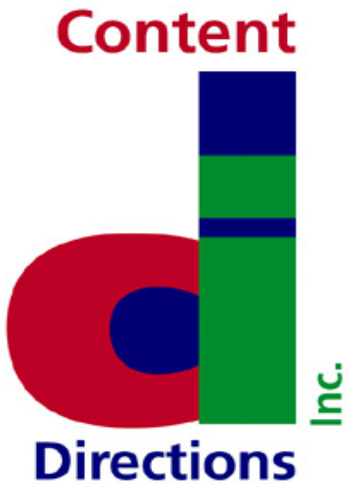
What is the Digital Object Identifier (DOI)?

June 2003

DOI: http://dx.doi.org/10.1220/presentation1

Live Customer Examples: http://dx.doi.org/10.1220/demo21



David Sidman, CEO

(dsidman@contentdirections.com, 212-792-1847)

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CDI's Mission

- CDI enables companies to make more money from the Internet by better linking their customers and business partners to their information and services.

- The mechanism we use for this is the Digital Object Identifier (DOI), a linking system developed by the primary inventor of the Internet itself, and which represents the "Next-Generation URL"

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What CDI Does for You

NO MATTER WHAT BUSINESS YOU ARE IN…

- **More people will find your products on the Internet**
  - (and within your enterprise, if authorized)
  - Your products will be discovered via Search Engines, Partner Web sites, Reviews, Email blasts, Embedded within Content itself, etc.
- Once people do find your products, **you can always bring them directly to whatever you want**
  - Purchasing
  - Other transactions
  - Product information
  - Related products
  - Selected business partners
- Further, **these links are always current, permanent** (they never go out of date), and **rich in functionality** (the customer sees all the options you want them to – wherever the DOI appears)

The Digital Object Identifier

A universal linking technology for intellectual property both across the Internet and within enterprises

- Unbreakable
- Multi-linkable
- Dynamic
- Industry standard
- Scalable
- Low-cost to implement

…DOIs are URLs on steroids

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What is the DOI?

"The DOI is like the UPC (Bar Code), but for objects on the Internet."

Two aspects:

1. **Uniquely Identifies the Object -** therefore enables computers to interoperate about it and execute transactions of all kinds.
2. **Provides Linking to the Object Itself** (or to any related objects, transactions or services). These links are:
   - Permanent
   - Dynamically maintainable
   - Capable of one-to-many routing
   - Capable of supporting new applications over time

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#1 - Unique Object ID

- Applies to any type or format of object
  - text, music, film, video, photographs, software, database record, certificate…
- Applies at any level of granularity or specificity
  - whole book/individual chapters, music collection/individual tracks, software programs/individual routines, products/components…
- Compatible with (superset of) every other numbering scheme (UPC, ISBN, GUID, Social Security #, CUSIP…)
- Permanent. (Once assigned, never changes. "A DOI is Forever.")

- Why is a unique ID so important for transactions?

(UPC/Bar Code example…)

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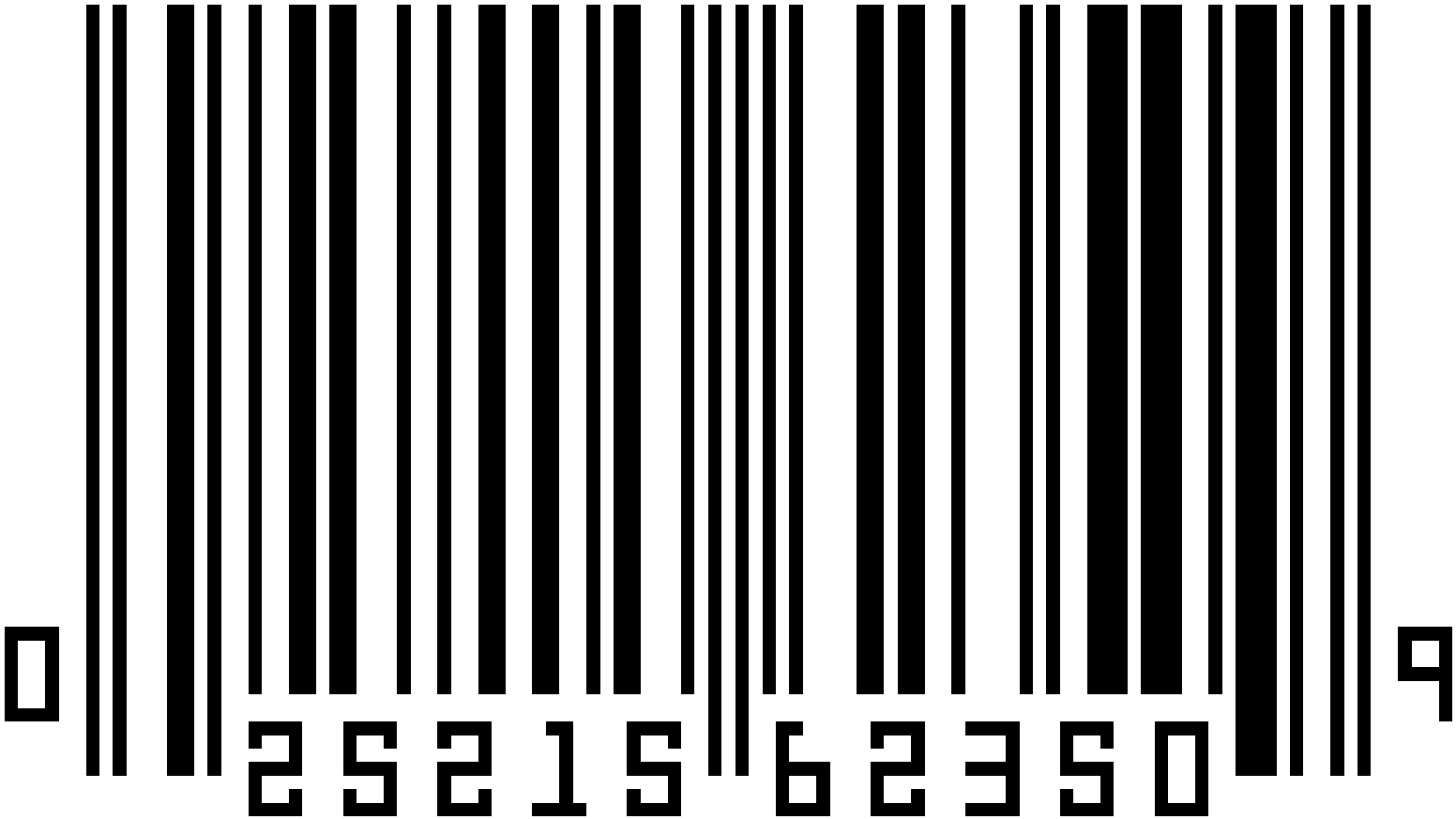

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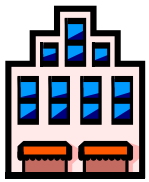
The UPC (bar code):
more than just a quick way to get through the checkout line



Store

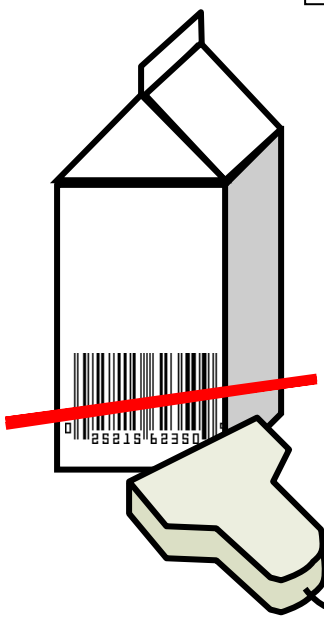
Receiving

Manufacturer

Distributor

Just-in-Time Ordering

Inventory computer



Cash register

Financial systems

Head Office

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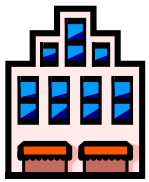
The UPC:
more than just a quick way to get through the checkout line



Store

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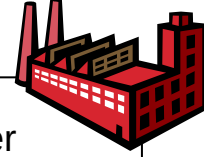
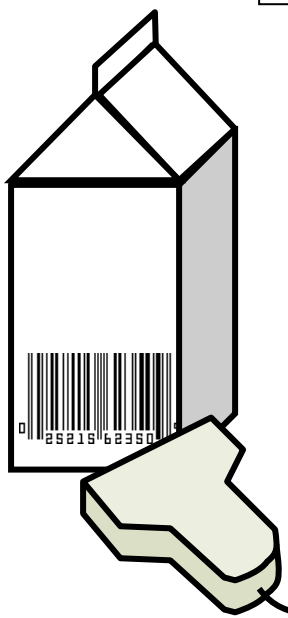


Just-in-Time Ordering

Inventory computer



Cash register

Financial systems

Head Office

Unique product identifier also used across supply chain for:

- Billing/Payments
- Sales Tracking
- Financial Reporting
  - # goods shipped
  - sales by store or region
- etc.

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So in the physical world, a Unique Identifier:

- enables all kinds of automated transactions (selling, distributing, transporting, etc.)

- facilitates inventory control, financial tracking, reporting

In the online world, content has no physical inventory, transportation, or physical logistics. But:

- There is a fully analogous, if not more complex, chain of transactions and systems which must interact to facilitate sale, distribution, copyright protection, re-use, etc.

- Like any other computer systems, these systems require a unique, unambiguous ID - so they know exactly what object they're talking about.

- Like any other computer systems, these systems must share that ID universally if they are to talk to each other - successfully, reliably, and cost-effectively

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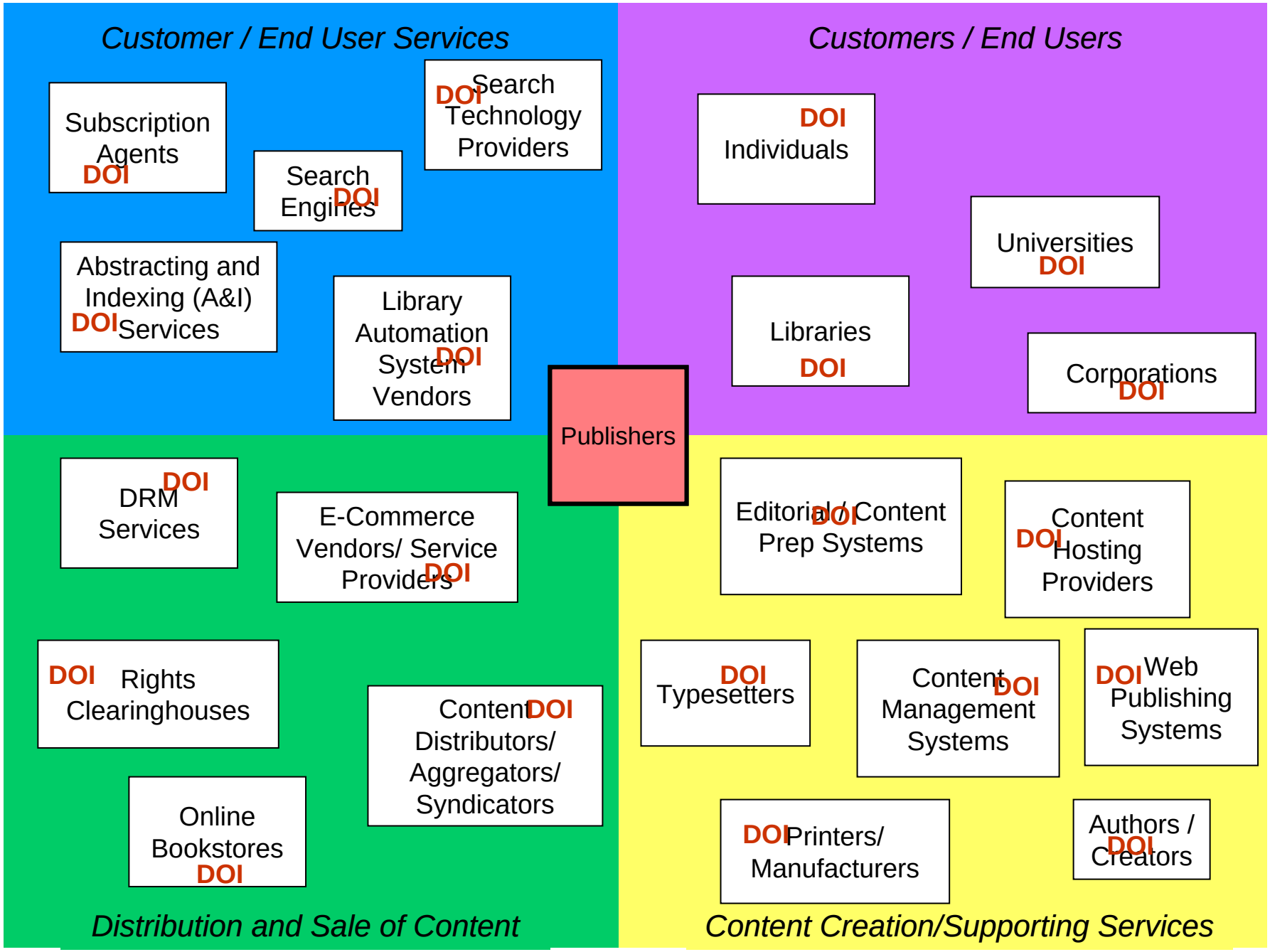
Customer / End User Services
Subscription Agents
DOI
Search Technology Providers
DOI
Search Engines
DOI
Abstracting and Indexing (A&I) Services
DOI
Library Automation System Vendors
DOI
Customers / End Users
Individuals
DOI
Universities
DOI
Libraries
DOI
Corporations
DOI
Publishers
DRM Services
DOI
E-Commerce Vendors/ Service Providers
DOI
Rights Clearinghouses
DOI
Content Distributors/ Aggregators/ Syndicators
DOI
Online Bookstores
DOI
Distribution and Sale of Content
Editorial/ Content Prep Systems
DOI
Content Hosting Providers
DOI
Typesetters
DOI
Content Management Systems
DOI
Web Publishing Systems
DOI
Printers/ Manufacturers
DOI
Authors / Creators
DOI
Content Creation/Supporting Services

#2 – The Next-Generation URL

- A central directory provides a level of indirection between the ID and its location(s) or services
- Analogous to DNS: a single directory logically, but distributed physically
- All broken links can be fixed via a single update
- New destinations can be added at will
- Linking is now one-to-many (“MultiLinks”)
- MultiLinks are always up-to-date; never stale
- Via CDI’s implementation, these links can serve needs locally as well as globally (e.g. linking within a Library environment or Intranet)

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Why a Persistent Identifier?

URLs are not sufficiently reliable

	http	gopher	ftp	Total
Number of journals	33	26	2	
URLs listed	81	36	29	148
% functional	67%	28%	31%	50%

Data from Ford& Harter, College and Research Libraries, July 1998

Brewster Kahle (1997): half life of a URL = 44 days
OCLC (2002): 20% of public websites from 9 months ago are now gone
SnapNames (2002): # of expiring domains now exceeds those new/renewed

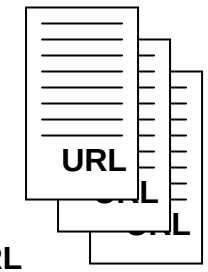
URL

URL

URL

URL

URL



URL

URL

URL

URL

URL

URL

Content

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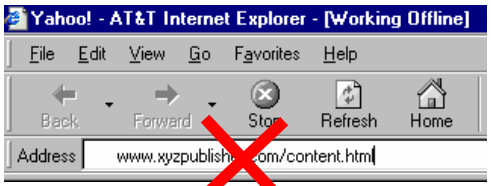
URL

URL



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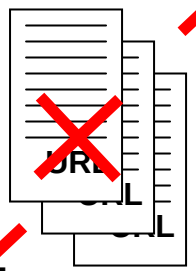

URL

URL

URL

URL

URL

URL

404
File not found

Content

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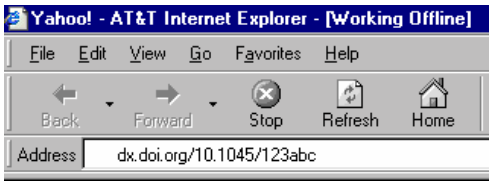
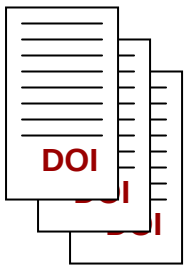
DOI

DOI



DOI DOI DOI



DOI DOI DOI

DOI DOI

DOI DOI DOI

Publisher

DOI directory

Content

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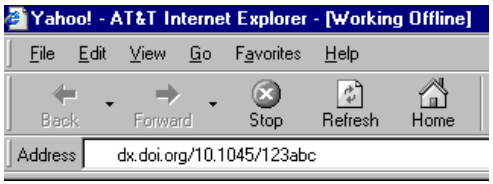
DOI

DOI



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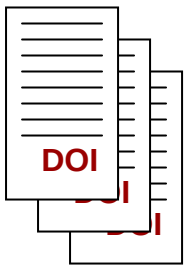


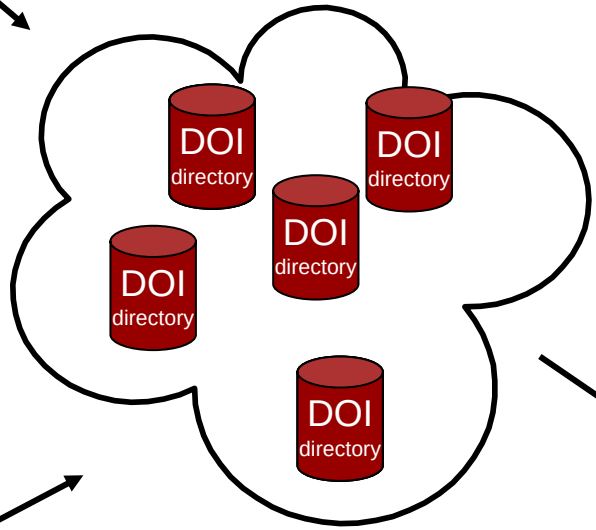
DOI DOI DOI

DOI DOI

DOI DOI DOI

Publisher

Internet



Content

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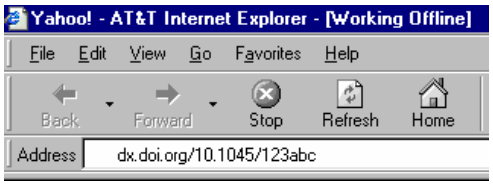
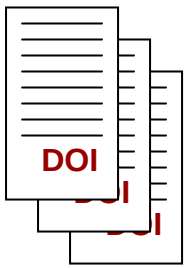
DOI

DOI



DOI DOI DOI



DOI DOI DOI

DOI DOI

DOI DOI DOI

DOI directory

Publisher

CDI Multi-Linking

- purchase content
- get metadata
- get price quote
- request rights clearance
- request permissions

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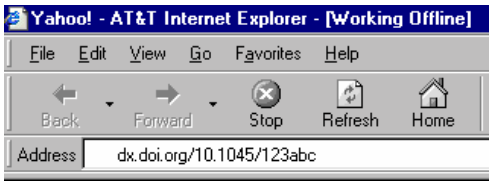
DOI

DOI



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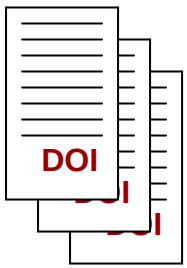

DOI DOI DOI

DOI DOI

DOI DOI DOI

DOI directory

Publisher

CDI Multi-Linking

- purchase content
- get metadata
- get price quote
- request rights clearance
- request permissions

Bookstore

Bookstore

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* * * Live Examples * * *

available on the Web at

http://www.contentdirections.com

For demos click links under “See the DOI in Action”

For live Customer Examples click “Live DOIs”

or click on the following DOI itself:

http://dx.doi.org/10.1220/demo21

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What CDI Does: Full Range of Services which Guarantee Customer Success

- Enable registration of DOIs on Internet (1st Commercial DOI Registration Agency)
- License software for internal-only registration
- Provide value-added tools for registration, DOI management, and look-ups
- Automatically cross-link related content (by same author, on same subject, etc.)
- Provide consulting and implementation services
- Help local organizations to use publishers' DOIs to service their own site-specific needs

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Underlying Technology for the DOI

- Developed by CNRI (Corporation for National Research Initiatives - non-profit, federally-funded research organization based in Reston, VA)
- Run by Dr. Robert Kahn, one of principal inventors of the Internet (co-inventor of TCP/IP & packet switching, builder of the ARPAnet, co-recipient of Nat'l Medal of Technology along with Vint Cerf; serves on the President's Internet Advisory Council)
- CNRI runs, coordinates, or supports many Internet standards bodies: IETF, IAB, etc.
- System is similar to DNS: a distributed global directory, but capable of scaling indefinitely as DOI volumes grow over time
- Commercial adoption since 1997; live & working

Publishing Industry Support

- **Association of American Publishers** (project was initiated by the AAP Enabling Technologies Committee, 1996)
- **International Publishers Association** (IPA endorsed its launch at the Frankfurt Book Fair 1997)
- **STM International** (also endorsed the launch, and has given special support because the STM market was the first to go online)
- **Many individual publishers**, esp. STM Journals but now also textbooks, professional books, trade books, research reports, photos/images, etc.

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Current State of Deployment

- Scientific Journals
  - 200 of the largest international journal publishers funding permanent non-profit DOI tagging operation ("CrossRef"), with 8 million DOIs to date
  - "Killer app:" Cross-linking the world's scientific journal literature, based on a common "DOI Lookup" database
- Information Industry
  - Using DOI to cross-link and cross-sell content from different "silos"
  - Re-using existing assets to drive more revenue from existing customers
  - Developing new/flexible information products more rapidly
  - Making content more discoverable (esp. "The Invisible Web")
- Book Publishers
  - Selling more physical (print) books, not just eBooks
  - Stephen King moves 500,000 eBook copies in 24 hours, but many are pirated
  - AAP/Andersen Consulting "eBook Standards" initiative has declared DOI the identifier of choice for eBooks (November 27, 2000 - see http://www.publishers.org/home/press/monthly.htm#ebook)
- Other Content Industries (Music, Video, Photography, Software...)
- Technology Vendor support: Adobe, Microsoft, Digital Rights Mgmt (DRM) vendors, Content Mgmt vendors, "infomediaries"

1st Real-World Industry Application: CrossRef

- Cross-linking the world's Scientific Journal literature via the DOI
- 200 Publishers now members
- >8 million articles already tagged w/DOIs
- Non-Profit operation (run by PILA - Publishers' International Linking Association)
- Operating under policies/guidelines of the IDF (International DOI Foundation)

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Why CrossRef?

- Enhances the value of primary journal content
  - References all linked, even across journals and (especially!) across publishers
  - Links are permanent
  - Not just links from articles to other articles, but all links in to these articles are now permanent
- Reduces costs throughout the production cycle

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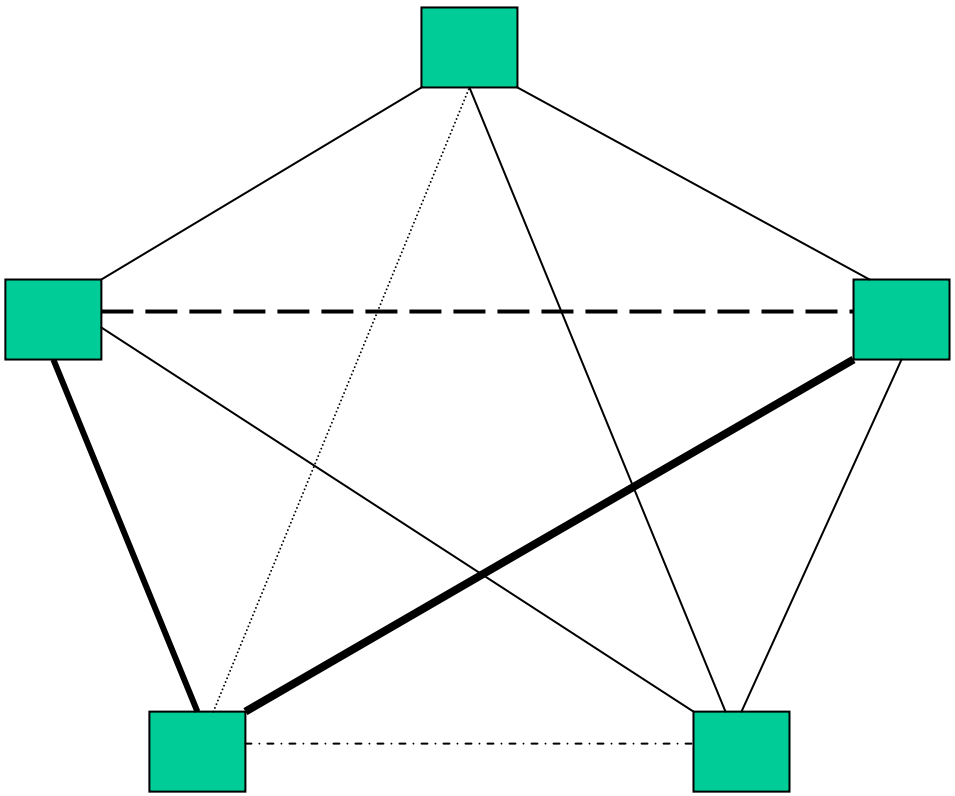
One Example:
Cost of Bilateral linking agreements



Publishers	Agreements
5	10
25	300
50	1225
N	½N(N-1)

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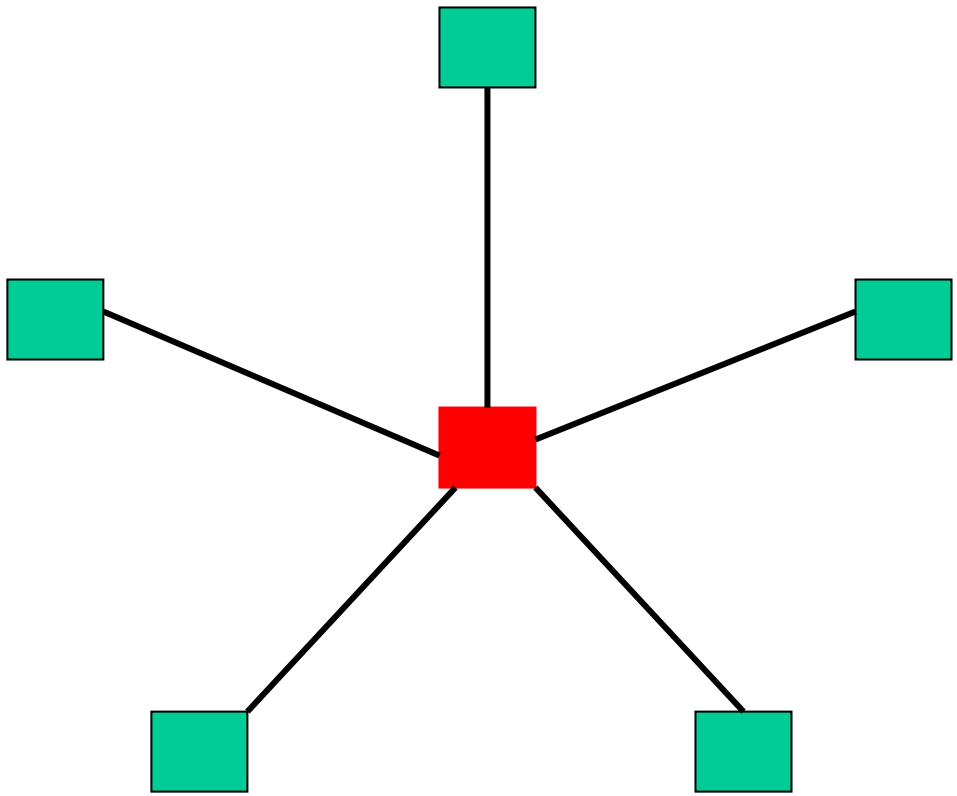
Central linking agreements



Common interchange

N publishers = N links

Same principle applies to:

- Publisher-to-Retailer operations
- Publisher-to-Search Engine relationships
- all other B2B relationships

*** HUGE COST SVGS – FOR ALL PLAYERS ***

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2nd Industry Application: eBooks

Why?

- Advent of new devices (RocketBook, SoftBook, PalmPilot, etc.) now allowing electronic presentation to begin to rival the advantages of print presentation
- Stephen King proved that with the right content at the right price, you can move 500,000 copies in 24 hours
- So Trade Publishers are now trying to publish content online for the first time, and are therefore hitting all the problems that DOI was created to solve…
- …including piracy: many of S. King's 500,000 were hacked and pirated

So:

- On Nov. 27, 2000, the AAP/Andersen Consulting project on eBook Standards announced that the Book sector, led by 7 largest of the largest publishers, would implement the DOI as the identifier of choice for eBook content, along with recommendations on how to implement it, assign metadata (extended ONIX), etc.

Suddenly all trade publishers needed a DOI Registration Agency, and began working with Content Directions (December 2000-present)

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3rd Industry Application: Print Books (and potentially all Physical Products Sold on the Net)

- The DOI is NOT just for digital content: works just as well for selling physical products over the Internet
- Enhances the discoverability of physical product info
- Puts a purchase action a single click away, from anywhere that the user encounters a DOI:
  - on a website
  - in Search Engine results
  - in an email
  - within a downloaded document

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4th Industry Application: Large Information Companies

Information Company challenges:

- Realize more revenue from existing assets
- Develop new products more rapidly
- Manage content better
- Communicate with customers at point of need

- …and do it cost-effectively

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CDI Enables Information Companies to:

- Add value to existing content by cross-linking it with other content
- Cross-sell content from different silos
- Re-use existing digital assets
- Sell content in more discrete “slices”
- Make content more discoverable

Click on the following DOI and read “*Enterprise Content Integration with the Digital Object Identifier: A Business Case for Information Publishers,*” at

http://dx.doi.org/10.1220/whitepaper5

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5th Industry Application: Knowledge Management, Intranets, Library Systems

- Link permanently/reliably to both external AND INTERNAL information
- Manage your information assets within your enterprise
- Permanent accessibility for internal info, regardless of location changes
- Automatic cross-linking of related info
- Direct your patrons to local copies of published information, as well as locally-produced information
- …and do it all cost-effectively

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6th Industry Application: Stock Photos/Images

- With the signing of CORBIS (the giant stock photo house owned by Bill Gates), CDI has entered the market for stock images (DOI for the Mona Lisa: **http://dx.doi.org/10.1219/10223954**)
- The DOI facilitates:
  - External licensing-out of images (for use in advertising, reference publishing, educational publishing, etc.)
  - More efficient back-office processing with licensees and other business partners
  - External distribution of the owner's MultiLinks so as to bring customers directly back to the owner for additional services, related images, etc.

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7th Industry Application: Music?

- Recent settlements with Napster, MP3.com, etc. require that they develop a mechanism to track usage and pay royalties back to the record companies
- DOI is the key: enhances digital distribution and ensures that producers get paid
- Historic opportunity to unite "Old Economy" (which owns the content, not just the lawyers) and "New Economy" (which owns the Internet savvy and skill-sets to execute digital distribution with breakthrough-level effectiveness)
- Stakes are high: Besides record companies' $$ already being lost to piracy, Napster & equivalents are also struggling for survival - not only against lawsuits, but for viable business models
- $50M at stake with Bertlesmann's Napster investment; $53M settlement between UMG and MP3.com (plus $20M paid earlier to both Sony and EMI); Scour.com being rescued from bankruptcy by bids of $5M+

Assertion:

DRM will never deliver a friction-free end-user experience, nor track usage & royalties in a leak-proof way, without the DOI as a universal ID and a persistent link

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Market Opportunity (Content only)

- 54% of all Internet users indicate a willingness to buy content (Jupiter Communications, Aug 1999)
- $40 billion digital commerce market opportunity by 2003 (SIMBA, Jan 1999)
- $185 billion market today for online intellectual property, growing to $275 billion by 2003 (J.P. Morgan, November 1999)
- $200 billion in media content already sold in the U.S. in 1999 (Veronis, Suhler & Associates, Information Industry Report, 1999)

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DOI History

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In the beginning...

- In 1994-95, publishers realized that the Internet represented a new market and a new delivery channel for digital information
- They also realized that online publishing would allow for unprecedented tailoring, customization, and repackaging of information in more granular forms

But…

- They knew that you couldn't manage or conduct transactions for object-level information without at least having a unique identifier for it (like an ISBN for physical books)
- They were terrified of digital piracy

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So...

- AAP's "Enabling Technologies Committee" initiated a consulting study to determine whether any other intellectual property industries had already solved this problem by adopting an object-level identifier, and/or if they had implemented copyright-protection mechanisms on an industry basis
- Answer: No, they had not. (Surveyed Music, Film, SW, etc.)
- Result: AAP and major publishers developed an RFP, considered bids from a dozen technology vendors, and selected a joint proposal by CNRI (as technology provider) & R.R. Bowker (as administrative agency, since was already the major issuer of ISBNs)

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DOI Timeline
(Major Milestones)

1994-95 - AAP's Enabling Technologies Committee defines need for unique identifier to enable e-commerce market for online content, and to protect copyright online. Commissions research study of identifiers in other online content industries.

Summer 1996 - AAP issues RFP; selects CNRI/Bowker. Launches prototype project.

Spring 1997 - 1st mtg of prototype project. Participating publishers must commit to bringing 5-10 examples of actual content tagged with DOIs. Wiley brings 70,000 DOIs representing all of its online scientific journal content, at 4 levels of granularity (articles, abstracts, journal issue, journal title); shares its methodology for tagging/registering DOIs on a large-scale basis.

Summer 1997 - Academic Press "sees Wiley's 70,000, raises it 140,000" by tagging all of its own online journal articles. Frankfurt Book Fair (October) declared as "go live" target date.

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DOI Timeline (2)

October 1997 - DOI System goes live at the Frankfurt Book Fair; receives endorsements from IPA, STM International, plus many individual publishers worldwide. Featured in NY Times (10/20/97). System is fully "open for business," with policies, procedures, pricing and automated facilities in place to accept purchases of publisher prefixes, and with DOI registration/maintenance being handled by CNRI on behalf of the AAP.

October 1997 - International DOI Foundation (IDF) established, with offices in Washington & Geneva, to develop policies and governance procedures, and to administer the system via service contract with CNRI. IDF is non-profit, supported primarily by membership fees, and chaired by Charles Ellis (CEO, John Wiley & Sons).

Dec 1997 - First DOI workshop for technology vendors (DRM, CMS, etc.) held in NY. That morning, DOI project team defines need for a Metadata Database to allow for DOI lookups (like a "DOI Phone Book"), as the first "killer app" needed to enable widespread adoption and application of DOIs.

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DOI Timeline (3)

March 1998 - Dr. Norman Paskin (Reed Elsevier) appointed first IDF Director.

Summer 1998 - AAP transfers trademarks to IDF; website launched (www.doi.org)

Summer 1998 - Wiley begins developing Metadata Database, to enable batch-mode lookups of DOIs and thus provide platform for applications such as reference linking across the scientific journal literature.

October 1998 - At the 1998 Frankfurt Book Fair, David Sidman (Wiley) demonstrates live, working Metadata Database; shows mock-up of end-to-end process for cross-linking journal references across publishers; calls for cross-publisher collaboration

March 1999 - Dr. Paskin appoints David Sidman to chair IDF Metadata Policy Committee, to develop policies, business models, and prototyping guidelines for DOI metadata.

June 1999 - AAP Enabling Technologies Committee initiates DOI-X project to take the Wiley Metadata Database cross-publisher. 14 companies join, with Frankfurt '99 as the target "go live" date. Project is chaired by Howard Ratner (Springer-Verlag), project-managed by David Sidman (Wiley), developed by CNRI/Wiley.

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DOI Timeline (4)

October 1999 - DOI-X goes live at Frankfurt Book Fair, with Registration facilities built (publishers can register both DOIs/URLs and Metadata into the system in a single pass), the Metadata Database enhanced and populated with cross-publisher DOIs, and an XML DTD defined and implemented for Journal Article metadata. (DOI-X published in D-Lib magazine, 2/00: http://www.dlib.org/dlib/february00/02risher.html)

Nov 1999 - CrossRef established: non-profit organization, funded jointly by 12 member publishers (now 120), to permanently operationalize DOI-X and cross-link the world's scientific journal literature using DOI. Chaired by Eric Swanson (Wiley), with Director Ed Pentz (seconded from Academic Press).

Summer 2000 - Content Directions, Inc. (CDI) founded by David Sidman in order to bring the same successful implementation methodology and infrastructure to other sectors of Publishing, as well as Music, Film Video – and other non-Content applications such as Social Security records, Medical records, Security/Authentication mechanisms, online info about physical products, etc.

Oct 2000 - "DOI-EB" project announced, to develop a "DOI genre" for eBooks modeled after the DOI-X project for scientific journals (DS later nominated to project-manage)

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DOI Timeline (5)

Nov 2000 - AAP releases "Numbering Standards for Ebooks," the culmination of a months-long study conducted by the AAP, several leading publishers, and Andersen Consulting, in which the DOI is chosen as the standard identifier for the Book industry.

April 2001 - Content Directions approved by the IDF as the first commercial Registration Agency. Begins working w/Book industry & 4 others.

May 2001 - CEO David Sidman appointed to project-manage the “DOI-EB” project, in collaboration with several major publishers and technology vendors, to develop prototype applications for the Book industry in the same way that the “DOI-X” project (also project-managed by DS) developed the applications which drove adoption in the Scientific Journals industry.

- “Phase 1” of the DOI-EB applications demo’d at Book Expo America in Chicago. Press coverage in NY Times, Seybold, etc.

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DOI Timeline (6)

Oct 2001 - "Phase 2" of DOI-EB demo'd at the Frankfurt Book Fair, then at NIST/NISO eBook 2001 in Washington. Microsoft and Adobe join project. Public support from Terry McGraw of McGraw-Hill, Dr. Robert Kahn of CNRI, etc. The Hon. Pat Schroeder (former Congressperson, now President of AAP) organizes CEO-only executive presentation for major publishers, to be held Dec. 2001.

Jan 2002 - Content Directions enters strategic partnership with SealedMedia, the first major Digital Rights Management (DRM) vendor to help drive DOI adoption by incorporating it into their products. SealedMedia joins a number of other vendors who have also committed to supporting the DOI (iCopyright, NetPaper, etc.)

Feb 2002 - McGraw-Hill becomes the first major publishing outside of the Scientific Journal sector to sign a registration contract for implementing the DOI across its entire publishing program (McGraw-Hill Education). Other publishers soon follow (Thomson Learning, Penguin Putnam, RAND), as well as other companies outside of Publishing altogether (e.g. Corbis, the large stock photo agency owned by Bill Gates).

DOI Timeline (7)

May 2002 - Stevens Institute of Technology signs pact with CDI to use DOIs within it's online courses.

August 2002 - Corbis announces that it will use CDI to register DOIs across a pilot project line.

October 2002 - CDI selected as one ot the top technology companies by the New York New Media Association. RAND and CDI sign comprehensive agreement to register DOIs.

November 2002-Gale, a division of Thompson Corp., signs a comprehensive agreement with CDI to register DOIs.

January 2003 - CDI signs registration agreement with The Humana Press, completes a strategic alliance with Publishing Dimensions and intiates a DOI-based project with Business and Legal Reports. McGraw-Hill DOIs go live on its Web site.

March 2003 - Paraview Publishing and CDI strategic partner Publishing Dimensions announce agreement to register DOIs.

April 2003 - AAP signs with CDI to register DOIs. Gale applies DOIs to its entire E-Doc product line.

See examples of DOI implementations from CDI's major customers.

How is the DOI System Governed?

- **International DOI Foundation (IDF)** established October 1997
- Offices in Washington & Geneva
- Dr. Norman Paskin, Director
- Chaired until Aug 2000 by Charles Ellis (former CEO, Wiley); now by Joel Baron
- Non-profit: supported primarily by membership fees
- Develops policies and governance procedures (“policy infrastructure”)
- Liaises with standards organizations internationally
- Manages the relationship with CNRI via service contract
- Develops standards to enable applications (e.g. Application Profiles)

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Metadata Standards

- Each new type of content must declare a “genre” (content type), and an appropriate metadata set must be defined in order for registration to be consistent and DOI lookup to be enabled
- Different metadata sets for different “genres” (content types)
- Determined on a sector by sector basis (e.g., done for Journals within the DOI-X project)
- Must share a common “kernel” with other metadata sets to allow interoperability (kernel is part of the <indecs> framework)

(Find all worldwide metadata projects on the “MICI” website:

“Metadata Information Clearinghouse - Interactive”

http://www.metadatainformation.org)

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How the DOI System Works

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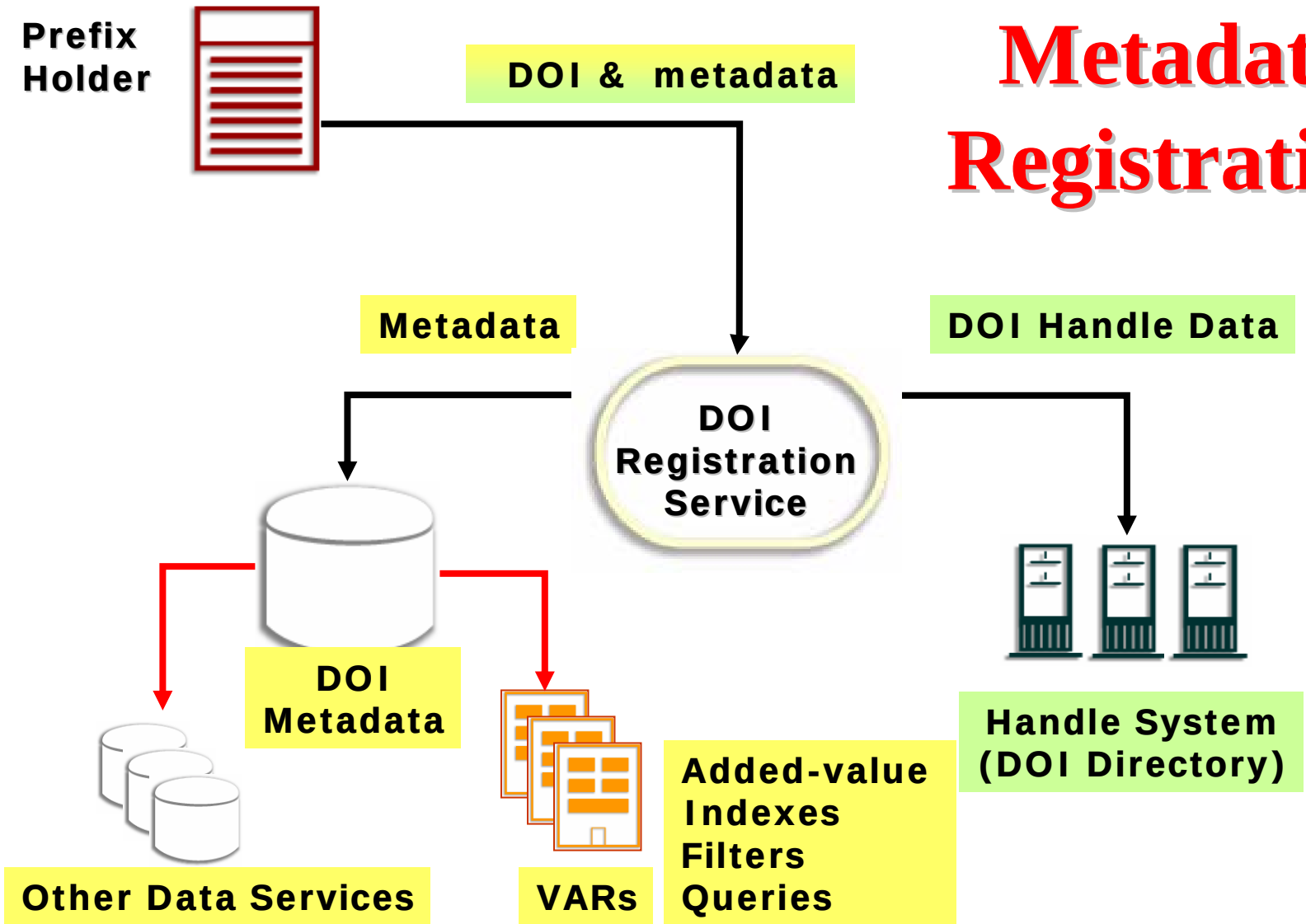
DOI number format

- **10.1065/abc123defg** = the whole DOI
- **10.1065** = Publisher Prefix
- **abc123defg** = Suffix
  - item identifier
  - any format
  - naming authority (publisher)
- in use, a DOI is an opaque string (a “dumb number” - a good thing)

© International DOI Foundation

DOI & Metadata Registration



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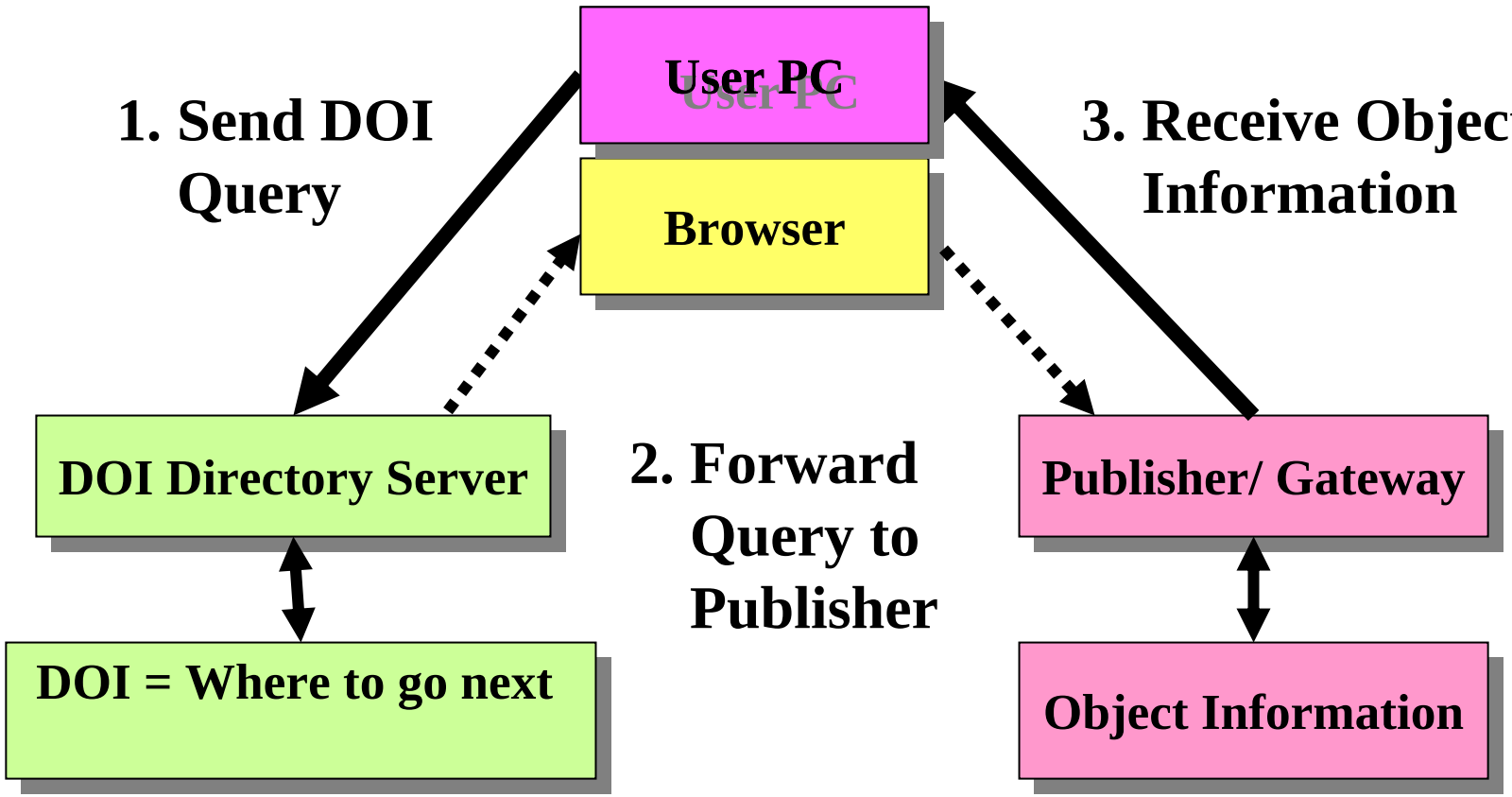
DOI System as seen by a user



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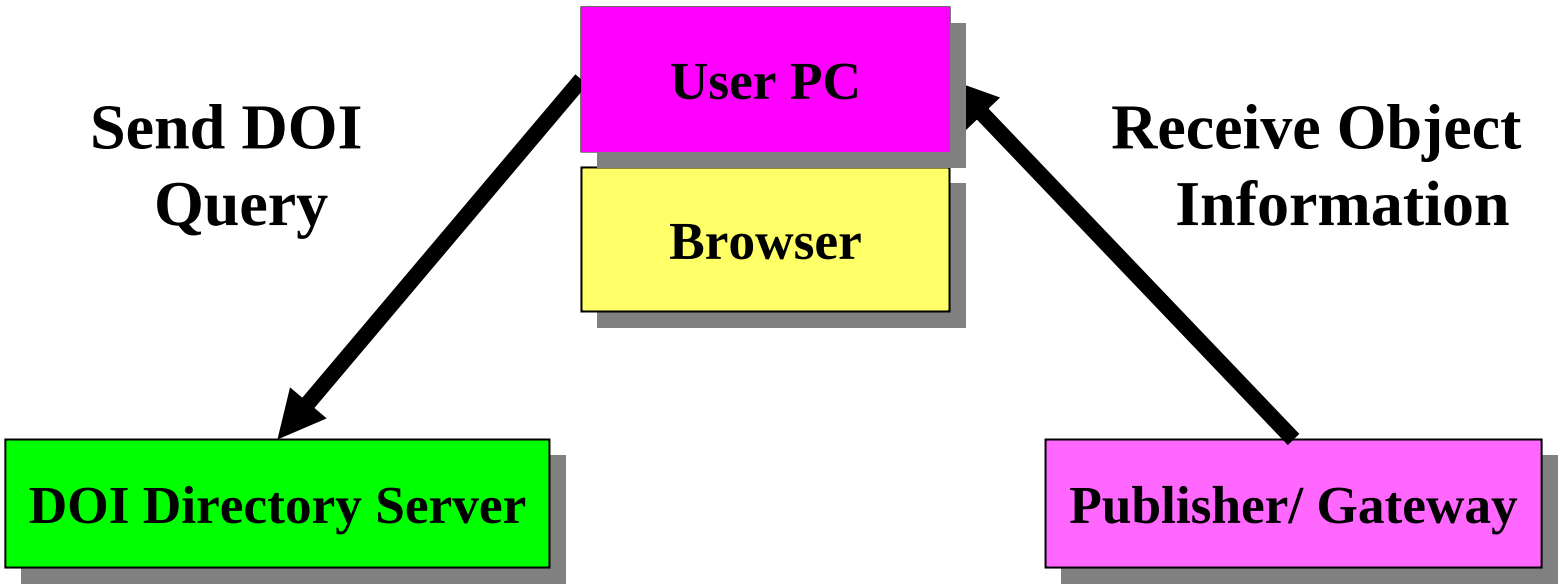
DOI System as seen by a user



Click on DOI, receive object information

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What is Content Directions' Role in the DOI Value Chain?

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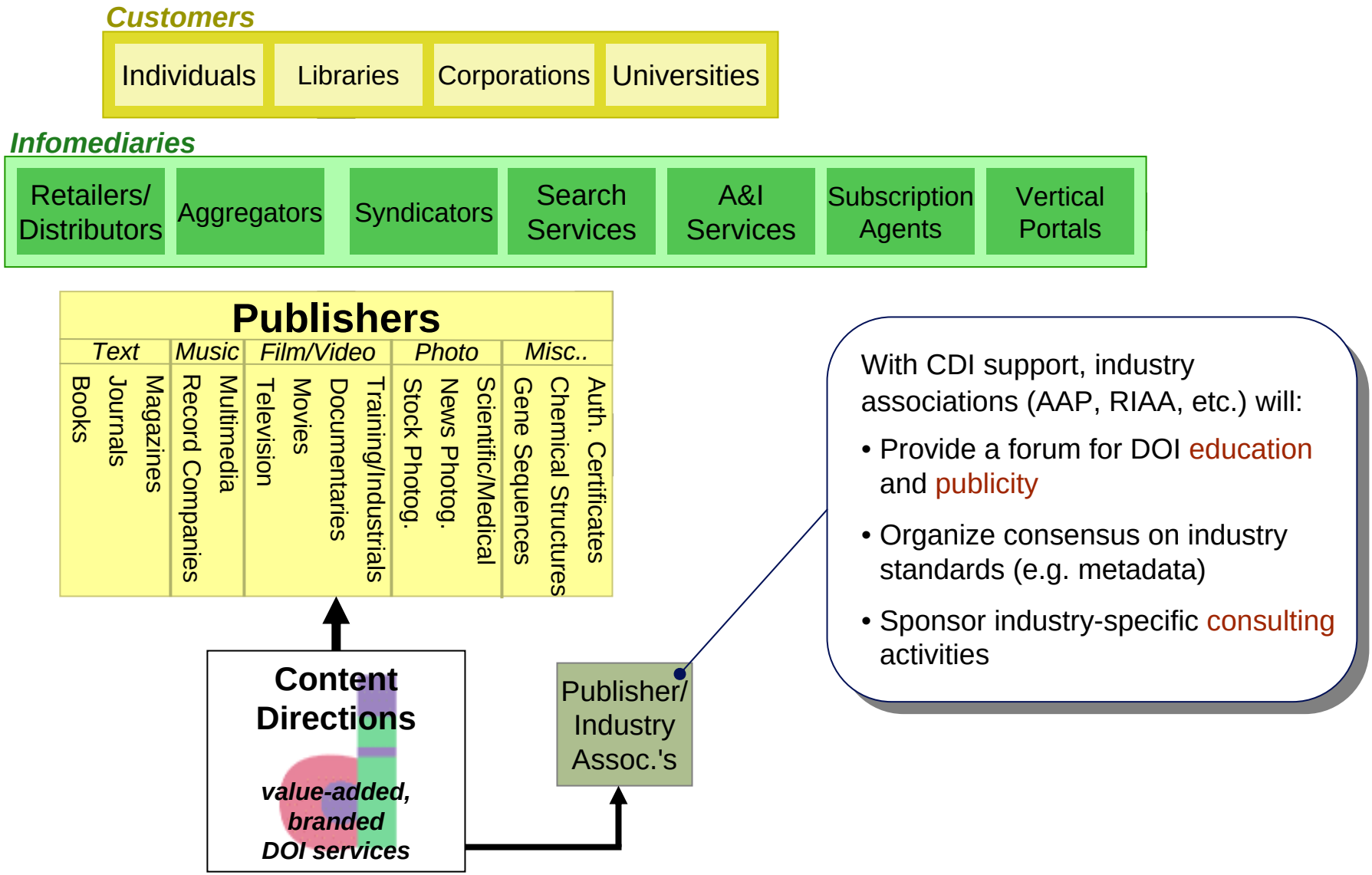

DOI VALUE CHAIN

Consulting and Implementation

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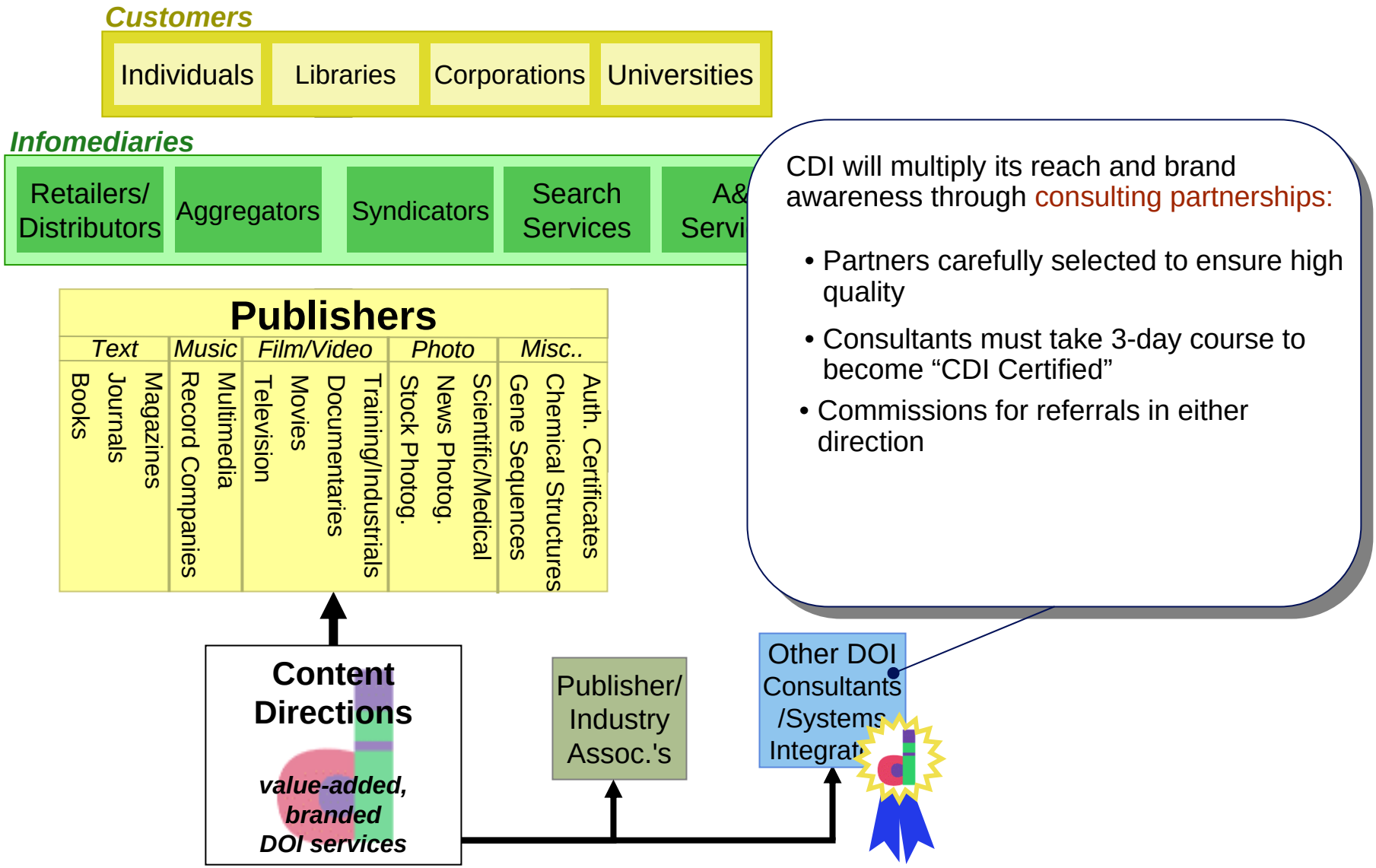

DOI VALUE CHAIN

Consulting and Implementation

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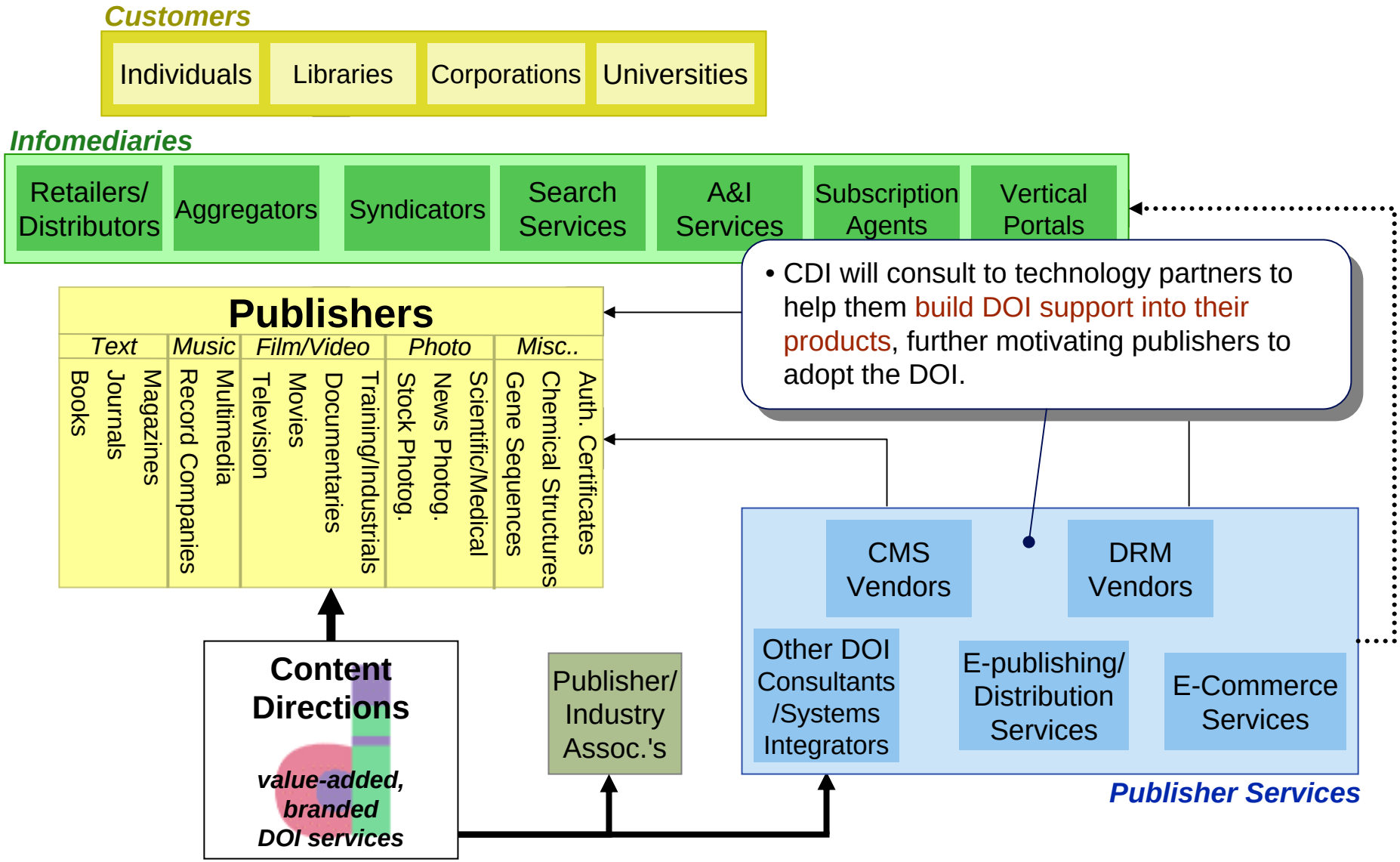

DOI VALUE CHAIN

Consulting and Implementation

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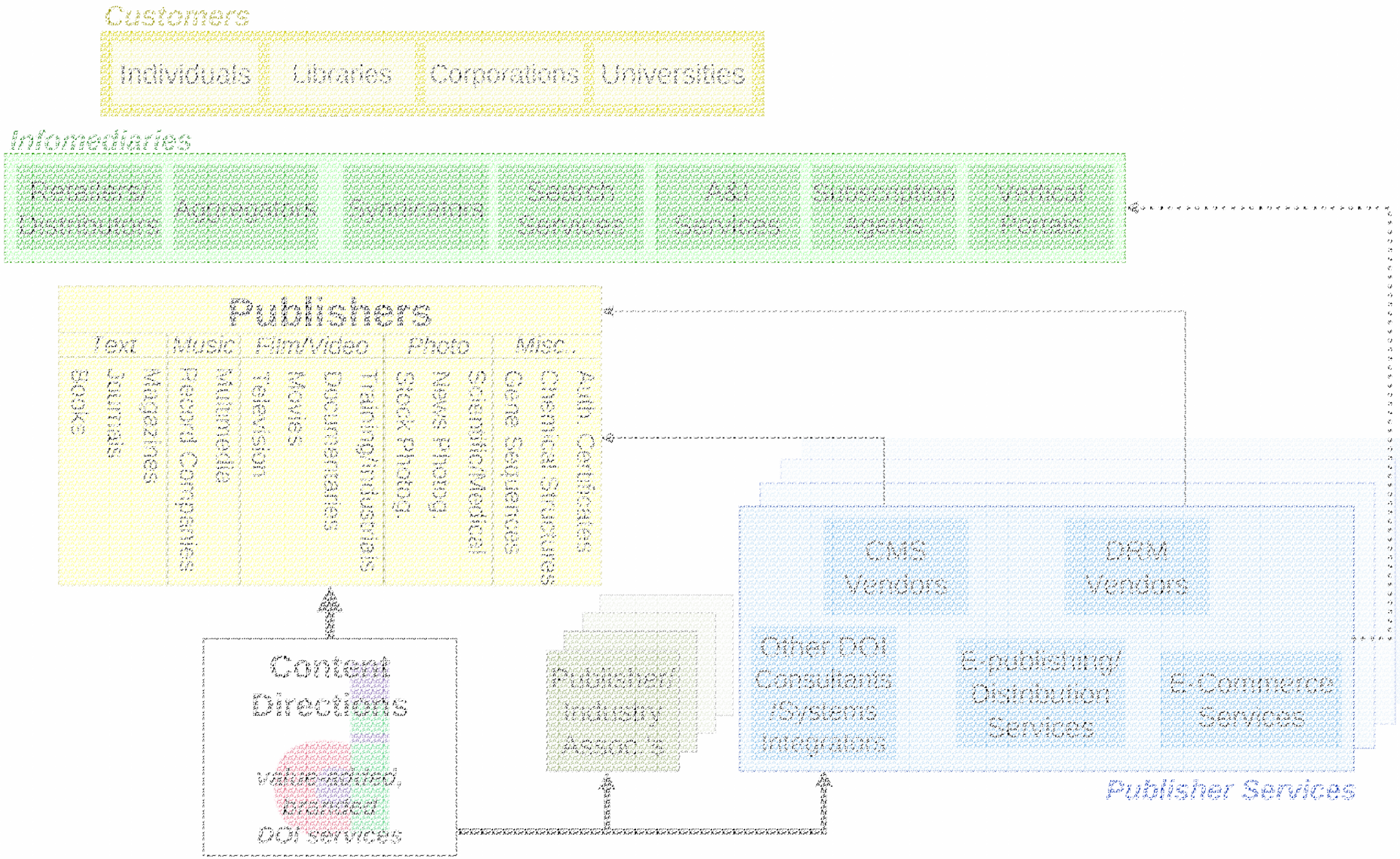

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DOI VALUE CHAIN

Consulting and Implementation

Examples of 3rd-party DOI-based Applications which CDI will Support or Co-develop

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Customers

Individuals | Libraries | Corporations | Universities

Infomediaries

Retailers/ Distributors | Aggregators | Syndicators | Search Services | A&I Services | Subscription Agents | Vertical Portals

Publishers

Text	*Music*	*Film/Video*	*Photo*	*Misc..*
Books	Record Companies	Television	Stock Photog.	Gene Sequences
Journals	Multimedia	Movies	News Photog.	Chemical Structures
Magazines		Documentaries	Scientific/Medical	Auth. Certificates
		Training/Industrials		

Further Applications include:

-Multiple Resolution

Content Directions

value-added, branded DOI services

Metadata

DOI **Purchase = URL1**

Rights Clearance = URL2

Price Quote = URL3

Get Metadata = URL4

Redirect

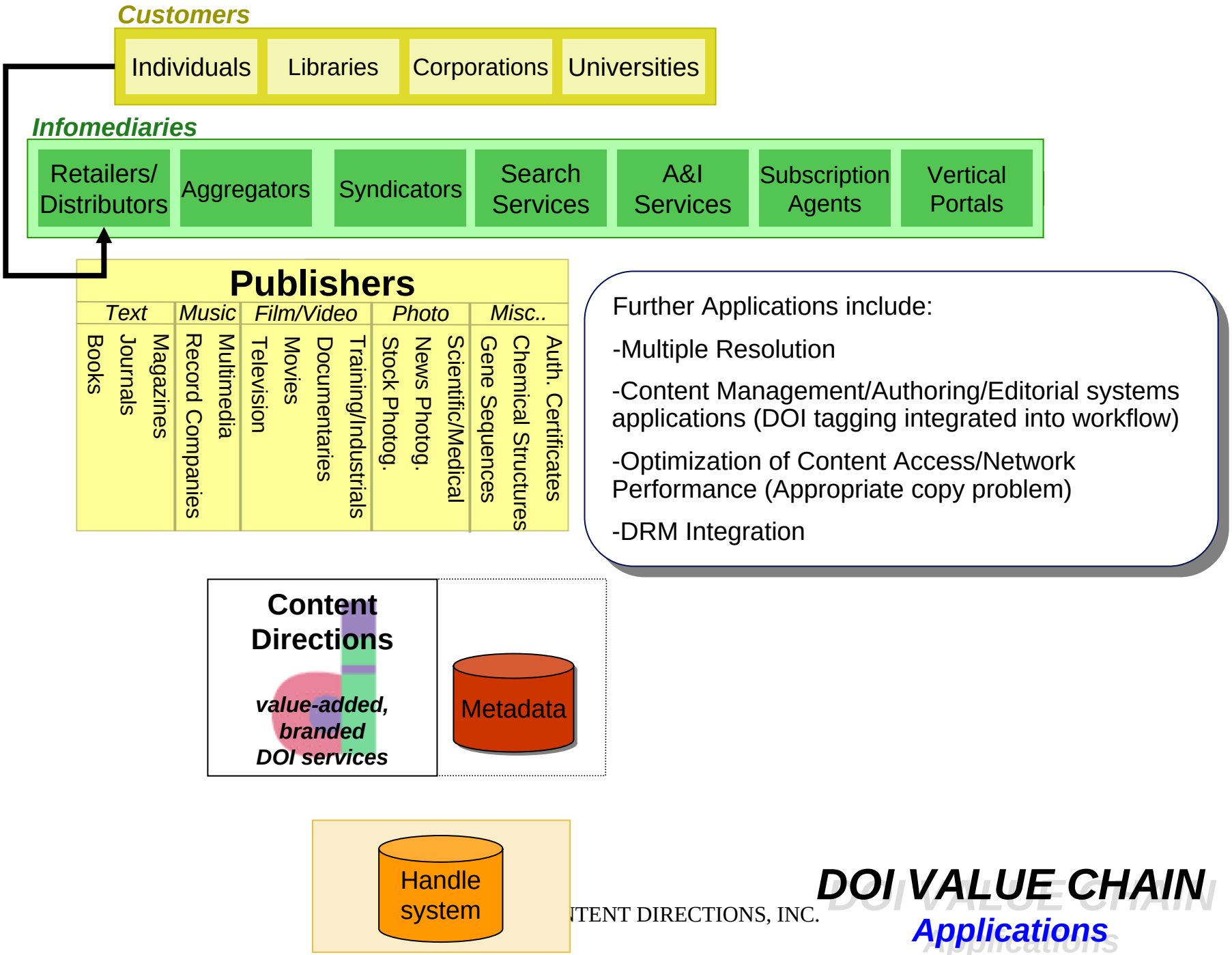
service@DOI

Handle system

ITENT DIRECTIONS, INC.

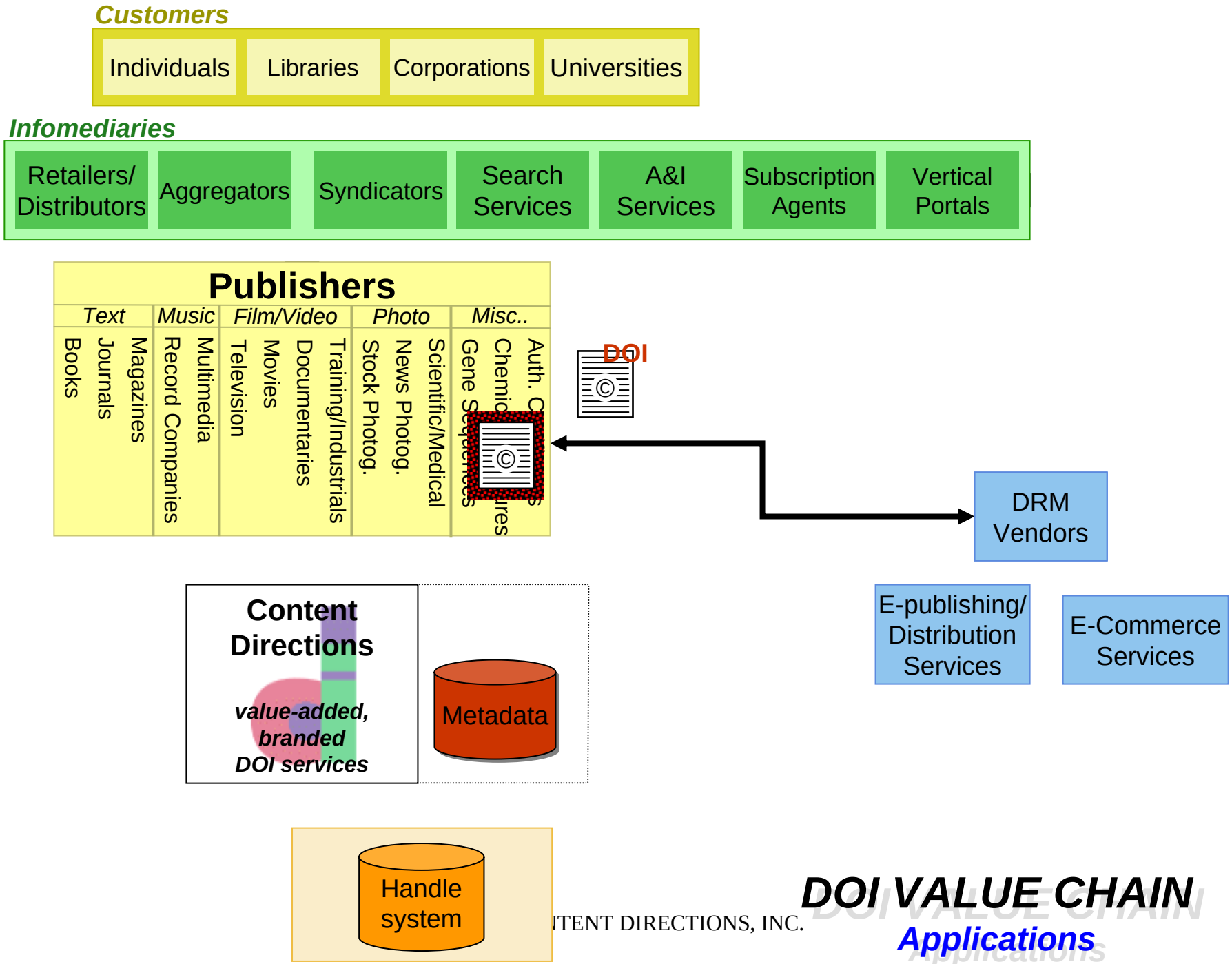
DOI VALUE CHAIN

Applications



DOI VALUE CHAIN

Applications


Customers
Individuals
Libraries
Corporations
Universities
Infomediaries
Retailers/ Distributors
Aggregators
Syndicators
Search Services
A&I Services
Subscription Agents
Vertical Portals
Publishers
Text
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Film/Video
Photo
Misc..
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Journals
Books
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Record Companies
Training/Industrials
Documentaries
Movies
Television
Scientific/Medical
News Photog.
Stock Photog.
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Content Directions
value-added, branded DOI services
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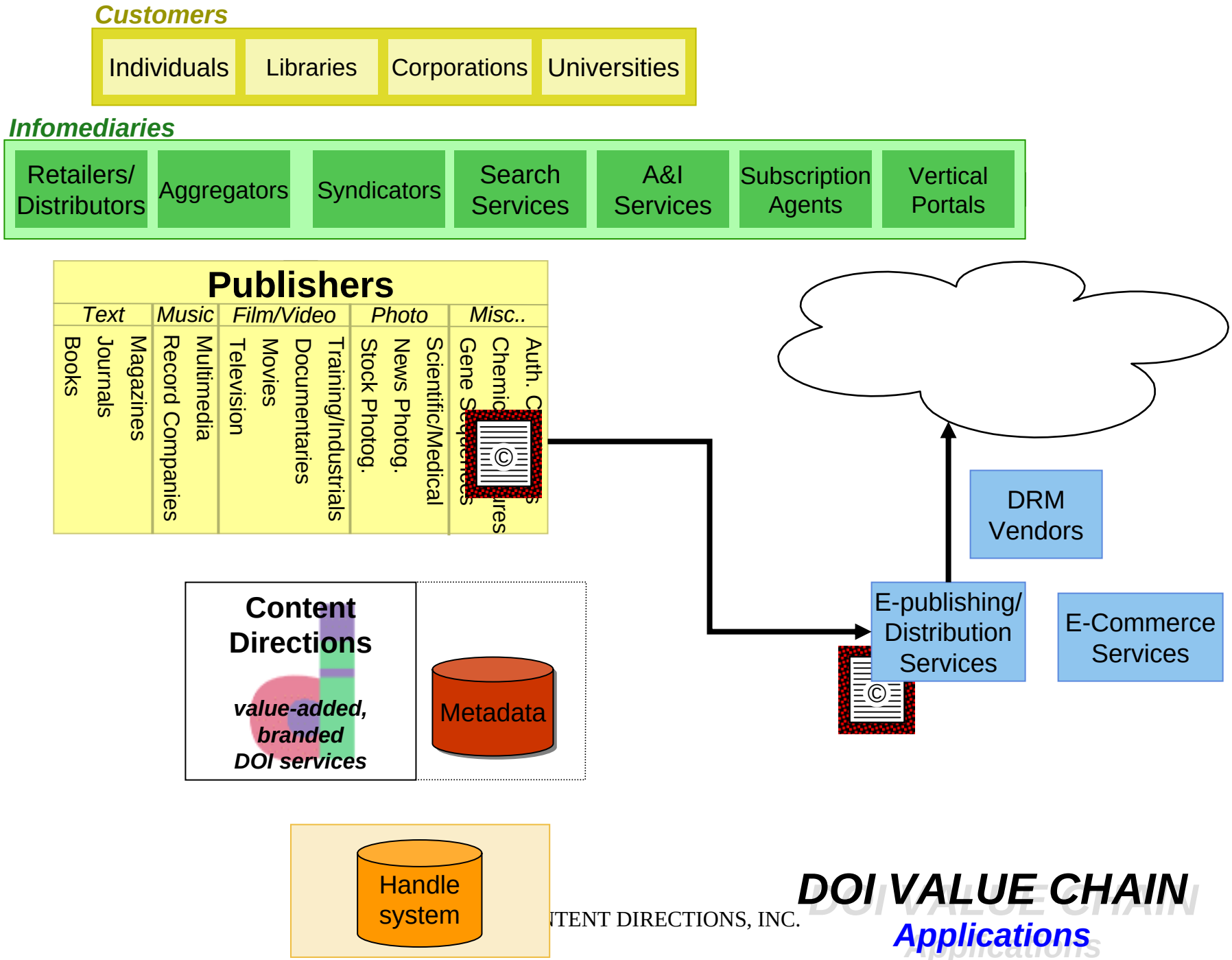
DOI VALUE CHAIN
Applications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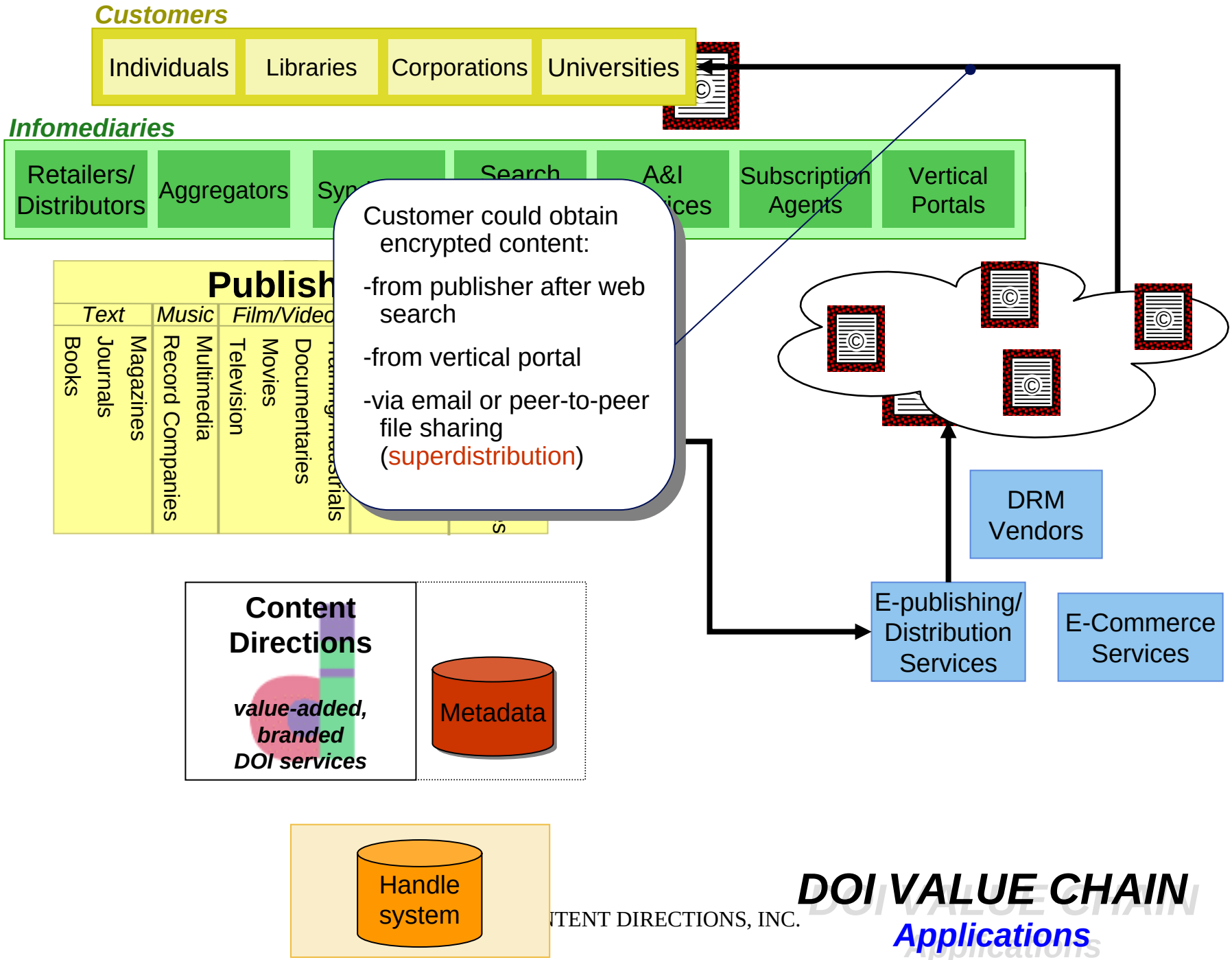
Applications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Vertical Portals
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Journals
Books
Multimedia
Record Companies
Movies
Television
Documentaries
Customer could obtain encrypted content:
-from publisher after web search
-from vertical portal
-via email or peer-to-peer file sharing (superdistribution)
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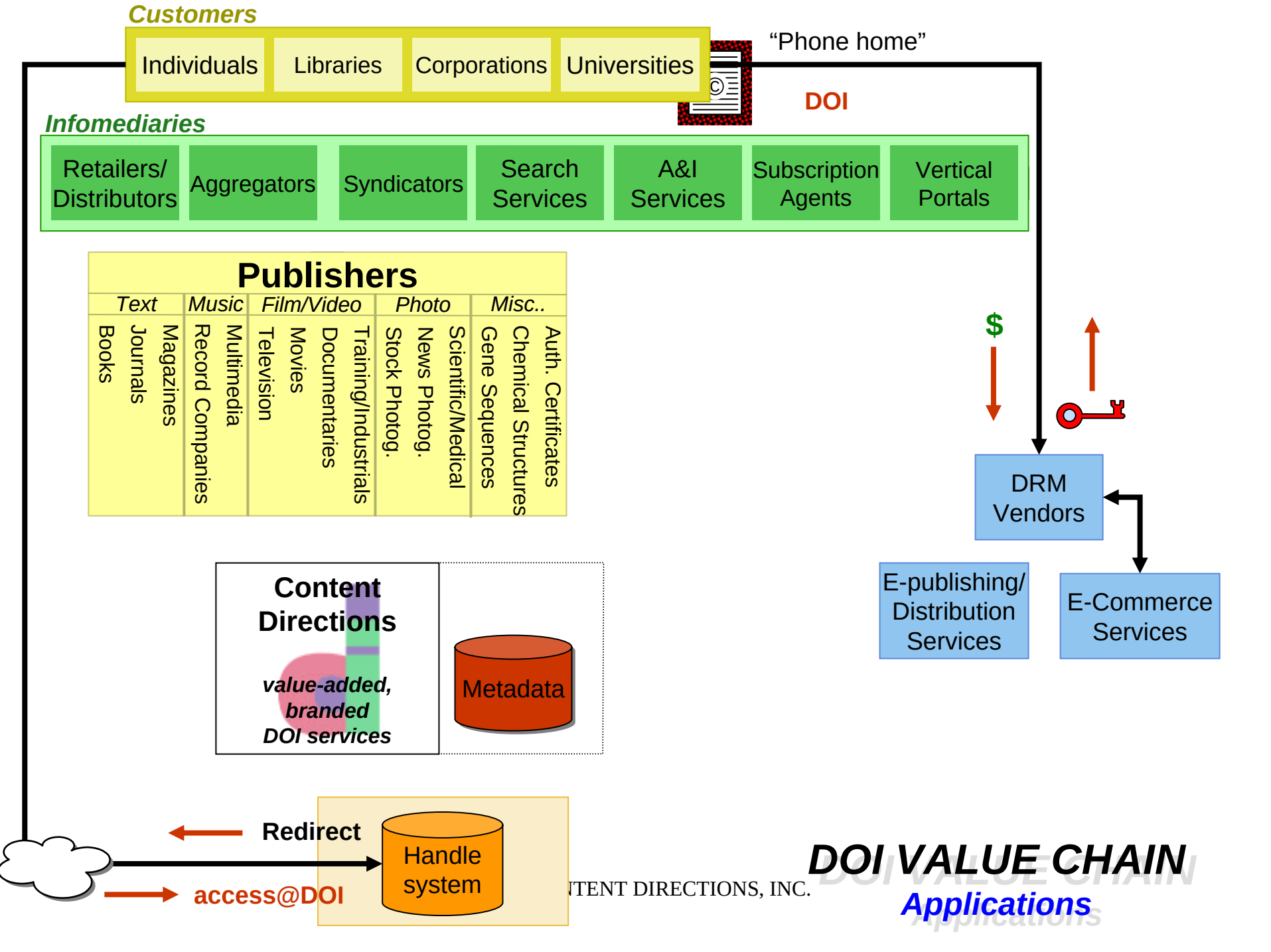
Customers
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“Phone home”
DOI
Infomediaries
Retailers/ Distributors
Aggregators
Syndicators
Search Services
A&I Services
Subscription Agents
Vertical Portals
Publishers
Text
Music
Film/Video
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DRM Vendors
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Redirect
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access@DOI
DOI VALUE CHAIN
Applications

DRM is More than Anti-Piracy

- Allows the Publisher to specify all the things that the reader can do with content:
  - Read
  - Copy/Paste
  - Forward
  - Sample/Preview
  - Re-use
  - Re-sell
  - Print
  - Modify
  - Syndicate
- Can also specify:
  - How many times
  - For what price
  - For how long a period
  - To whom (forwarding)
- Not just negative (locking content up), but also affirmative (new ways to sell, great mktg potential)

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Super-distribution:
The "Holy Grail" of DRM

- Turn customers themselves into points of additional distribution
- The most targeted, effective selling imaginable (friend to friend; knows tastes/interests; more pre-qualified than the best sales lead, targeted banner ad, or bookstore display)
- Turns pass-along from an act of piracy into an additional sale
- Instead of undermining revenue, multiplies revenue

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So the new focus on DRM & DOI is being driven by...

- Not just “Fear of Napster” (though Forrester predicts the Publishing industry will lose $1.5B to piracy by 2005, Music $3.1B)
- Not just the eBook phenomenon (Stephen King moved 500,000 copies in 24 hours, but many were pirated)
- Instead the move to DRM/DOI is part of larger movement to take full advantage of online publishing

WHY?...

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Because the online medium allows unprecented levels of usefulness and value for content

- Forwarding, sharing, re-use, incorporation into internal work processes
- More granular, customized, targeted packaging of information
- New business models (pay-by-the-drink, targeted subscriptions, customized/personalized selection & packaging of content, just-in-time versus just-in-case purchasing)
- New dimensions to content value & pricing (timeliness, comprehensiveness, richness of presentation)
- Reach more customers, and more types of customers

(see "Books by the Chapter and Verse arrive on the Internet this Fall," by Lisa Guernsey, New York Times, 7/18/2000, p. 1)

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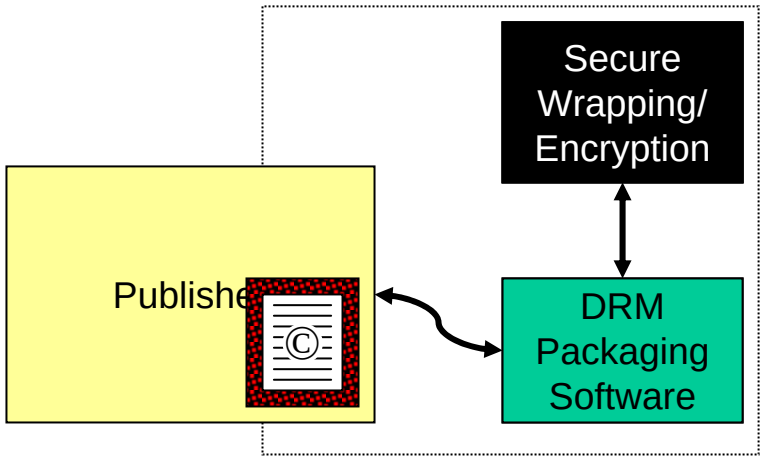
Why is the DOI an enabler of DRM?

- **Globally-unique, machine-readable ID enables interoperability among all the "moving parts" of the DRM process.**
- **So does the DOI's linking capability: persistent links which don't break, perform one-to-many linking instead of single linking, are centrally maintained/updateable**
- **Use of DOI to represent (and link to) digital certificates, digital signatures, authentication records, etc.**
- **Endorsed by SIIA ("DOI: Keystone to DRM")**
- **Publishing Industry's original motivation for initiating the DOI, even before learning of Dr. Kahn's system**
- **BUT MORE THAN MERELY "IMPROVING THE STICK," DOI "EMPOWERS/ENABLES THE CARROT" –** i.e., affirmatively enables a better customer experience, more effective marketing/sales, stronger lock-in of customer, rapid/scalable business development/partnering

Case Study:
Digital Rights Management (DRM)



Rights specification:

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-Copy and Paste
-Forward
-Print

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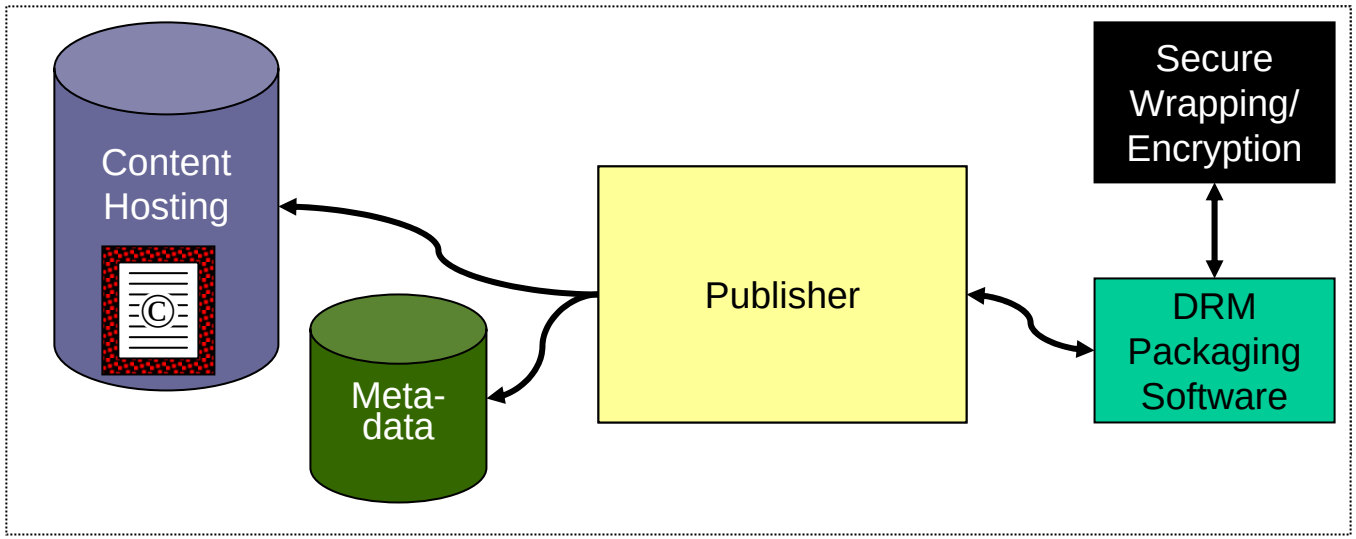
Case Study:
Digital Rights Management (DRM)



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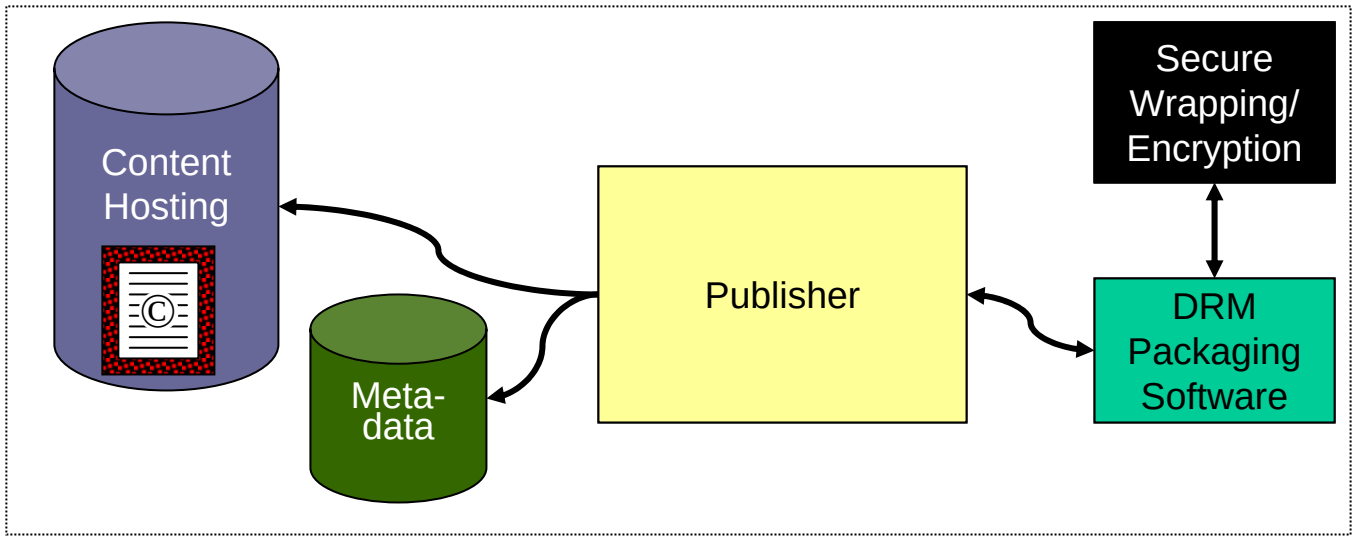

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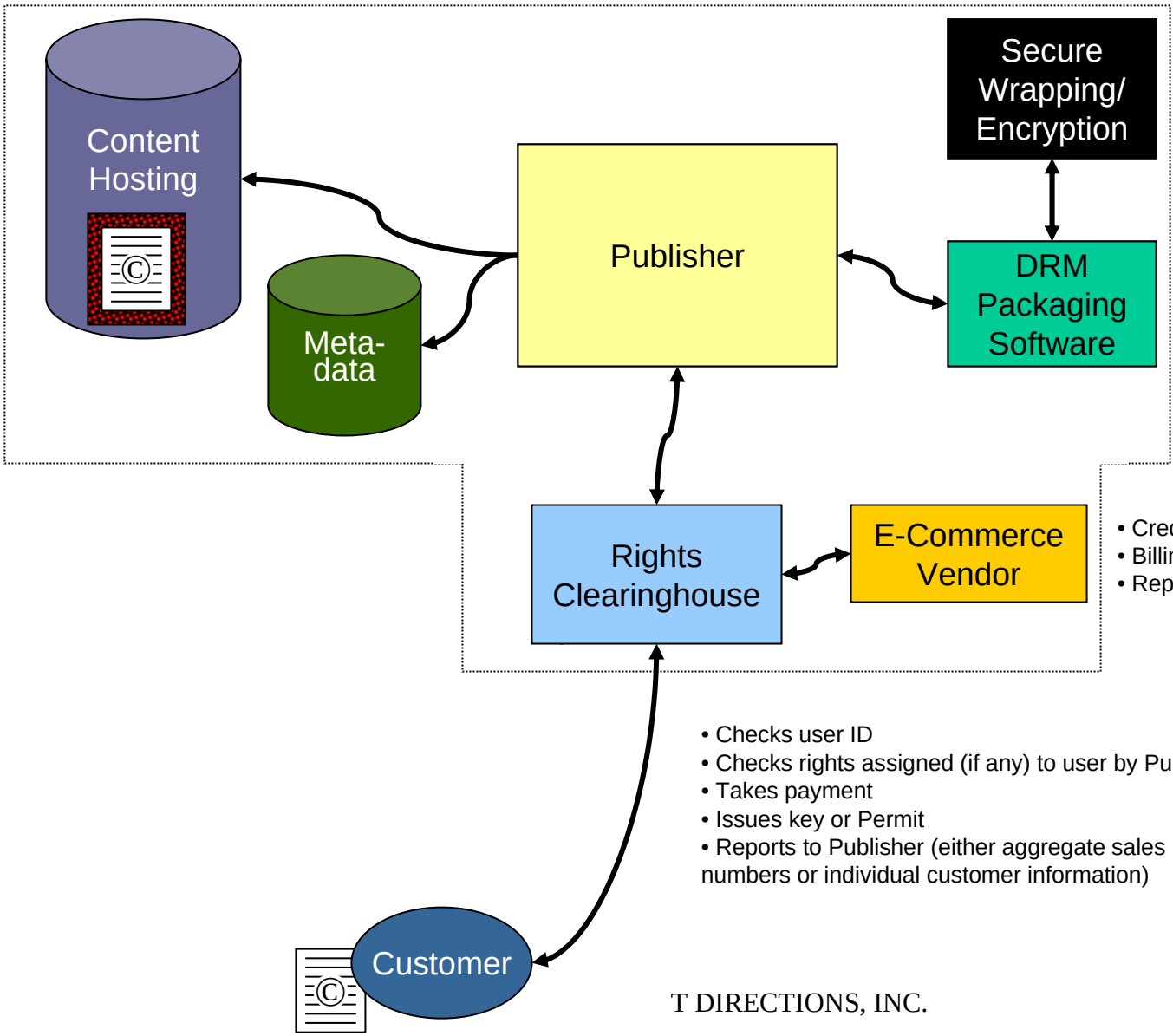
Digital Rights Management (DRM)



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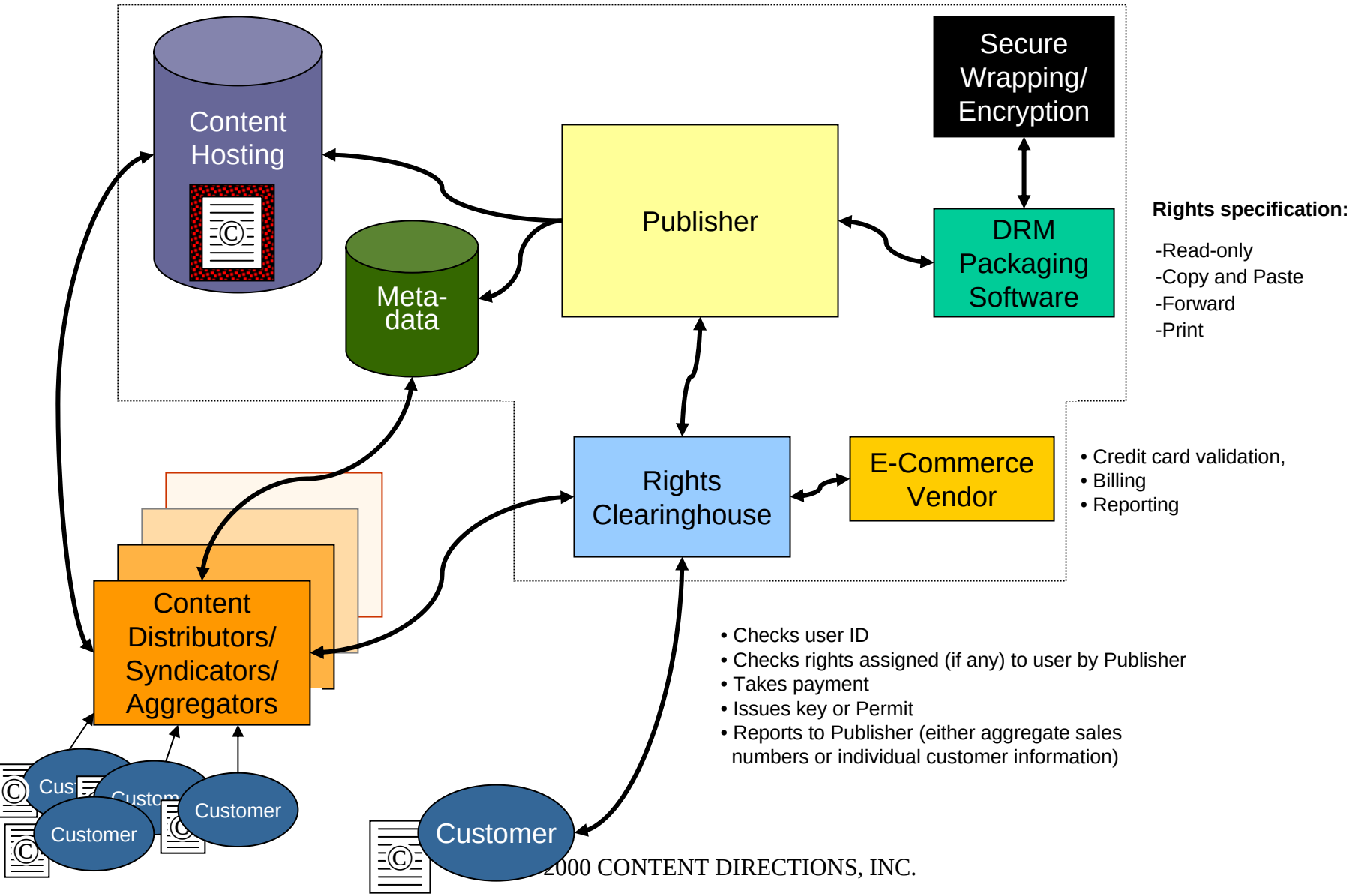
Digital Rights Management (DRM)



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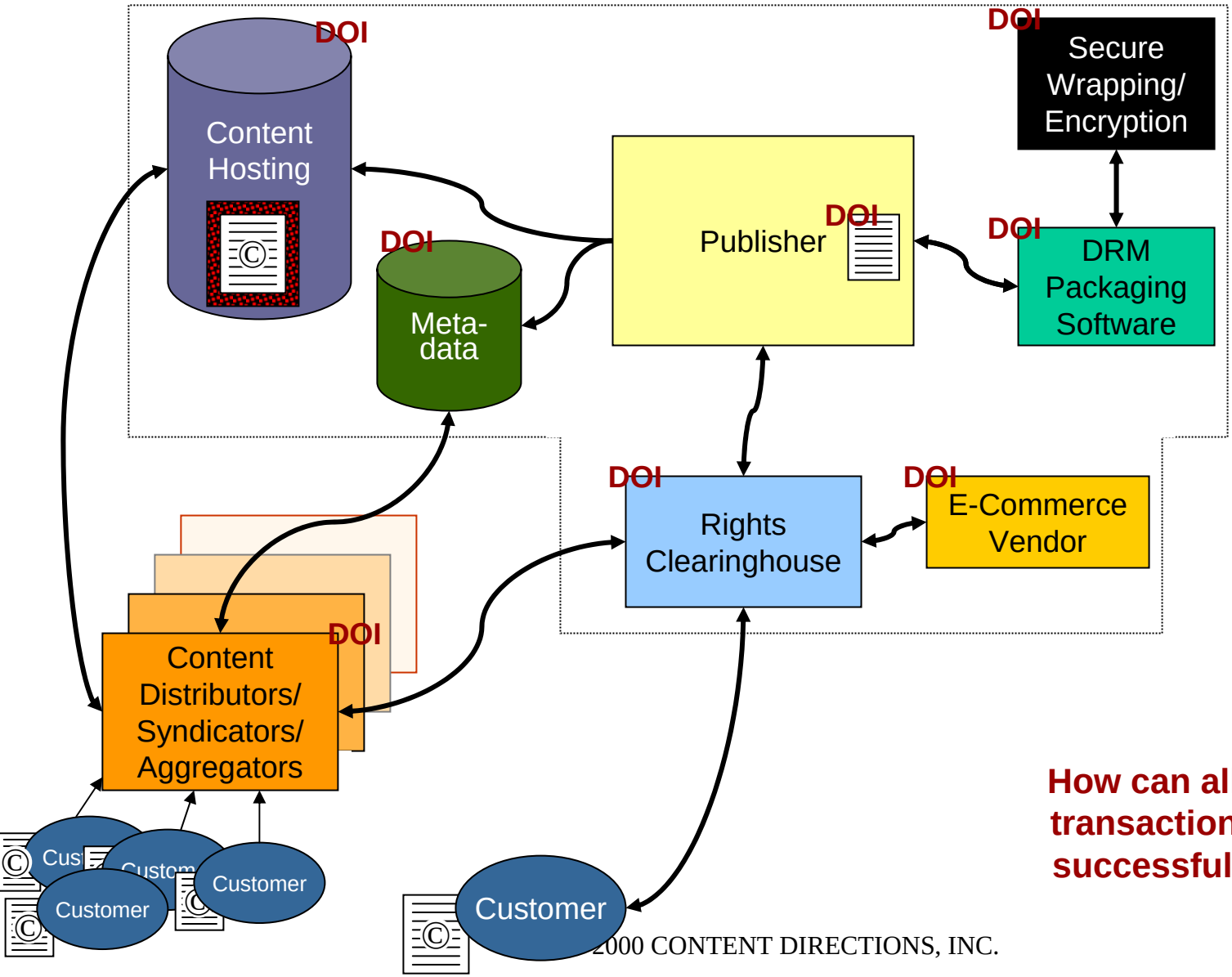
Case Study:
Digital Rights Management (DRM)



How can all these transactions flow successfully ???

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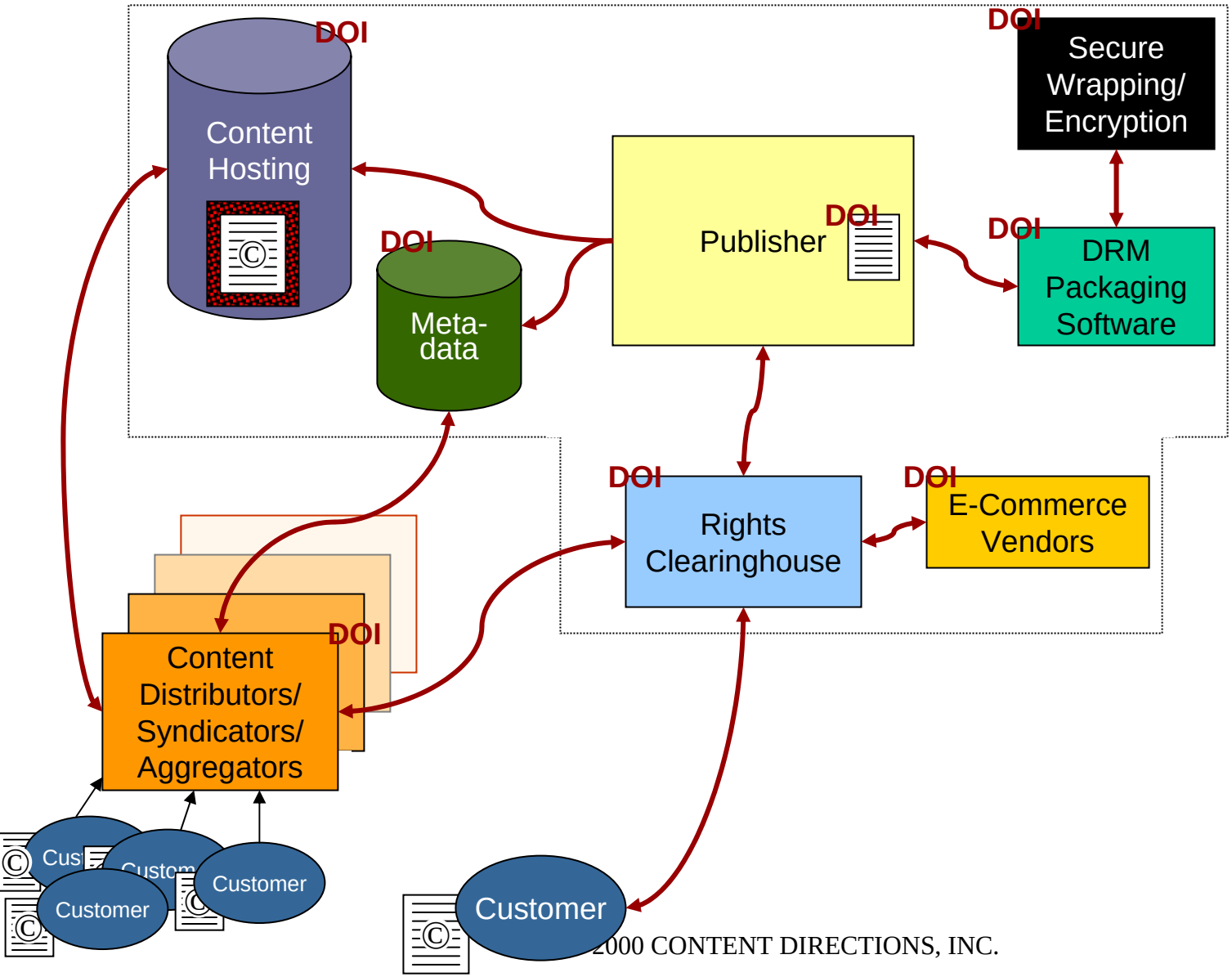
Case Study:
Digital Rights Management (DRM)



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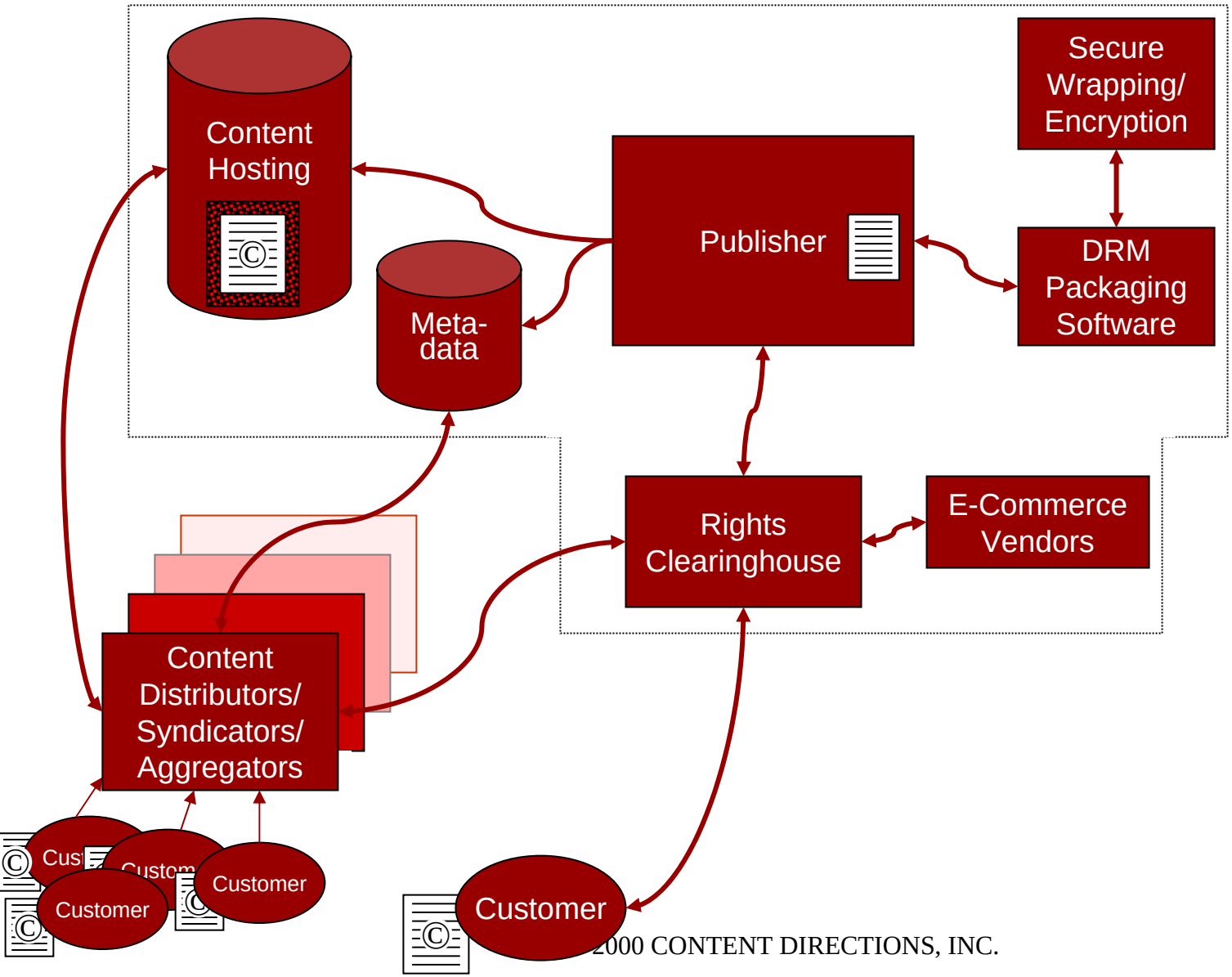

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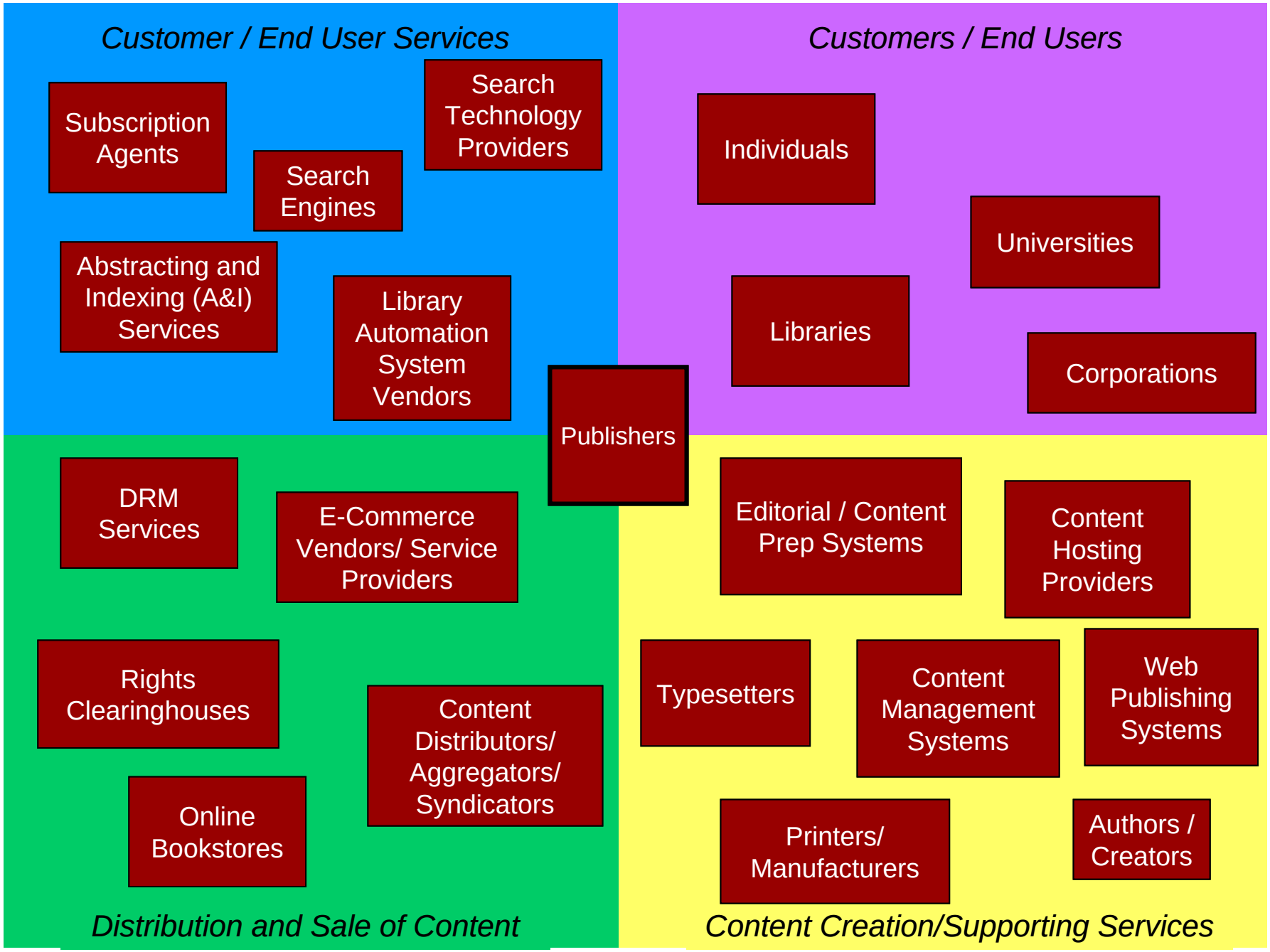
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Subscription Agents
Search Technology Providers
Search Engines
Abstracting and Indexing (A&I) Services
Library Automation System Vendors
Customers / End Users
Individuals
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Libraries
Corporations
Publishers
DRM Services
E-Commerce Vendors/ Service Providers
Rights Clearinghouses
Content Distributors/ Aggregators/ Syndicators
Online Bookstores
Distribution and Sale of Content
Editorial / Content Prep Systems
Content Hosting Providers
Typesetters
Content Management Systems
Web Publishing Systems
Printers/ Manufacturers
Authors / Creators
Content Creation/Supporting Services

CDI Consulting Services

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CDI Consulting Methodology (hi-level summary)

Strategy and Business Case

- Education
  Overviews or intensive workshops tailored to Executives and/or Staff.
- Business Case
  Identify increased revenues, cost savings, and implementation costs

Business Planning

- "State-of-Readiness" assessment of:
  Editorial, Marketing, and Production workflow; IT systems; E-commerce systems; Back-office systems
- Develop DOI-based product strategy
- Develop implementation recommendations

Implementation Planning

- Metadata assessment
- Detailed cost-benefit analysis
- Define implementation project

Implementation

- CDI will act as project manager and general contractor
  - Custom development or off-the-shelf package integration (Content Mgmt/Web Publishing Systems, Digital Rights Mgmt, E-Commerce...)

Post- Implementation Value-Added Services

- CDI will develop or consult on developing company- or industry-specific value-added applications. E.g.:
  - Reference Linking
  - Automation of relationships with online bookstores/ syndicators/aggregators
  - Advanced DRM solutions
  - "Multiple-resolution" applications

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How Does a Publisher Get Up & Running?

(8-Step Process)*

1) Sign with a Registration Agency
2) Target which content should be identified with a DOI
3) Choose a numbering scheme
4) Source the Metadata within the Production process
5) Assign DOIs within the Production process (if implementing DRM, this includes assigning rights and wrapping content)
6) Register DOIs & Metadata
7) Maintain DOIs & Metadata
8) Integrate or Benefit From DOI-based Applications

*See "A Practical Guide to Automating the Digital Supply Chain with the Digital Object Identifier (DOI)," by David Sidman & Tom Davidson, Publishing Research Quarterly, Spring 2001.

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Further information

- Content Directions, Inc.:
  http://www.contentdirections.com
  info@contentdirections.com
- International DOI Foundation (IDF):
  http://www.doi.org
- Corporation for Nat'l Research Initiatives (CNRI):
  http://www.cnri.reston.va.us
- CrossRef Consortium
  http://www.crossref.org

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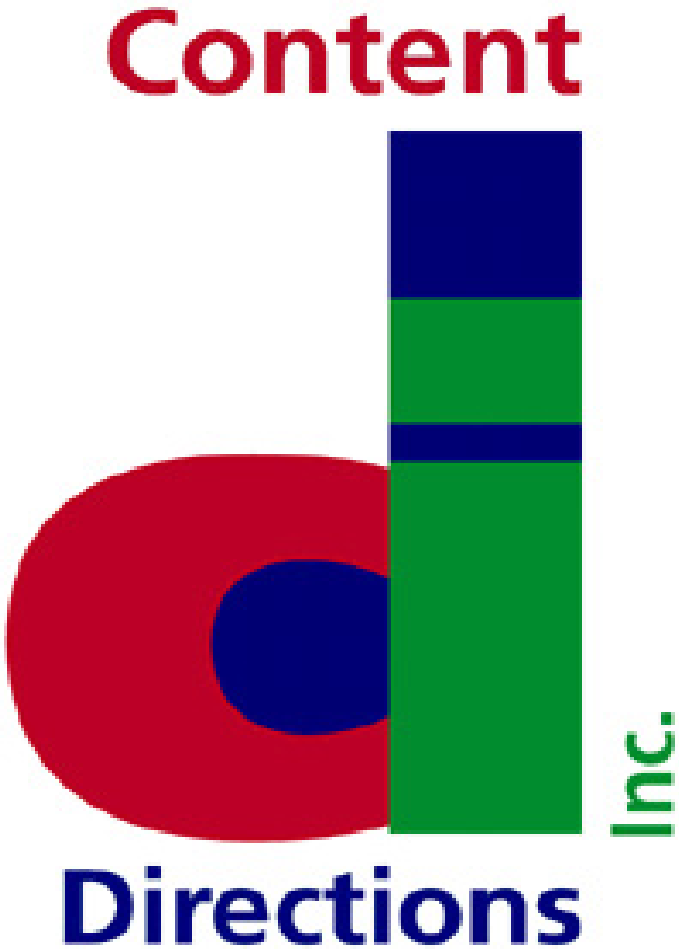

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