TILBURG UNIVERSITY

cloud computing for libraries

we all use the cloud

at work


salesforce
SOFTWARE


yammer


Microsoft
Office 365


Basecamp


box


rackspace

in libraries, research and education

Gartner

Cloud computing: “a style of computing in which massively **scalable** and **elastic** IT-enabled capabilities are delivered **as a service** to external customers using **Internet** technologies.”

The *4S experience*—consumers’ desire to

- store
- sync
- stream
- and share

their content **seamlessly** regardless of **device** or **platform**.

Predicts 2012: Cloud Computing Is Becoming a Reality

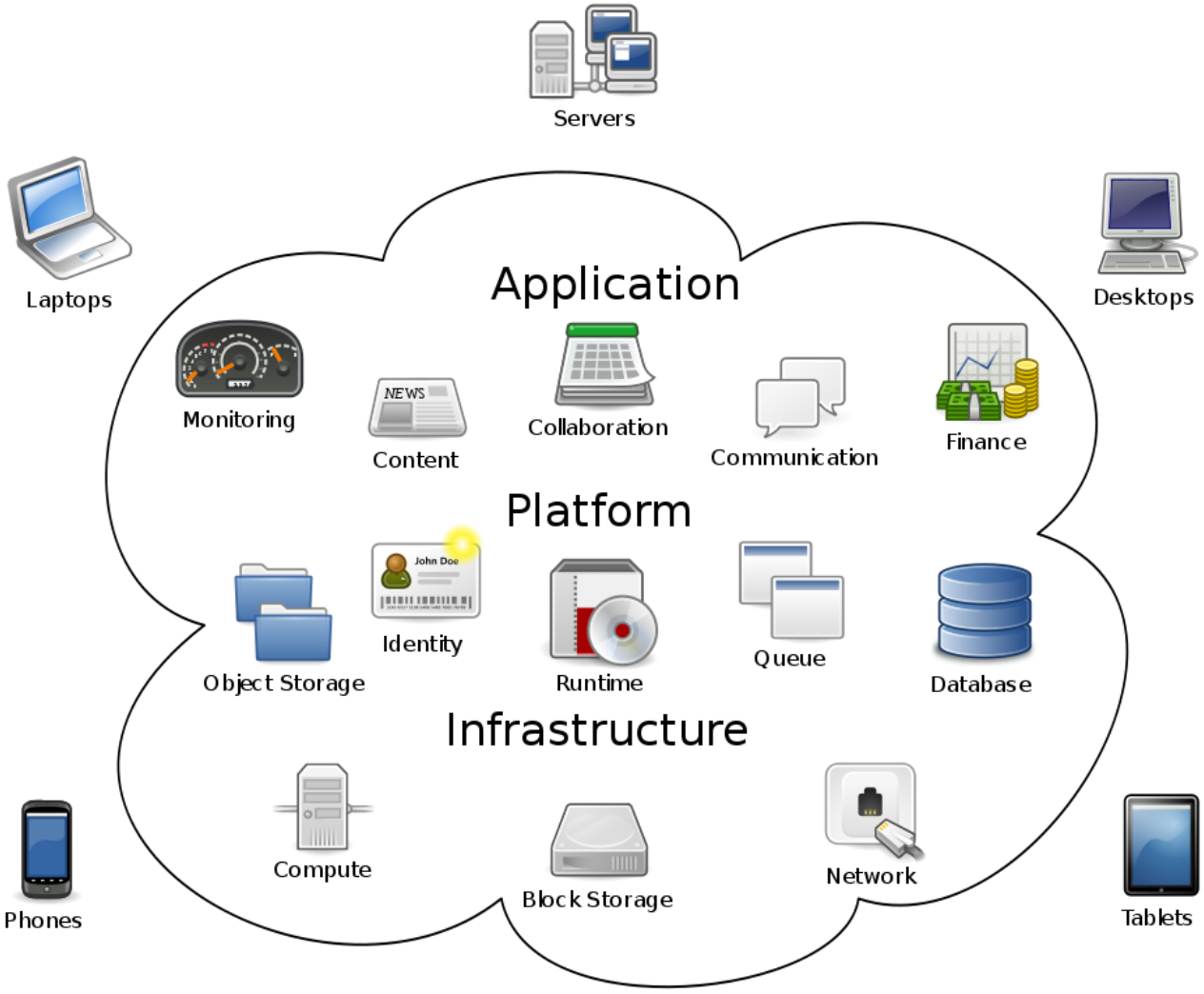
PC stands for … personal cloud (from 2014).

key characteristics

service types 1

Type	What it is	Examples
Services	Ready to use services accessed with a Web browser	Google Maps
Applications	Software applications accessed with a Web browser	Google Docs Microsoft 365 Salesforce.com
Platform	An existing software platform to build your own applications on	Facebook
Infrastructure	Buying space / time on external servers	Amazon A3

SaaS
PaaS
IaaS



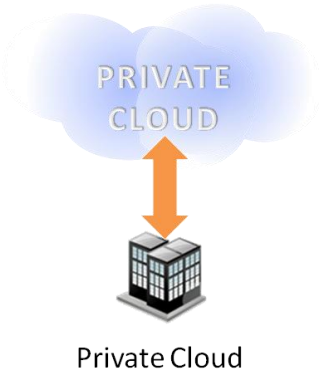
service types 2

- Private cloud
  - on site
  - outsourced

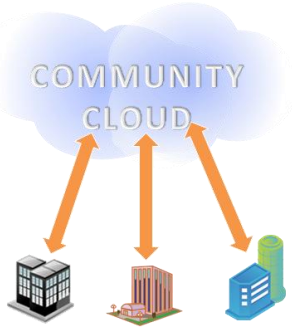
- Community (vertical) cloud
  - on multiple sites
  - outsourced

research data
learning objects

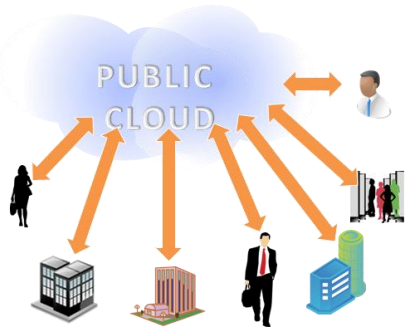
- Public cloud



Private Cloud



Community Cloud



Public Cloud

Cloud Services for Higher Education and Research

V 1.01
12-7-2011

Infrastructure as a Service (IaaS)

Provides cloud service users the ability to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run software, which can include operating systems and virtualized hardware as well as applications (e.g. Amazon Web Services, IBM's Smart Business Cloud, Microsoft's Azure Database).

Platform as a Service (PaaS)

Provides cloud service users the ability to deploy their own applications onto cloud infrastructure (e.g. Google Apps Premier).

Software as a Service (SaaS)

Provides cloud service users the ability to use cloud service providers' applications running on a cloud infrastructure (e.g. Gmail, Facebook, Salesforce, Dropbox). Users do not control operating systems, hardware or network infrastructures.

Service Models & Different Cloud Types

PRIVATE CLOUD

Operated and customised solely for one organisation.

Use cases / when to use

- For customised applications and services
- In case of highly sensitive data
- For extremely mission critical and high-load appliances
- As a first step in a cloud migration strategy
- When high performance is necessary
- Full control is demanded (legal, privacy)

Requirements

- High level of expertise needed
- Operational and system management resources needed

Examples and Tools

- Local Grid or HPC clusters (IaaS)
- Any organisation with a high degree of virtualisation, common in OTAP environment (IaaS)
- IaaS tools: Openstack, VMware, Eucalyptus, OpenNebula (virtual machine deployment including storage)

COMMUNITY CLOUD

Shared by several organisations and supporting a specific community. Governance model may be federated or brokered.

Use cases / when to use

- Well-identifiable community with common interest and specific demands (performance, legal & privacy aspects)
- Collaboration between institutions and researchers
- Sharing of resources to reduce costs
- Procurement of cloud services in shared context easier

Requirements

- Broker or trusted third party
- Governance structure
- Consensus on offered functionality

Examples and Tools

- Federative model: eduroam and SURFfederatie (IaaS)
- SURFnet mailfilter, FileSender and SURFmedia (SaaS)
- SURFconext (PaaS, interface to public/private cloud)
- LHC storage & grid (PaaS)
- CLARIN content federation for humanities (IaaS)
- IaaS tools: Openstack, Eucalyptus, Cloud.com, OpenNebula (virtual machine deployment including storage)

PUBLIC CLOUD

Available for personal and business use

Use cases / when to use

- Incidental or ad-hoc need for resources
- Commodity or standardised IT services (e.g. mail, document transfer)
- Public sharing of research results
- When IT staff resources and knowledge is limited

Requirements

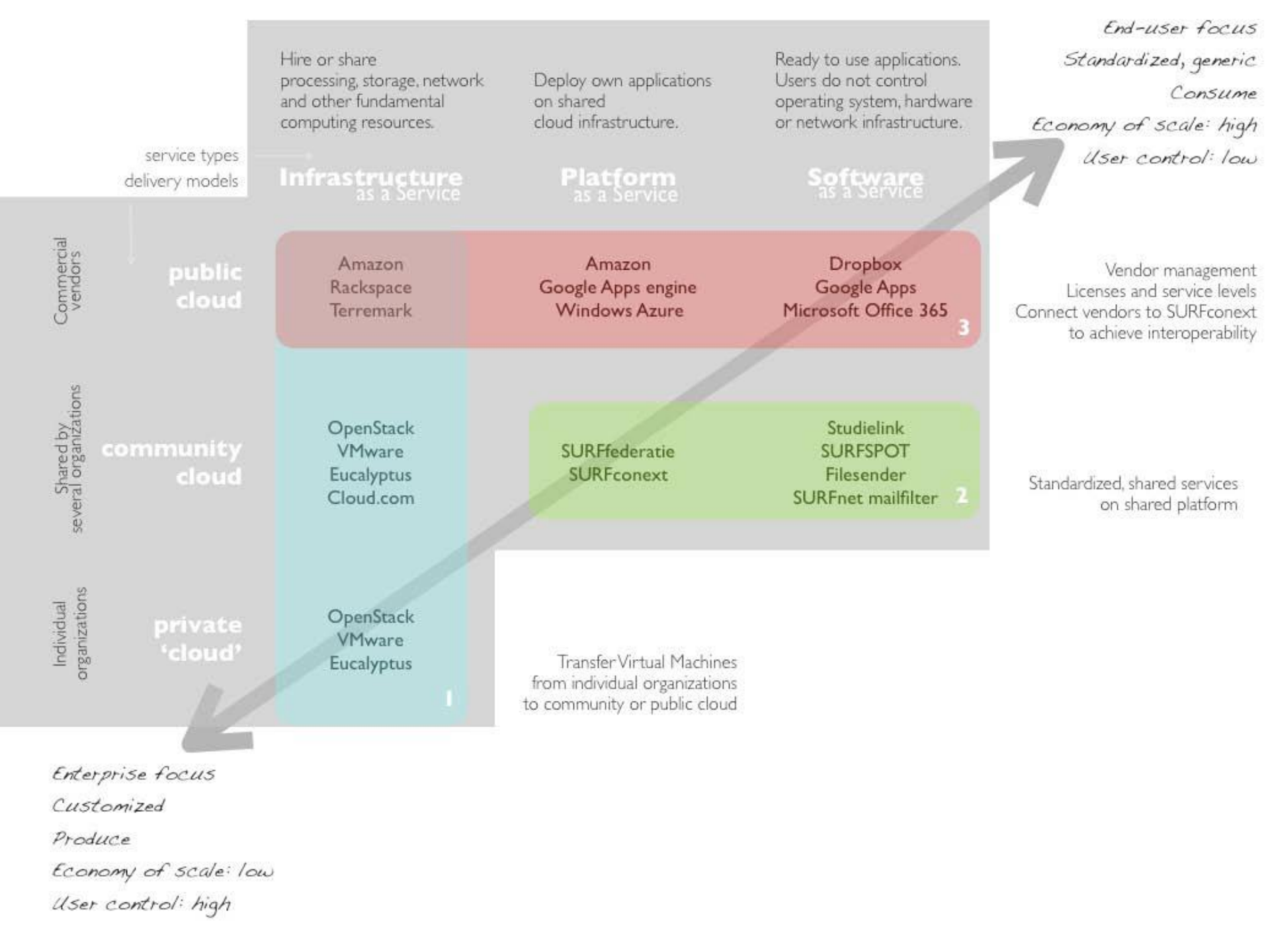
- Check if legal and privacy conditions are met
- Consider fall-back and migration scenarios
- Must match with commodity facilities
- Risk management assessment essential

Examples and Tools

- Open Universiteit and University of Utrecht student mail
- DANS as a repository for research content (publications and data) and 3TU Datacenter
- Microsoft Azure cloud resource for NSF researchers
- SaaS: gmail, Dropbox, Microsoft Office 365
- PaaS: Google Apps Engine
- IaaS: Amazon, Rackspace, Greenqloud (virtual machine deployment including storage)

Hybrid cloud: a composition of two or more of the above clouds. The clouds remain unique entities, but are tied together by standardised technology that allows a degree of data and application portability.

Authors: Arjan Peddemors (Novay), Bob Hulsebosch (Novay), and Rogier Spoor (SURFnet)


End-user focus
Standardized, generic
Consume
Economy of scale: high
User control: low
Hire or share processing, storage, network and other fundamental computing resources.
Deploy own applications on shared cloud infrastructure.
Ready to use applications. Users do not control operating system, hardware or network infrastructure.
service types
delivery models
Infrastructure as a Service
Platform as a Service
Software as a Service
Commercial vendors
public cloud
Amazon
Rackspace
Terremark
Amazon
Google Apps engine
Windows Azure
Dropbox
Google Apps
Microsoft Office 365
3
Vendor management
Licenses and service levels
Connect vendors to SURFconext
to achieve interoperability
Shared by several organizations
community cloud
OpenStack
VMware
Eucalyptus
Cloud.com
SURFfederatie
SURFconext
Studielink
SURFSPOT
Filesender
SURFnet mailfilter
2
Standardized, shared services
on shared platform
Individual organizations
private 'cloud'
OpenStack
VMware
Eucalyptus
1
Transfer Virtual Machines
from individual organizations
to community or public cloud
Enterprise focus
Customized
Produce
Economy of scale: low
User control: high

why?

- scalable
- elastic
- anytime, anywhere
- any device (iPads …)
- pay per usage
- economy of scale & skills
- technology improvements
- integrated services
- no upgrades
- community power
- online collaboration, easy sharing
- findability

why not?

- standard services
- inflexibel
- legal & privacy issues
- poor integration with existing systems on campus and other cloud solutions
- fixed subscription price (e.g. per fte)

- vendor lock-in
- reliability (+ or -)
- security

cloud storage 1

- many suppliers (IBM, Amazon…Dropbox, Mozy)
- some data is more equal than others
  - one size does not fit all
  - hybrid solution (public, community, private)
  - storage ≠ back-up
- reliability, continuity, integrity
- performance

cloud storage 2: preparations

1. before you get in: how to get out?
2. functionality and performance
3. legal issues
   - ownership
   - privacy
   - security
   - integrity
   - continuity
   - SLA's
4. cost

architectural & technical requirements

- clear architecture, separated services, e.g.:
  - identity management
  - payment services
  - authentication & autorisation
- well defined interfaces (open, mashable)
- open standards
- secure channels
- network access & bandwith

requirements: different skills

LESS

- operations
- systems management
- application development
- helpdesk?

MORE

- IT architects
- information analysts
- legal knowledge
- contracting skills
- service (level) management

requirements for libraries

- separation between front end and back end
- separation of services
  - account management
  - financial (licensing, fees, fines)
- standardise (MARC21, RDA, …)
- know your functional requirements (MoSCoW)
- collaborate closely with IT

the view from NL

- higher education CEO's & SURF: *cloud first*
  - common strategy
  - preconditions: security, privacy & identity management
  - business cases
  - governance
  - community cloud services

the view from Tilburg: data

- high level SAN's on campus
- 2 sites (fail over)
- back-up at SARA in Amsterdam

- for research: low cost NAS – no back-up
- research data sets in Dataverse
  - back from Harvard to Utrecht
  - -> community cloud (SURF)?

- library data to the cloud: OCLC (WMS)
- student e-mail and data to the cloud: Google

the view from Tilburg: applications

- SAP (HR & finance): hosted yes, (public) cloud no
- SIS: hosted -> community cloud?
- CRM: -> cloud

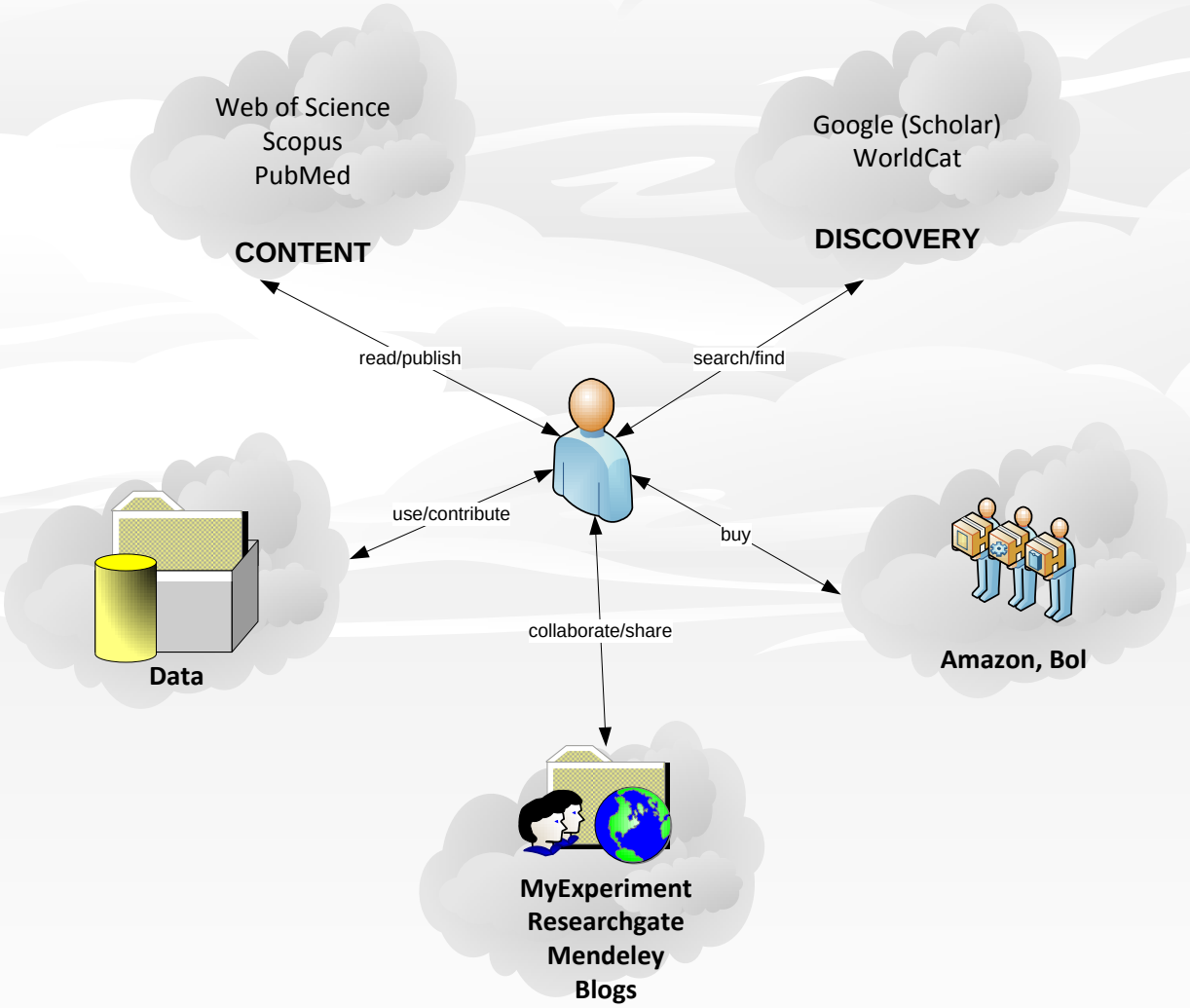
- student e-mail & apps: ~~Microsoft~~ -> Google
- side effect: Google apps for staff

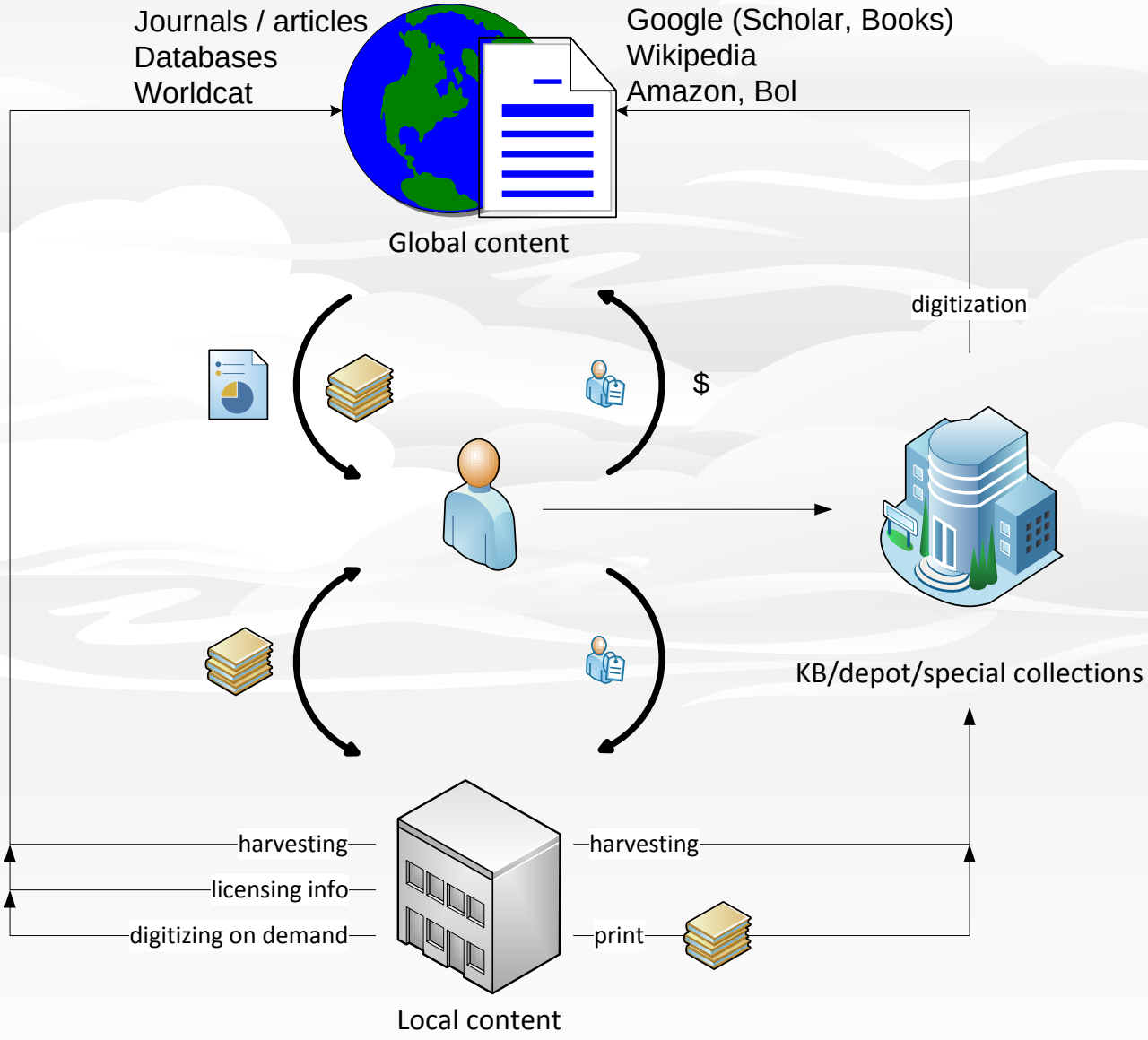
- library
  - ILS front end: WorldCat (cloud)
  - ILS back end: WMS (cloud)

the view from Tilburg: focus shift

- from
  - IT support
  - systems management
  - application development

- to
  - education support
  - research support
  - opening up management information
  - allow mobile services


Web of Science
Scopus
PubMed
CONTENT
Google (Scholar)
WorldCat
DISCOVERY
read/publish
search/find
use/contribute
buy
collaborate/share
Data
Amazon, Bol
MyExperiment
Researchgate
Mendeley
Blogs


Journals / articles
Databases
Worldcat
Google (Scholar, Books)
Wikipedia
Amazon, Bol
Global content
digitization
$
KB/depot/special collections
harvesting
licensing info
digitizing on demand
harvesting
print
Local content

end

See also:

- http://www.youtube.com/watch?v=QJncFirhjPg
- http://www.youtube.com/watch?v=_eq3Sj1GGs8&feature=related
- Wikipedia
- Slideshare
- Educause
- OCLC
- SURF, JISC, etc.
- Gartner
- plain old Google ☺

Thank you for listening.