4 Communities, the Web and Multimedia

4.1 Evolution of the Web
4.2 Social Networks and Social Media
4.3 Web Content Aggregation and Integration
4.4 Virtual Worlds in the Web
4.5 Embedded Social Media

Literature:

T. O’Reilly: What is Web 2.0: Design Patterns and Business Models for the Next Generation of Software. 
The Key Idea of the Web

  “CERN is a model in miniature of the rest of the world in a few years time.”

- Discussions on Mosaic browser, 1993:
  “I ... made my now-standard case for making the Mosaic browser an editor, too. Marc [Andreessen] and Eric [Bina] explained that they had looked at that option and concluded that it was just impossible.”
  (Weaving the Web p. 77)

- Tim Berners-Lee on the future of the Web:
  “My hope and faith that we are headed somewhere stem in part from the repeatedly proven observation that people seem to be naturally built to interact with others as part of a greater system.”
  (Weaving the Web p. 223)
Generations of the Web

- **Web 0.5**
  - 1988-1995
  - Only predecessors of WWW exist

- **Web 1.0**
  - 1996
  - Static HTML pages, few publishers - many readers

- **Web 1.5**
  - 1996-2001
  - Dynamic Web pages, E-Commerce

- **Web 2.0**
  - 2005?
  - Collaboration, communities
  - Openness, standardization, liberty
Web 2.0 Meme Map

- Flickr, del.icio.us: Tagging, not taxonomy
- PageRank, eBay reputation, Amazon reviews: user as contributor
- Blogs: Participation, Not publishing
- BitTorrent: Radical Decentralization
- Gmail, Google Maps and AJAX: Rich User Experiences
- Google AdSense: customer self-service enabling the long tail
- Wikipedia: Radical Trust

Strategic Positioning:
- The Web as Platform

User Positioning:
- You control your own data

Core Competencies:
- Services, not packaged software
- Architecture of Participation
- Cost-effective scalability
- Remixable data source and data transformations
- Software above the level of a single device
- Harnessing collective intelligence

Trust your users
Small Pieces Loosely Joined (web as components)

The Long Tail
Data as the "Intel Inside"

The perpetual beta
Software that gets better the more people use it

Play
Rich User Experience

Hackability
The Right to Remix "Some rights reserved"

Emergent: User behavior not predetermined
Granular Addressability of content

Tim O'Reilly
What is the Meaning of „Web 2.0“?

  – Tim O’Reilly, Dale Dougherty
  – Similar conference titles exist, e.g.: “Where 2.0” (geospatial web)

• Basic question for the conference:
  – Which ideas have survived the burst of the dot-com bubble?
  – Creating the next wave out of the remains of the last

• “Web 2.0” has become a “buzzword”
  – Extremely rapidly...
  – There is no agreed definition

• The conference lives on – or not?
  – Web 2.0 Summit (http://www.web2summit.com)

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WHAT WE HATH WROUGHT will give us a forecast of the interconnected world in 2040, then work backwards to explain how the personal, economic, political, and technological strands of this human narrative have evolved from the pivotal moment in which we find ourselves now.

John Battelle: Truth is, we’re not going to do the Web 2 Summit [in 2012], and I’m writing this post to explain why. For the most part, it has to do with my book...
Two Aspects of Web 2.0

• Social Aspect
  – Collaboration
  – User-Generated Content

• Technical Aspect
  – Huge bandwidth, therefore graphics, audio, pictures, videos…
  – Web browser as a universal platform for application software
  – Increasing interactivity in the browser
    » Presentation based on server-side data (e.g. PHP, JSP, JSF)
    » Direct response to user reactions (JavaScript, Flash, Silverlight, …)
    » Asynchronous interaction (Ajax)
    » Real-time data (Reverse Ajax, Comet)
## Comparison by Examples

<table>
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<th>Web 1.0</th>
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</table>
Web 2.0 Principles

- Web 2.0 is about harnessing collective intelligence!
- Reach out to the entire Web, to the edges and not just the center, to the long tail and not just the head.
- The service automatically gets better the more people use it.
- Network effects from user contributions are the key to market domination in the Web 2.0 era.
- Web 2.0 companies build value as a side-effect of the ordinary use of their application.
- The race is on to own certain classes of core data (e.g. location, identity, calendaring, product identifiers)
- Consequences for software development:
  - Software will cease to perform unless it is maintained on a daily basis
  - Users must be treated as co-developers
  - Lightweight programming models and loose coupling are needed
  - Design for remixability
2.0 Everywhere!

Internet-Protest gegen Online-Überwachung

Buch von Angelika Fleckinger 2011
The Long Tail

- Clay Shirky 2003, Chris Anderson 2004:
  - “The future of entertainment is in the millions of niche markets at the shallow end of the bitstream” (Anderson)
- Business models for online sales:
  - Can create large revenue out of low individual sales for many niche products
  - Driven by low production and distribution costs
- Theory under discussion
  - Alternative: Pareto distribution
    20% of products give 80% of sales volume
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Literature:

Eigner/Leitner/Nausner/Schneider: Online-Communities, Weblogs und die soziale Rückeroberung des Netzes, Nausner & Nausner 2003

C. Stöcker: Die Zeit der Kopfjäger, Spiegel-online.de, 1. August 2006

Brian Solis: The Essential Guide to Social Media
Social Networks, First Generation

- College traditions:
  - Class listings, alumni listings, freshman listings
  - Personal profiles
  - Keeping in touch (classmate reunions)
- 1995: Classmates.com
  - German version: stayfriends.de
- Many similar platforms
  - E.g. facebook.com
Social Networks, Second Generation

- From documentation of existing relationships to creation of new relationships
- General platform for self presentation
  - Easy way to personal homepage
- Examples:
  - MySpace.com
  - Friendster.com
  - StudiVZ.de
  - Xing.com (OpenBC)
- Establishment of “friend” link by mutual agreement
- Tracing of social network
  - 2nd degree contacts
  - Former colleagues

Quelle: netzeitung.de

spiegel.de, 11.06.2012
Example: facebook.com (1)

- **History:**
  - Mark Zuckerberg and friends, Harvard, October 2003:
    » Facemash: Comparing student photos
  - Mark Zuckerberg, February 2004:
    "The Facebook" for Harvard students
  - Stepwise expansion to other colleges and high schools
  - Sept, 2006: Open to everybody of age 13 and up

- **Popularity:**
  - Over 800 million active users (November 2011)
  - Alexa.com traffic rank:
    » Sept. 2006: Traffic rank
    » Nov. 2012: Traffic rank (rank 2 in Germany, rank 1 in 16 countries)
  - Still high user growth
Example: facebook.com (2)

- One billion monthly active users as of October 2012.
- 584 million daily active users on average in September 2012.
- 604 million monthly active users who used Facebook mobile products as of September 30, 2012.
- Financial side:
  - 2007: Microsoft buys 1.6% share for $240 million
  - September 2009: First time positive cash flow
  - Value estimate 2010: $41 billion, 2011: $100 billion
  - IPO: May 2012, market capitalization $104 billion
  - Offering price per share was $38.00
  - Current price (Nov 12): around $26 (nasdaq.com)
- Open question: Business model

http://newsroom.fb.com/Key-Facts
http://forbes.com
Social Networks, Third Generation

- Battle for market share
  - Currently clearly led by facebook
- Integration of all communication services onto a single platform
  - Logical layer above email, chat, SMS etc.
Social Media

• Media consisting of user-generated (multimedia) content
• Classics: Flickr.com (photo), YouTube.com (video)
• Tagging
  – By originator
  – By others
  – Folksonomy
  – Tag clouds
• Comments
  – Discussion
  – Feedback
• Ratings
• Automation
  – Most recent, most popular
Social Bookmarks

• Organizing Web content:
  – Hierarchical directories, taxonomy:
    » Gopher, Yahoo
  – Personal bookmarks
    » Retrieval problem, metadata
  – Sharing platform for links to information in the Web
  – Classics: Del.icio.us, digg.com, spurl.net, furl.net (with archive)

• Tagging:
  – Adds a semantic dimension to Web search

• Browser extensions for keeping personal bookmarks on server

• Digg effect:
  – Small web sites becoming quickly popular – overload situations

• Overview paper (found via del.icio.us...):
  – http://www.dlib.org/dlib/april05/hammond/04hammond.html
Weblog, Blog

**Definition:** A collection of chronologically (backwards) ordered, regularly added contributions to an umbrella topic. (adapted from Ebner/Baumann/Krcmar)

- **Technical view:**
  - Simple content management system, often push notifications (RSS feed)
- **History:**
  - First online diary by Simon Gisler 1994 (according to Wikipedia)
  - John Barger 1997: Term “Weblog”; Term “Blog” since 1999 (Peter Merholz)
  - Huge popularity since 2002
- **Platforms:** e.g. wordpress.org, blogger.com
  - Links point to individual contribution and are permanent (“permalink”)
- **Variants by media type:**
  - Vlog, linklog, photoblog, moblog
- **Problematic issues:**
  - Borderline between advertisement, propaganda, free speech
  - Law violations, offensive statements
Blog as an “Oscillation Medium”

• Traditional web sites (including online versions of traditional media):
  – Closed content
  – Links mostly internal to web site
  – Plus a few “related links”

• Bookmark collections:
  – Completely open content
  – Only reference to outer location

• Oscillation media:
  – Both closed and open
  – Blog comments on a link and contains external links
  – Reader is “oscillating” between open and closed reading
    » Shall I follow the link?
    » Shall I read on?
  – Hypertextuality as a media creation force

From Eigner et al. p. 119
Reading and Writing, Talking and Listening

- Traditional cultural techniques: writing and reading
  - Mostly separated activities

- Blogging:
  - Writing as a continuation of reading (external trigger)
  - Reading as a continuation of writing (e.g. reading comments)

- A new cultural technique? (Eigner et al.)
  - Reading-writing-reading-writing-…

- Publishing in a blog is not speaking to an audience but spreading a message
  (Brian Solis)
  - Listening, participation
  - Dynamic creation of audiences (and influence)
  - Self-organizing cultures
Diversity of Blog Topics

What Topics Do You Blog About?

- Personal musings
- Technology
- Politics
- News
- Business
- Computers
- Travel
- Music
- Religion/spirituality
- Science
- Health
- Film
- Environment
- Economics
- Television
- Family updates
- Parenting
- Sports
- Gaming
- Finance
- Celebrity
- Real Estate
- Other

Technorati.com State of the Blogosphere 2011
Blog Search

- Blog search engine
  - Combining information from many blogs
  - Including tagging, rating etc.
  - Examples: Technorati.com, blogsearch.google.com
  - Being expanded towards multimedia
    » Counting links from blogs to music albums, videos, movies etc.
Microblogging

- Tumblelog:
  - Relatively unstructured "stream of consciousness"
  - Small bits of information and media

- Simplified blogging platforms
  - Tumblr (2006)
  - Twitter (2006/2007)

- Microblog:
  - Brief updates (text or small media units), published on the Web
  - Submitted through various means, also from mobile devices

- Microblogs built into social Web platforms
  - "Status Update" on Facebook

April 2005: Term "tumblelog"
Real Time Media

- Current main example: Twitter
  - Search, analytics and social networks built around real-time communication
  - Triggering of innovations:
    » Example: Shorthand URLs

- Everything in the world is now real time.
  - Technically, it is no problem notifying the manufacturer immediately if a certain type of shoe is not selling at a certain shop.
  - "Houdini" system used by Obama campaigners
Location-Based Services and Communities

- Driven by mobile networked devices like Smartphones
  - Geographical location through satellite navigation, cellular network, WLAN identification, …
- Long-term research topic (“restaurant finder” example)
  - Trend: Game-like elements to enable crowd-sourced information collection
Pommes Boutique
8.5
Amalienstraße 46
Fast Food

Die Pommes sind wirklich extrem lecker. Sehr interessant sind zudem die reiche Auswahl an verschiedenen Dip-Möglichkeiten. Gerne wieder - hmmm lecker! - Joachim B.

You and 8 friends have been here

Cafe Flower
Amalienstraße 33
Other - Food

Der Koch/Besitzer des Soul Kitchen ist nun hier zu finden. Wer es schon vermisst hat, nichts wie ab ins Cafe Flower!!! - Alexander D.

A new spot in the neighborhood

Zum Koreaner
Amalienstr. 51
Korean - 1 here now
Podcasting

• “History”:
  – Discussed since 2000, massive use since 2003
  – iPod & Broadcasting
  – Word of the year of the New Oxford American Dictionary 2005

• Media file distributed by subscription (paid or unpaid)
  – Playback on computers or mobile devices
  – Mainly audio, partly video information, may be any file technically
  – Automation of download by “feeds” (RSS or Atom)

• Often **User-Generated Content (UGC):**
  – Amateur podcasts
  – Production of audio podcasts has minimal hardware/software requirements
Corporate Blogs and Podcasting

• Companies use blogs and podcasts for:
  – General information on company
  – Brand formation, general public relations
  – Topic blogs, campaign blogs
  – Knowledge distribution and customer service
  – Internal information channels (intranet blogs)
    » Executive blog, team blog

• Problematic issues (for the company):
  – Negative image campaigns (e.g. attac)
  – Confidential or problematic issues discussed openly in internal blogs (e.g. cases of mobbing)
  – Danger of emotional escalations

• Future of communications for marketing (Brian Solis):
  – Listening is marketing. Participation is marketing. Conversations are marketing. […]

Peter Wolff: Die Macht der Blogs, Datakontext 2006
Context-Sensitive Advertisement

• Important source of revenue in Web 2.0 sites
  – Advertisement precisely targeted at customer

• Market leader: Google AdSense
  – Ad server operated by Google
  – Websites register with Google
    » Advertisement placed based on analysis of content of page to be shown (Javascript)
    » Generate revenue per click or per thousand impressions
  – Selection among relevant ads and order of ads by real-time auction
    » Ads creating highest revenue are shown
    » Using bid price of advertised and quality score of the ad (e.g. Click-Through-Rate)
      » Paid price may be lower than the bid (minimal price to keep position on the list)
  – Advertisers arrange fixed budgets in advance

• See: http://www.google.com/adwords/displaynetwork/control-your-costs/pricing.html
Improper Placement of Advertisement

http://img34.imageshack.us/img34/7545/bilddefault.jpg
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Literature:
R. Yee: Pro Web 2.0 Mashups, Remixing Data and Web Services, Apress 2008
Content Aggregation, Indexing, Curation

• Content aggregation:
  – Combination of content on specific topics from various sources
  – Essential steps:
    Finding content (indexing), filtering content, publishing combined content

• Indexing:
  – May address different types of source (web, blogs, local sources)

• Filtering:
  – Automatic filtering
  – Careful manual selection of content: Curation
  – Community-based automatic filtering (voting, tagging, counts)

• Publishing
  – User-configurable content (personal news)
  – Syndication to other online media
  – Basis for non-online media (e.g. print media)

Curation

Steven Rosenbaum's Curation Nation

"With the explosion of content, curation is the next great frontier."

"Curation Nation is a must-read to succeed in this hyper-connected age where community and contribution is of utmost important to creating value and relevancy."

-Shira Lazar,
Creator / Host "What's Trending" CBS News
curationnation.org
Content Indexing + Automatic Filtering: Examples
News Curation Tools and Services: Examples

newscred.com

storycrawler.com

THE FUTURE OF SEARCH
Curated Content. All at your fingertips.
Video Curation and Aggregation: Example

magnify.net

video.nymag.com
Print Media from Curated Online Content

In May 2010, we conducted a two-day media experiment. 8,000 people signed up, 1,500 submissions came in, 35 editors selected 70 pieces to fill a 60-page magazine.

People liked it. We broke our distributor’s sales records, received positive reviews in The New York Times, PBS, and the Village Voice, and won a Knight-Batten Award for Innovation in Journalism. Here, we present selected work from the print edition of Issue Zero.

48hrmag.com
Content Sources

• Data feeds (XML files)
  – RSS (Really simple syndication)
    » Channels and items
  – Atom, Atom Syndication Format (ASF)
    » Successor for RSS
    » IETF Standard
  – Proprietary file formats

• Database access
  – Often databases specific for application domain (e.g. in a company)

• Public Web Services
  – Access to information provided by large Web sites
  – E.g. Amazon, Google Maps
  – See later for details
Mashup

• Application integrating diverse Web content seamlessly

• Presentation screen and layout:
  – May be based on existing Web site
  – May be created specifically

• General architectural principle:
  – Web sites provide program access (API) over the Internet (Web Services)
  – Several Web Services are contacted and results are evaluated

• Basic alternatives:
  – Client-side mashup
  – Server-side mashup (more frequent)

• Various technologies for transmission/invocation:
  – REST
  – SOAP
  – XML-RPC
Mashup Examples

See programmableweb.com
twistori.com
trendsmap.com
townsoftheworld.com
Web Service APIs

• Example: Flickr API
• Existing methods are grouped in packages
• For each method, allowed parameters are defined
• Often a registration key is required which has to be obtained from Web service provider

flickr.photos.getInfo

Get information about a photo. The calling user must have permission to view the photo.

Authentication
This method does not require authentication.

Arguments

api_key (Required)
Your API application key. See here for more details.

photo_id (Required)
The id of the photo to get information for.

secret (Optional)
The secret for the photo. If the correct secret is passed then permissions checking is skipped. This enables the 'sharing' of individual photos by passing around the id and secret.
REST (Representational State Transfer)

- REST is one of many possible methods to call a Web Service API
- History:
  - Roy Fielding 2000, Ph.D. thesis
    » Analyzes and generalizes architecture of the Web
- Main features which made the Web architecture successful:
  - Identification of resources (in most cases by URIs)
  - Manipulation of resources through these representations
  - Stateless operation of server (regarding application state)
  - Hypermedia as base engine
- Applying REST to Web Services:
  - All resources on the server are identified by URI strings
    » API method plus parameters coded in URI
  - Client uses only standard HTTP methods, mainly GET
  - Response contains clear metadata about the used language and an information body containing hyperlinks (to further resources)
- Atom feeds also provide a REST-based API
Example: REST Request/XML Response

• Request:
  http://api.flickr.com/services/rest/
  ?method=flickr.photos.search&api_key=8c...93
  &tags=puppy&per_page=3

• Response:
  <?xml version="1.0" encoding="utf-8" ?>
  <rsp stat="ok">
    <photos page="1" pages="276125" perpage="3"
      total="828375">
      <photo id="41150XXXXX20" owner="41905YYY@N03"
        secret="13a...1c" server="2638" farm="3"
        title="MY PHOTO TITLE!" ispublic="1"
        isfriend="0" isfamily="0" />
      <photo id="4116JJJ47" owner="225GGG@N08"
        ... />
      <photo id="4176GGG653" owner="45HHHH06@N00"
        ... />
    </photos>
  </rsp>
SOAP and XML-RPC

- Remote procedure call (RPC):
  - Technology to execute a procedure (method) with certain parameter values on a different (remote) computer
  - Various technologies exist (e.g. CORBA, DCOM) outside the Web area
- Web Service Invocation:
  - Invoking a Web Service using Web standards
- SOAP (earlier acronym: Simple Object Access Protocol)
  - XML-based syntax for messaging between applications
  - Independent of transport protocol
  - Web Services are a special application of SOAP
  - W3C standard
- XML-RPC:
  - Similar to SOAP (somehow its predecessor)
  - Transport protocol is HTTP
  - Simpler but limited in functionality
SOAP Example

• From Flickr.com:
  
  ```xml
  <s:Envelope
    xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:xsi="http://www.w3.org/1999/XMLSchema-instance"
    xmlns:xsd="http://www.w3.org/1999/XMLSchema">
    <s:Body>
      <x:FlickrRequest xmlns:x="urn:flickr">
        <method>flickr.test.echo</method>
        <name>value</name>
      </x:FlickrRequest>
    </s:Body>
  </s:Envelope>
  ```

• SOAP makes use of XML namespaces
• Relatively high organizational overhead
• Compare equivalent REST request format

  ```plaintext
  http://api.flickr.com/services/rest/?method=flickr.test.echo&name=value
  ```
XML-RPC Example

• From Flickr.com:

```xml
<methodCall>
  <methodName>flickr.test.echo</methodName>
  <params>
    <param>
      <value>
        <struct>
          <member>
            <name>name</name>
            <value><string>value</string></value>
          </member>
        </struct>
      </value>
    </param>
  </params>
</methodCall>
```

• Simple structure, deep nesting, also large overhead
Conceptual Difference REST vs. SOAP/XML-RPC

• Tradeoff between
  – diversity of method names and
  – complexity of parameter structure

• Simple classical example
  – Special method name: fib
    » Call: fib(13)
  » SOAP style
  – Universal method name: exec
    » Call: exec(fib, 13)
    » REST style (GET is universal method name)

• Programs as data structures
  – Universal interpreter (compare Turing machine)
  – Basic idea of all current computer technology
API Kits

- Requests are constructed and responses are evaluated in scripts
  - Mostly server-side scripts, e.g. PHP
  - Constructing a request in PHP:
    $content = file_get_content($url);
  - Evaluating the response:
    XML parsing is standard part of PHP since version 5
- Simplifying development for specific API: API Kits
  - Example: phpflickr.com
  - "Wrapper" around API functions and invocation
  - Direct PHP call to required functionality
  - Response processed and data array returned
    - Example functions: `people_findByUsername()`, `getPhotos()`
Yahoo Pipes

- Example of a tool (Web application itself) for data mashup development:
  - Interactive feed aggregator and manipulator
- Graphical environment to
  - Fetch data from source
  - Extract data
  - Apply filters
  - Apply simple programming tools
HTML5 Geolocation API

- Very simple high-level JavaScript API to deal with geolocation
- Implementation automatically uses best available information source
  - GPS for mobile devices if available
  - GSM/CDMA cell
  - WLAN/Bluetooth/IP data
- Getting a position:
  - `navigator.geolocation.getCurrentPosition(successCallback, errorCallback)`
- Reading out location:
  - `function showMap(position) {
      // Show a map centered at
      (position.coords.latitude, position.coords.longitude).
  }`
- Supports “one-shot” requests as well as continuous updates
Screenscraping

- Technically the following is possible ("Screenscraping"):  
  - Send HTTP request from server script to a Web site  
    (even if it does not offer a Web Service API)  
  - Analyze the returned HTML code  
  - Proceed depending on the result  
- The script simulates a human person using a Web browser  
  - "Web Robot"  
  - Frequently used by search engines  
- Most Web site providers do not agree with automated access  
  - Dangerous in particular in the area of authentication  
  - Recommendation:  
    Check Terms of Use carefully, or better refrain from Screenscraping
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Virtual Worlds

• Online communities and online games are merging
  – Example World of Warcraft

• Non-Game online communities with virtual world
  – Old idea, see
    » Gibson: Neuromancer
    » Stephenson: Snow Crash
  – Was tried several times, but this time a bit more successful...

• Secondlife.com
  – Created and run by Linden Labs
  – Sixteen million accounts (2009), twenty thousand concurrent users
  – Full virtual environment, avatars, extensive creative tools

• Many simpler virtual worlds
  – E.g. www.habbo.de
    » Virtual hotel for kids
Example: Habbo.de
Second Life

http://video.google.com/videoplay?docid=-5182759758975402950
Second Life and Business

- Large companies are/were using Second Life
  - For meetings, conferences, customer care
  - As sales channel

IBM Conferences, using Opinionator

Infinite Images

- Shai Avidan, Adobe MAX 2008
- see YouTube v=QxNx2OyeCHA
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Literature:
T. O'Reilly, J. Battelle: Web Squared: Web 2.0 Five Years On
(www.web2summit.com/websquared – 2009)
Web 2.0 Five Years On: Web Squared

• Smartphones and other recent/upcoming developments:
  – Collective intelligence increasingly being driven by sensors.
  – Talking to the Web becomes a reality
    » Google Mobile App on iPhone, Siri
  – Information shadows, Internet of Things: Web meets World
  – Automatic geo-tagging of pictures (GPS built in cameras)
  – Face recognition built into photo archiving software
  – Object recognition via smartphone camera

• Key competency of the Web 2.0 era: Discovering *implied metadata*

• Systematic identities/primary keys:
  – Being replaced by clever recognition mechanisms (cf. CDDB/Gracenote signature of CD)