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Technology Overview

Creative Commons Technology Summit
June 18, 2008
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ver. 1.1

Unlicensed P2P: Nobody Wins

The current unlicensed P2P environment serves no one's interests well. Users get some free-as-in-beer content, but quality and selection are low. ISPs are seeing bandwidth utilization skyrocket, but cannot cache unlicensed content without risking liability for copyright infringement. And creators and publishers alike are losing the major source of their livelihood as online revenues fail to make up for plummeting physical retail sales.

End Users	Creators and Publishers	Internet Service Providers
No guarantee of quality or authenticity of content	Catastrophic loss of revenue from declining retail sales	Concerned about copyright liability for hosting illegal P2P traffic
Unpopular content is difficult or impossible to find	Data on content usage is hard to obtain and of limited accuracy	Bandwidth costs for illegal P2P traffic are high (on average occupies about half of global bandwidth)
Download performance is poor as ISPs restrict P2P bandwidth	Data on content usage is hard to obtain and of limited accuracy	Wish to promote "green ISP services" with licensed content, but few licensed content aggregators

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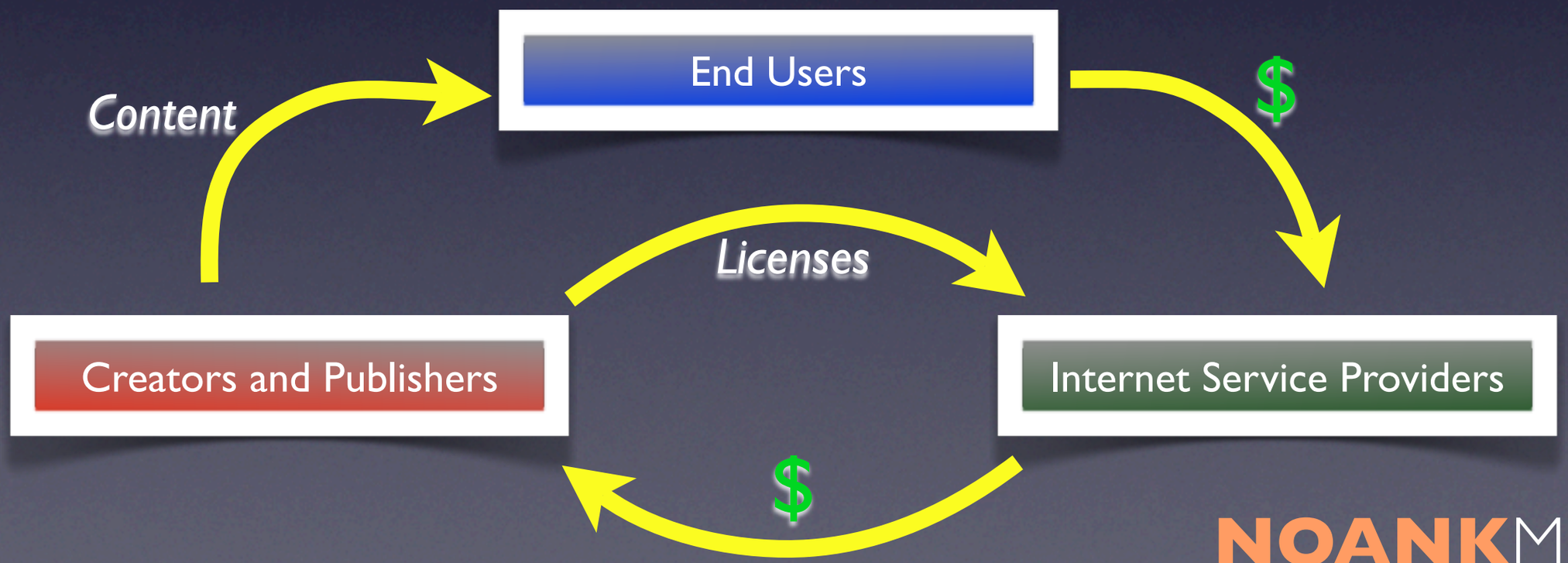
A Grand Bargain

Noank believes the best outcome for all players in this environment is a grand bargain between these three classes of stakeholders.

- Users must pay a small surcharge, but receive unlimited access to non-DRM content
- Creators and publishers give up control and pricing power, but get paid
- ISPs receive licenses and technology to enable caching and reduce utilization

We are building a technology infrastructure to support this bargain.



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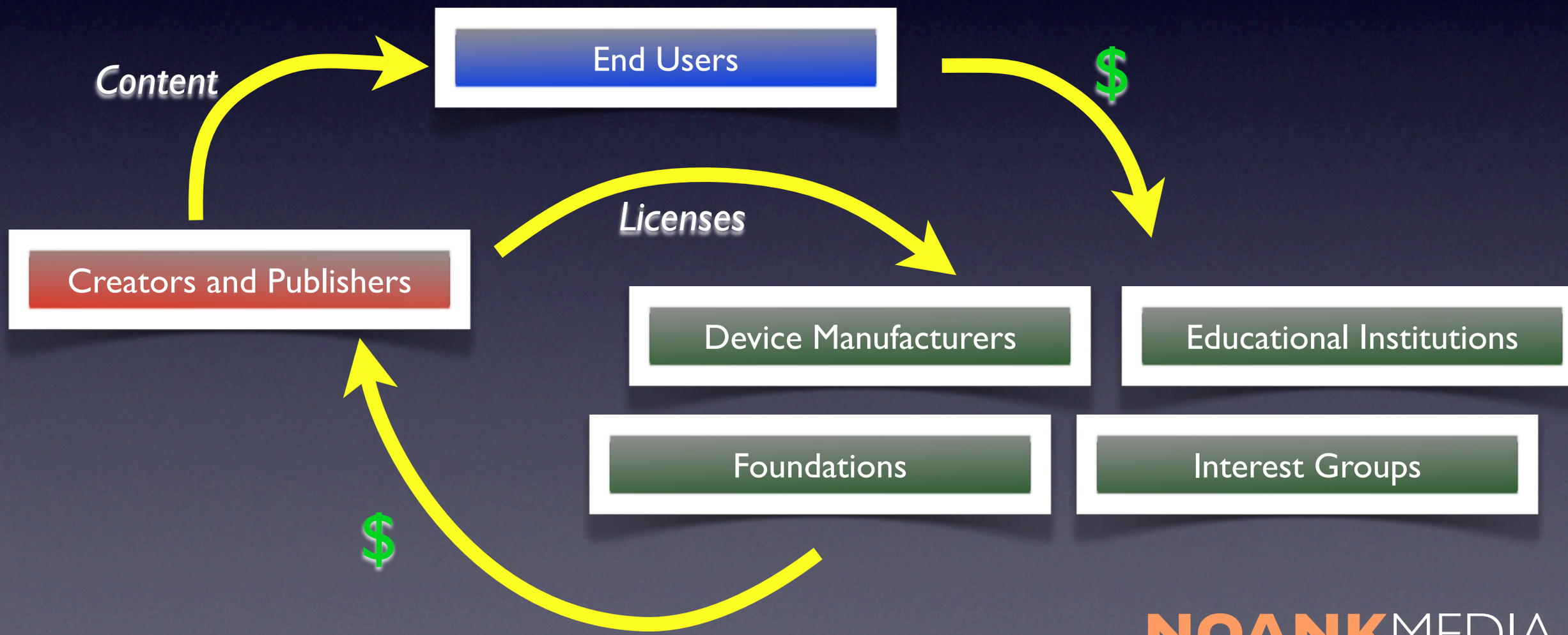
Less Grand, But Still Good, Bargains

Locating an ISP - or government - willing to embrace such a radically different model is challenging. But there are other sponsors who might be interested in enabling the distribution of specific classes of content for specific groups of users.

The Noank solution is designed to enable these transactions as well.



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The **NOANK** Solution:

A Blanket Licensing Engine

- Bundle digital content (music, video, educational content) with services and products that users are accustomed to paying for:
  - Consumer and university **broadband Internet access**
  - **Devices** (mobile phones, MP3 players, etc.)
  - **Almost anything else** for which a fee can be charged (e.g., theme park tickets, concert tickets, etc.)
- Make the content "feel free" to users, with easy access through multiple interfaces, and no DRM or other restrictions
- Collect a content fee from ISPs, device manufacturers, etc., and distribute a pro-rata share of that fee to each copyright owner based on detailed consumer usage data that Noank collects

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Ito's Continuum

Open
Free-as-in-beer

Closed
Retail Sales

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Technological Vision

Noank is developing a **general purpose** blanket licensing technology infrastructure to enable both grand and good bargains. Major goals include:

- Manage licensing of content across many blanket licensors in many territories
- Manage metadata for content in multiple languages
- Provide an open API to metadata, allowing third parties to connect licensed users with licensed content
- Collect accurate usage data for payment of content owners, while simultaneously protecting user privacy
- Provide a means for ISP customers to legally cache content
- Limit leakage of content to non-licensed users

Technology Overview

The Noank system consists of four major subsystems:

- **Licensing and Metadata Registry**
- Authenticated P2P Network
- Usage Counting Subsystem
- User Interface Components

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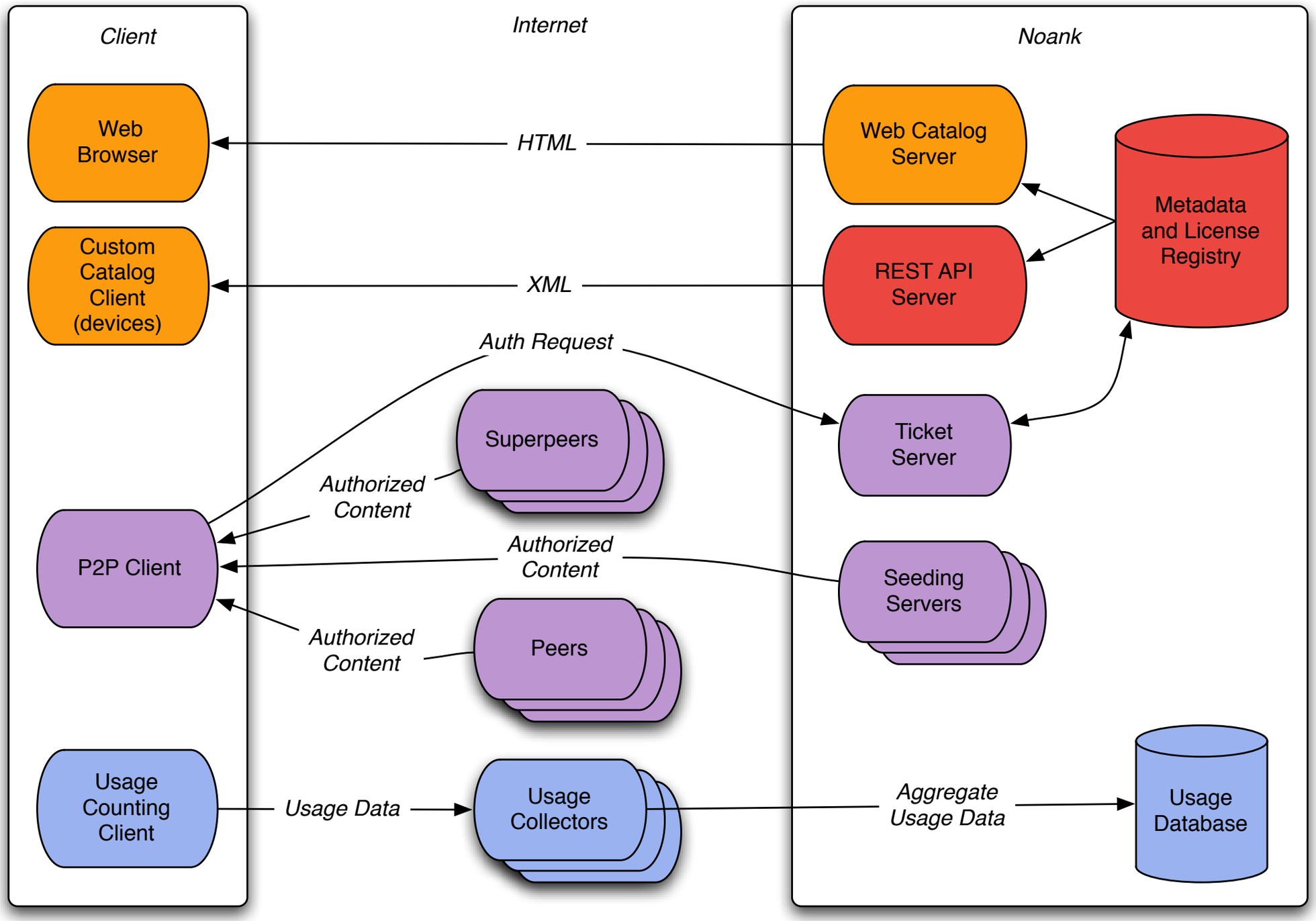
The Block Diagram



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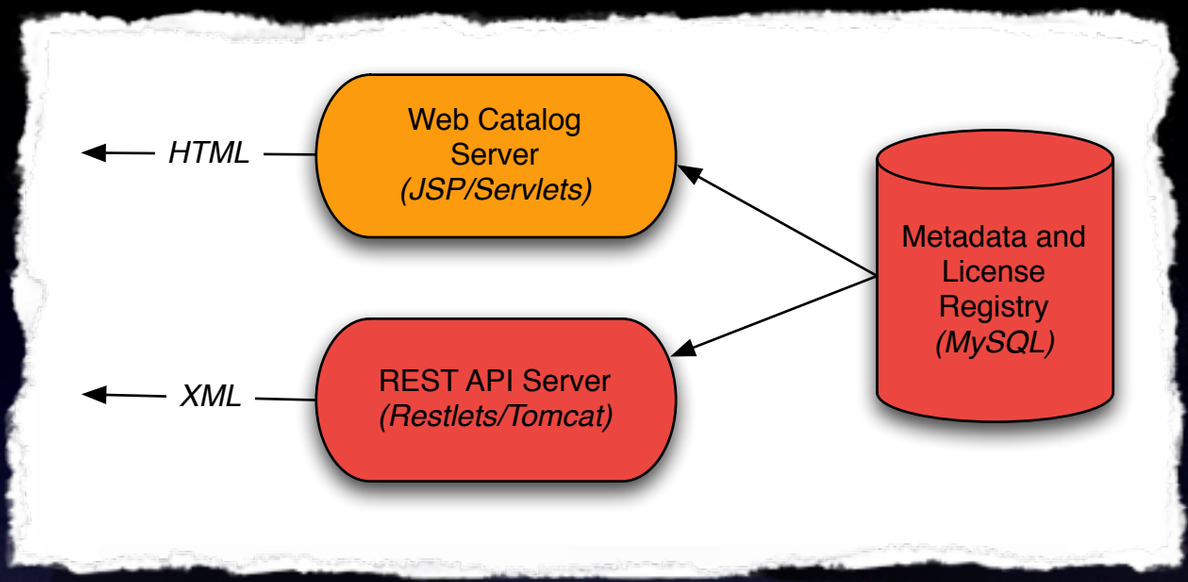
Registry



- Content catalog can be represented with standard HTML in a browser, or with an XML API
- RESTful API with flexible XML representation
- Licensing model designed for all media, all territories
- Support for metadata in multiple languages
- Flexible hierarchical, multilingual tagging
- Supports user profiles and social networking features

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Registry: Data Model Notes

- Focused on licensing data - prefer to leave domain-specific and subjective metadata to specialists (MusicBrainz, OpenLibrary)
- Supports CC, Noank, and Public Domain licenses
- Licenses are more complicated than CC licenses as they have terms, territories
- Ownership of rights can be split among multiple owners, across multiple territories
- Single Agent entity for both creators and consumers of content -- “everyone can be a creator”
- Basic social networking data

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Registry: API Notes

- RESTful design (PUT as well as GET)
- Core entities with URL's are Items, Collections, Agents, Tags and Groups
- Subordinate entities make sense; "instances" (files) are subordinate to Items
- Evaluated a number of existing representation options (microformats, Yahoo! media, PBCore, etc.) but reluctantly wound up rolling our own XML

Registry: API Example

Mozilla Firefox

http://feilio.com/items/audio/62095

Google

Getting Started Latest Headlines Noank Media - Inbox... WebSVN - dmx - Rev...


```
- <item cdt="2007-10-26" class="audio" dmxID="62095" mdt="" xml:lang="en"
  xsi:noNamespaceSchemaLocation="../schemas/dmx.xsd">
    <title xml:lang="en">Pop Culture to Democracy</title>
  - <titleAltList>
      <alt xml:lang="zh-hans">通俗文化与民主政治</alt>
    </titleAltList>
    <duration>0</duration>
  - <description>
      Steve Schultze discusses the convergence of pop culture with political action as it creates a new, networked form of participatory
      democracy. The discussion is a primer for the Beyond Broadcast 2007 Conference that will take place on February 24th at MIT.
    </description>
    <territory>USA</territory>
    <downloads>0</downloads>
    <favorites>0</favorites>
    <avgRating>0.0</avgRating>
    <contentLang dmxID="123">English</contentLang>
- <roleList>
  - <roleAssignment dmxID="2002">
      <roleName>Host/Moderator</roleName>
      <roleAgent dmxID="62000" href="/agents/62000">Berkman Center for Internet & Society</roleAgent>
    </roleAssignment>
  </roleList>
- <tagList>
  - <parentTag dmxID="1">
      <parentName>Subject</parentName>
    - <parentTag dmxID="6">
        <parentName>Social Sciences</parentName>
        <tag dmxID="58">Sociology</tag>
      </parentTag>
      <tag dmxID="7">General Education</tag>
    </parentTag>
  - <parentTag dmxID="110">
      <parentName>Educational Resource Type</parentName>
      <tag dmxID="112">Lesson</tag>
```


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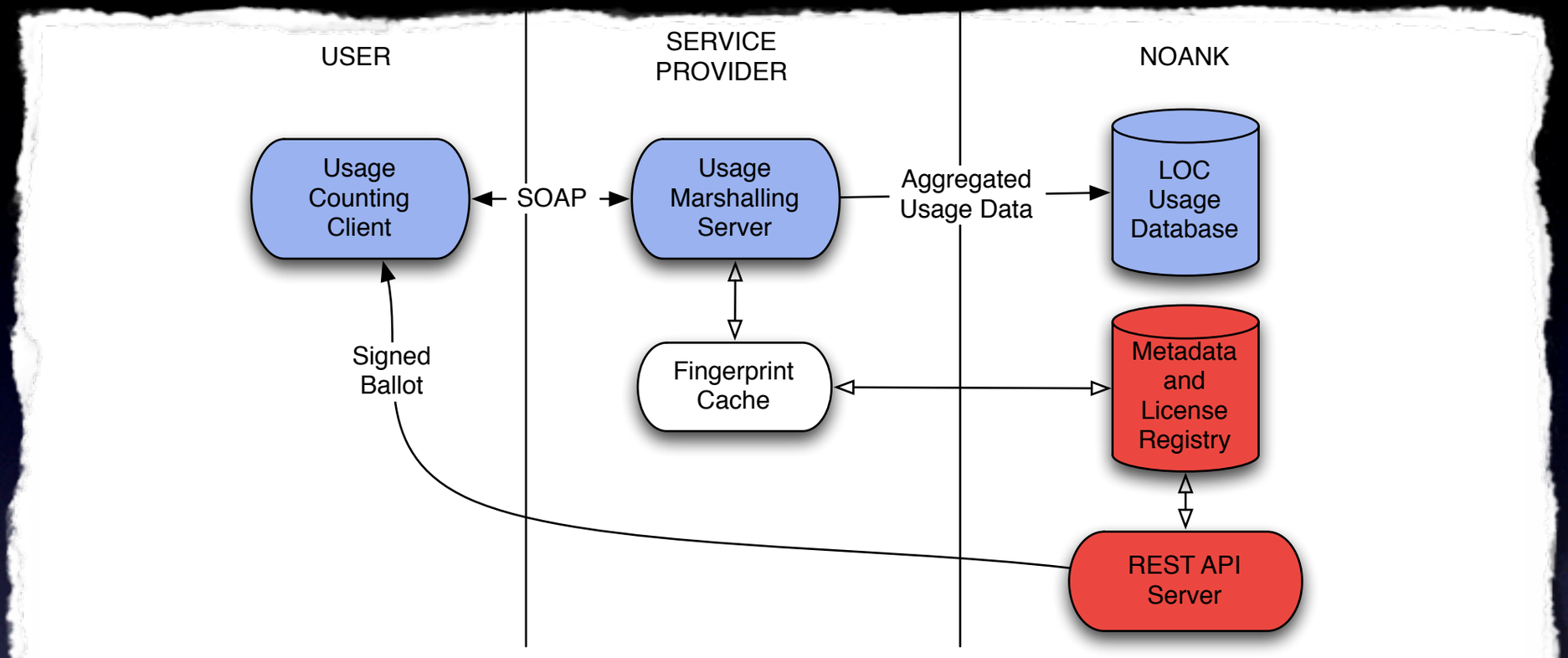
Usage Counting System



- Uses encrypted ballot to validate usage reports -- "One user, one vote" limits the risk of gaming
- No user-identifiable data is reported; IP addresses are dropped
- Demographic data is maintained

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Usage Counting System: Notes

- UCS Client monitors media file access at the driver level
- Various heuristics to identify actual media consumption versus other sorts of file access
- To ensure the most accurate revenue distribution, Noank **collects data on actual usage (not just P2P traffic flows)** in near real-time
- Noank **counts uses in any player application** (e.g., iTunes, Windows Media Player, etc.) without a plug-in
- Technology tracks not only whether a song is played, but **how much of the song and which portions,** accurate to with a few seconds
- Currently Windows XP/Vista only

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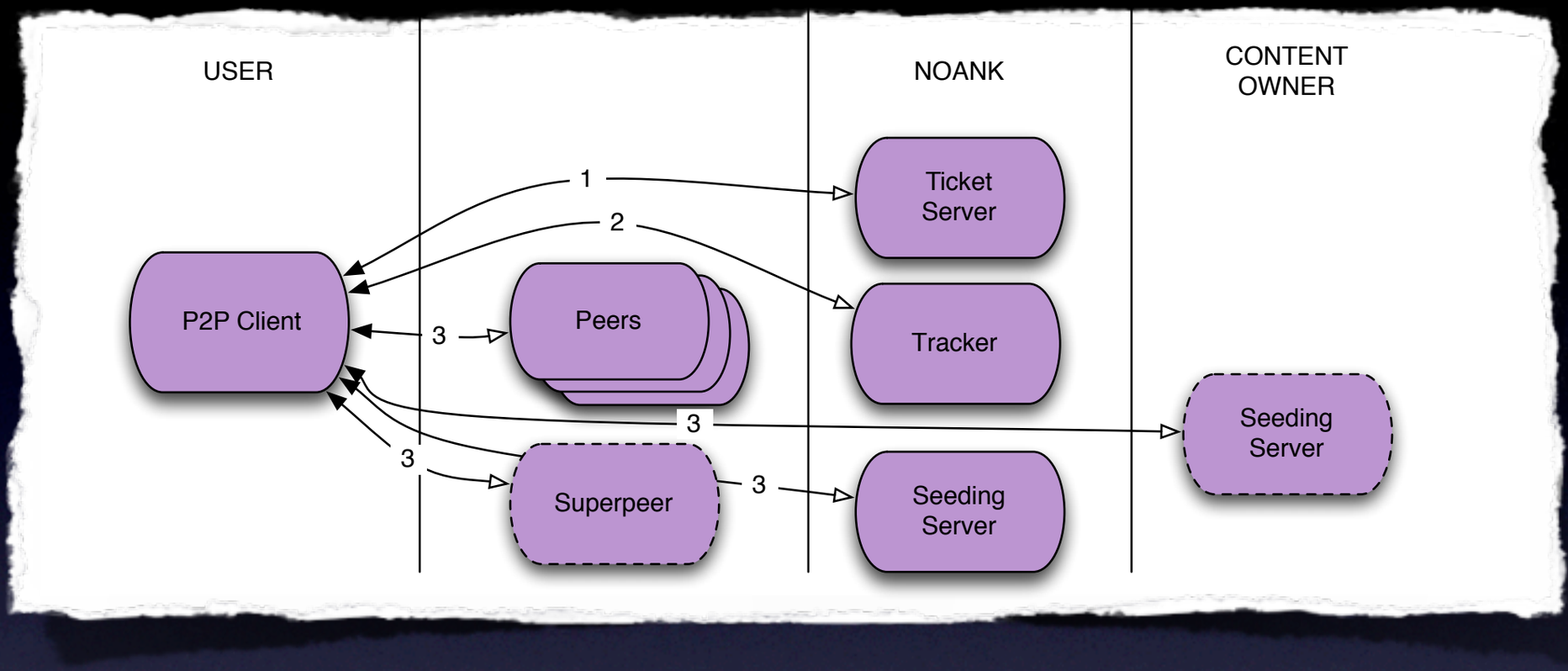
P2P System



- Based on BitTorrent protocol
- Key extension to protocol: use of a centrally-generated authentication token to verify that a given client has a valid license for the software
- Content can be hosted by Noank or by content owner
- "Superpeers" allow ISPs to cache popular content locally

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P2P Clients

- Simple "Accelerator" client for Chinese trial deployment
- Mozilla plugin for integration with Firefox, Songbird, etc.
- Full-fledged BT client with all the bells and whistles, based on an open-source client

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