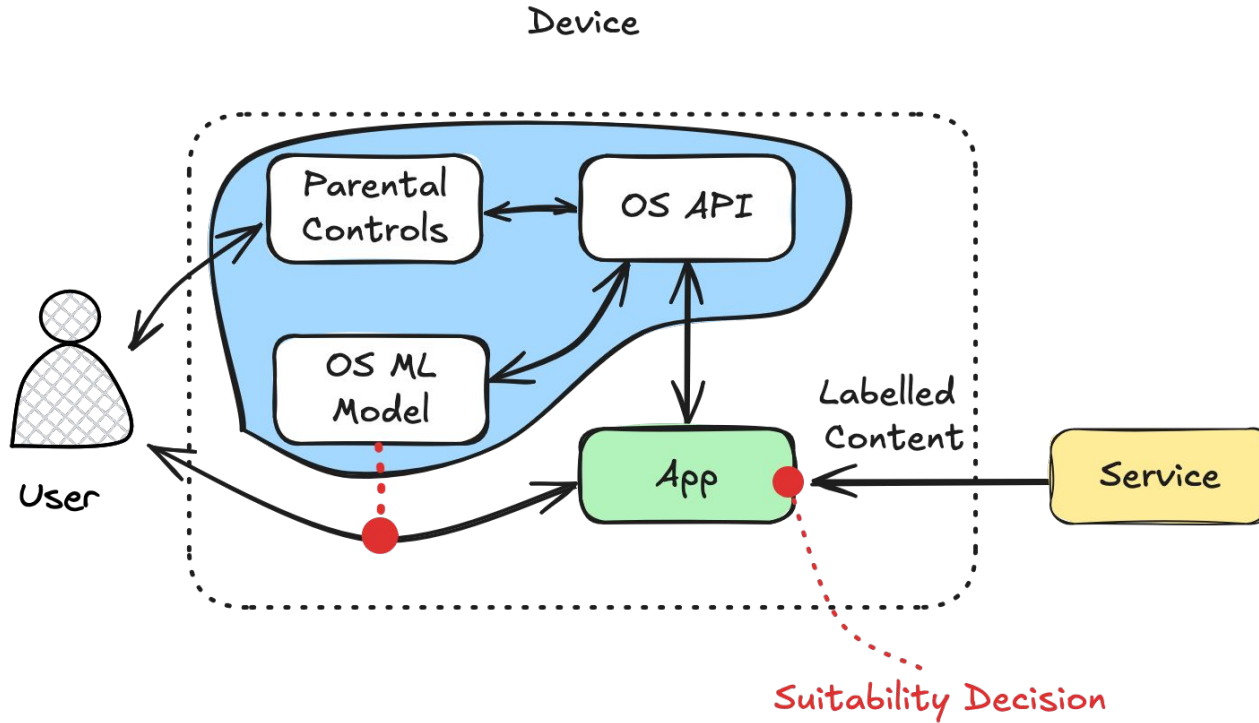
Services can label their content's suitability

Device-Enforced: Local ML Models



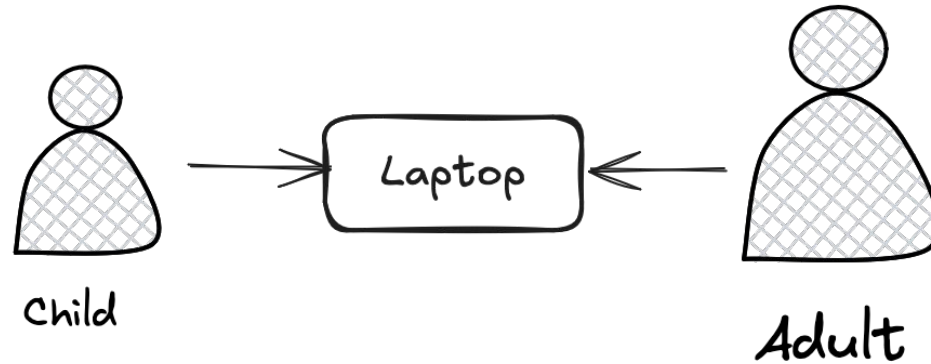
Machine Learning Models can classify content

Challenge: Shared Responsibilities



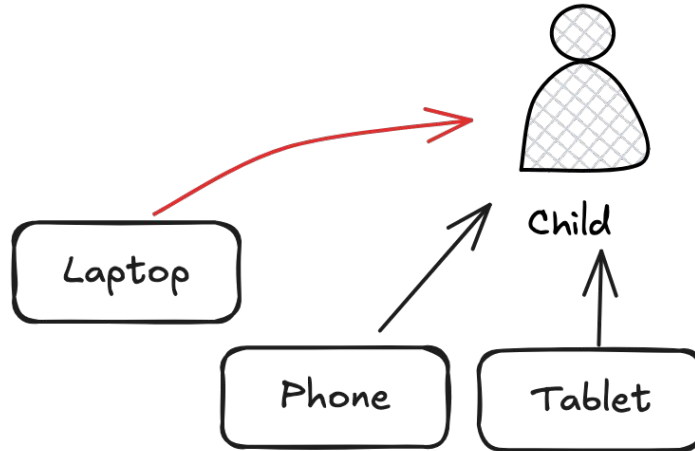
Coordinating enforcement across multiple components is challenging

Challenge: Shared Devices



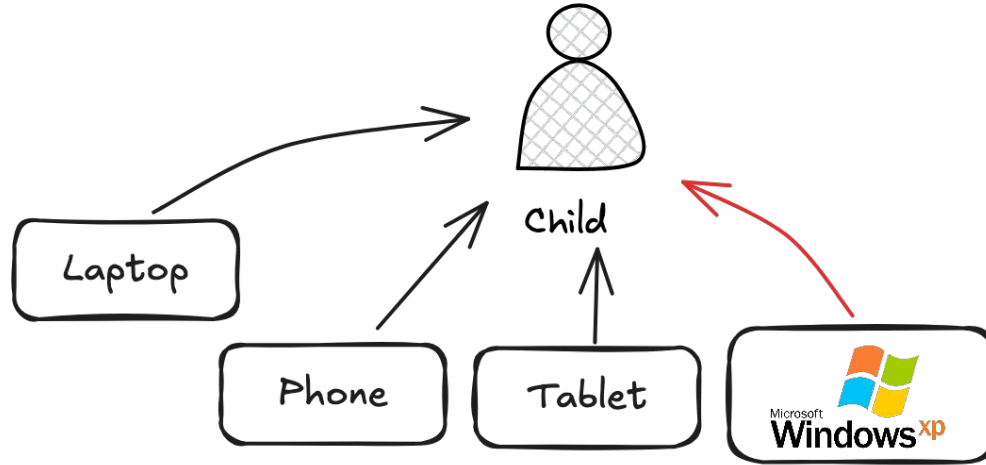
How are shared devices restricted?

Challenge: Multiple Devices



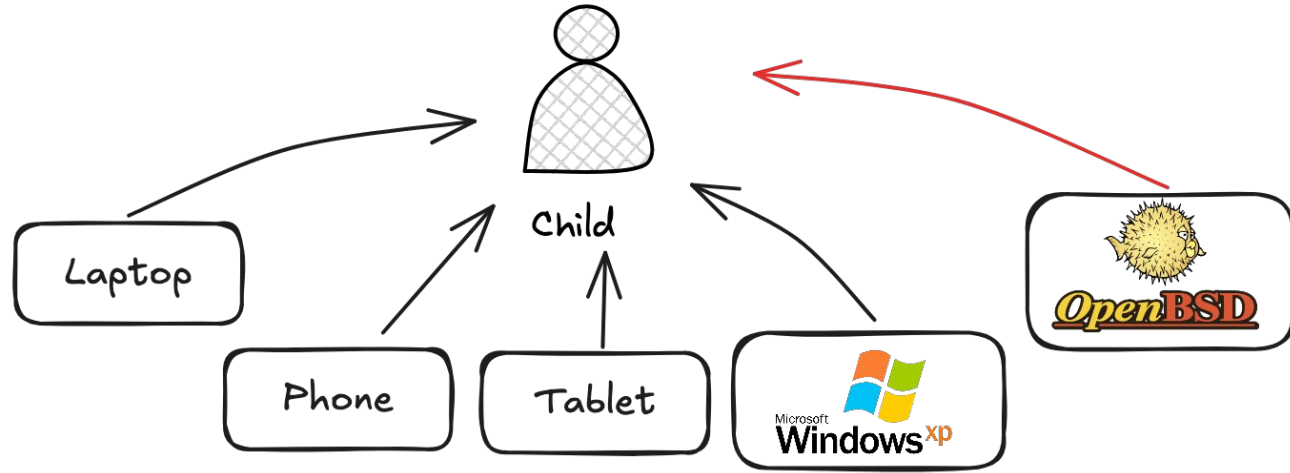
Protection is proportional to the most-permissive device

Challenge: Legacy Devices



Legacy devices can enable evasion

Challenge: Niche Devices



Which devices would come with age restrictions?

Architectural Open Areas

- Service-Enforced
 - Device Mediation of Credential Presentation (Security, Privacy, Friction)
 - Handling Circumvention (Avoidance, Evasion)
- Network-Enforced
 - Linking flows to individual subscribers and content types
 - Compatibility with modern privacy technologies
- Device-Enforced
 - OS APIs for age signals & interoperable standards for content signals
 - Achieving comprehensive deployment across devices