The background of the slide features three large, grey, textured paper elephants standing in a row, facing right. They are made of a material that looks like crumpled paper or cardboard. In the foreground, there is a field of green grass. Scattered among the grass are several colorful paper insects: a yellow butterfly on the left, a pink butterfly in the center, a green butterfly on the right, and a blue dragonfly on the far right. The overall scene is a creative, nature-inspired display.

# Developing a Personal Learning Infrastructure

TCU International e-Learning Conference 2016, Bangkok, Thailand

Stephen Downes, August 1, 2016

This workshop will map the technological infrastructure for a personal learning network. It will describe the major protocols supporting personal learning and describe how third party applications (such as simulation engines or learning management systems) interact with personal learning environments. It will draw on the technology developed by the National Research Council's 'Learning and Performance Support Systems' to create a testbed technology environment.

# Agenda

|               |  |
|---------------|--|
| 13:30 – 13:45 | Introductions and Aliases  |
| 13:45 – 14:00 | What is a PLE?   |
| 14:00 – 14:15 | Value Proposition Workshop   |
| 14:15 – 14:30 | Elements of the PLE  |
| 14:30 – 14:45 | Roles and Tasks Workshop   |
| 14:45 – 15:00 | Break  |
| 15:00 – 15:30 | Underlying Technologies  |
| 15:30 – 16:00 | Task Priorization Exercise   |
| 16:00 – 16:30 | Building the PLE environment<br>with knowledge of e-learning interoperability technologies, we will<br>'moot' a PLE infrastructure |

# Introductions and Aliases

# Introductions and Aliases

- Split into five groups as assigned:
  - Users (slightly larger group)
  - Sponsors (who will pay to have it built)
  - Developers (who will actually build it)
  - Marketing (who will sell it)
  - Operations (who will keep it running)



# Users

Choose a person - yourself, your child, a person you know

- it needs to be a specific person with a name, age, place of residence, educational background.

Chose a context or environment - do you work at a law office? A grocery store? Are they a teacher? Are they a farmer in the field?

# Sponsors

Choose a person who would pay for the system

- What problem are they trying to solve?
- Why would they be willing to pay?

Examples:

- Company investing in training systems
- College or university administrators
- Government employment support official

# Developers

Choose a specialization (don't worry if you aren't really a developer)

For example:

- Database engineer
- User interface designer
- Platform services

Ask yourself:

- What information do I need to be able to do the job?
- How does this look like products that already exist?



# Marketing

Some roles and questions:

- Business development
- Copy writer
- Purchaser / distributor

Some marketing questions to ask:

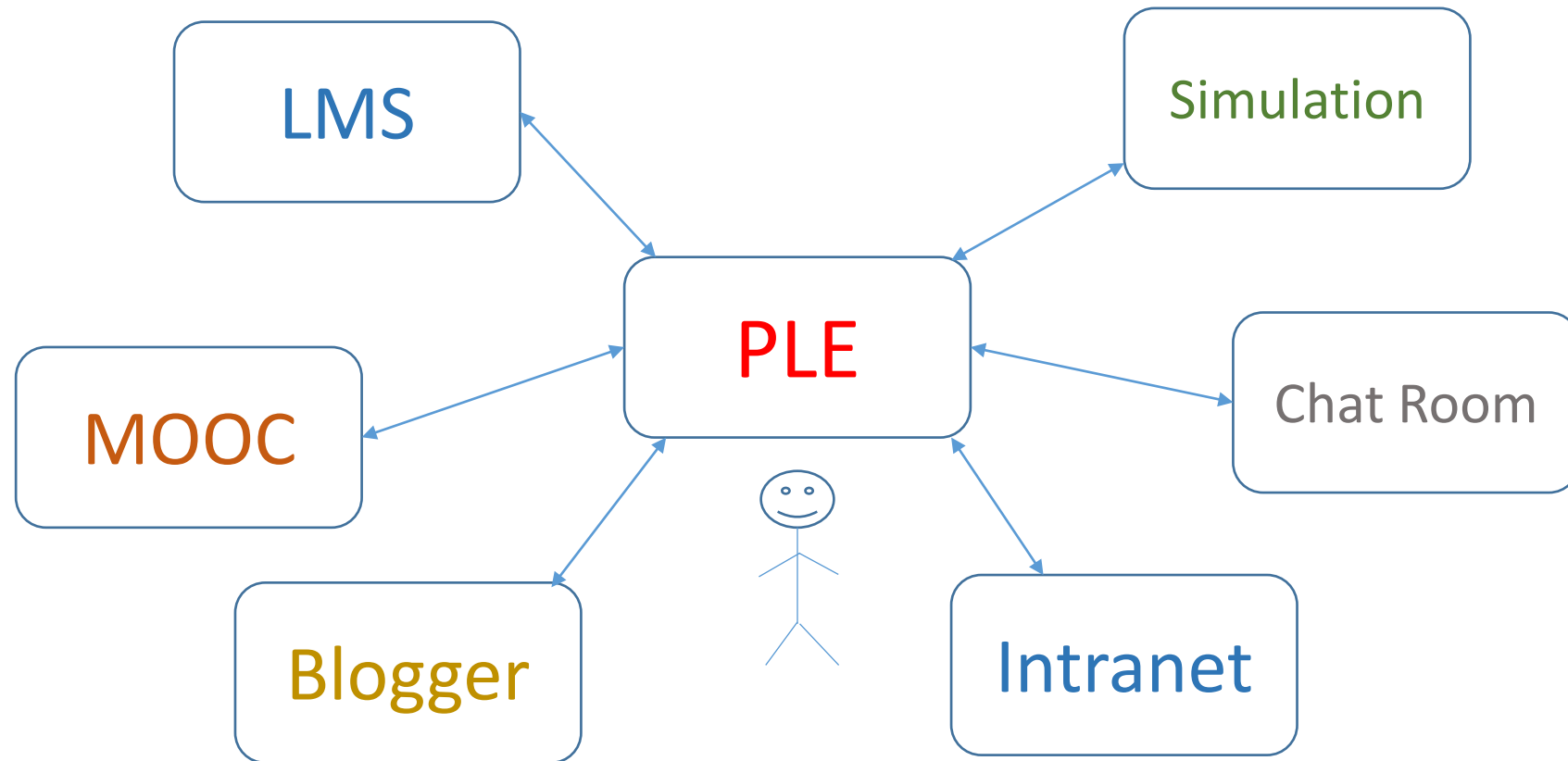
- What's the best business model?
- How can it address client needs?
- Where are the best channels to market it?

# Operations and Maintenance

- How do we keep the product running?
- How do we keep maintenance sustainable?
- What roles need to be filled to manage these?

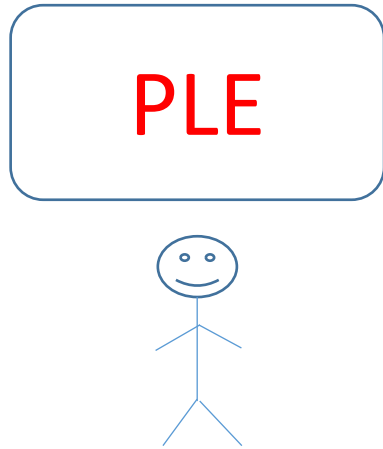
What is a PLE?

# Overview of the Concept of PLEs



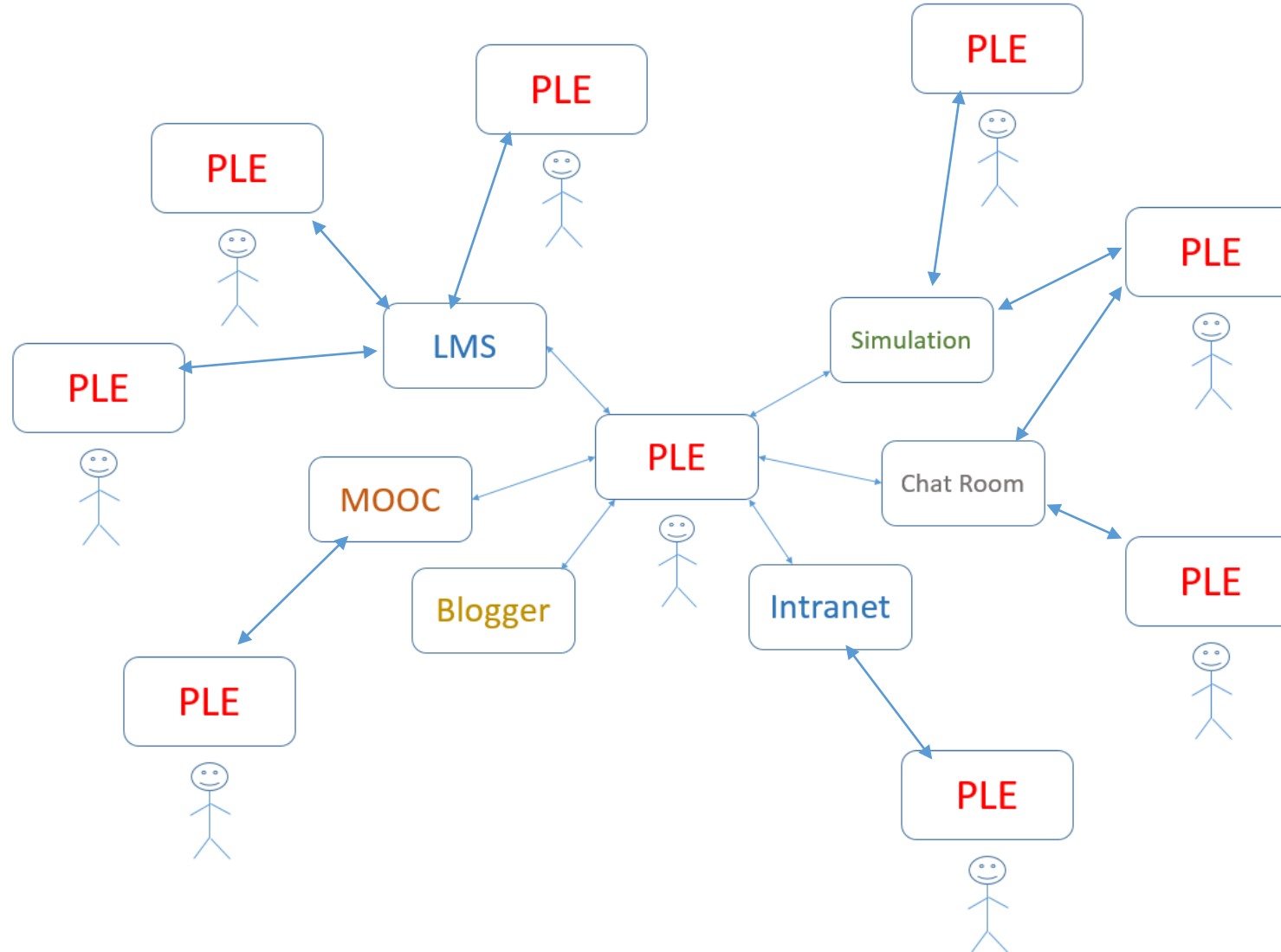
Access to many services in one personal environment

# Properties of the PLE...

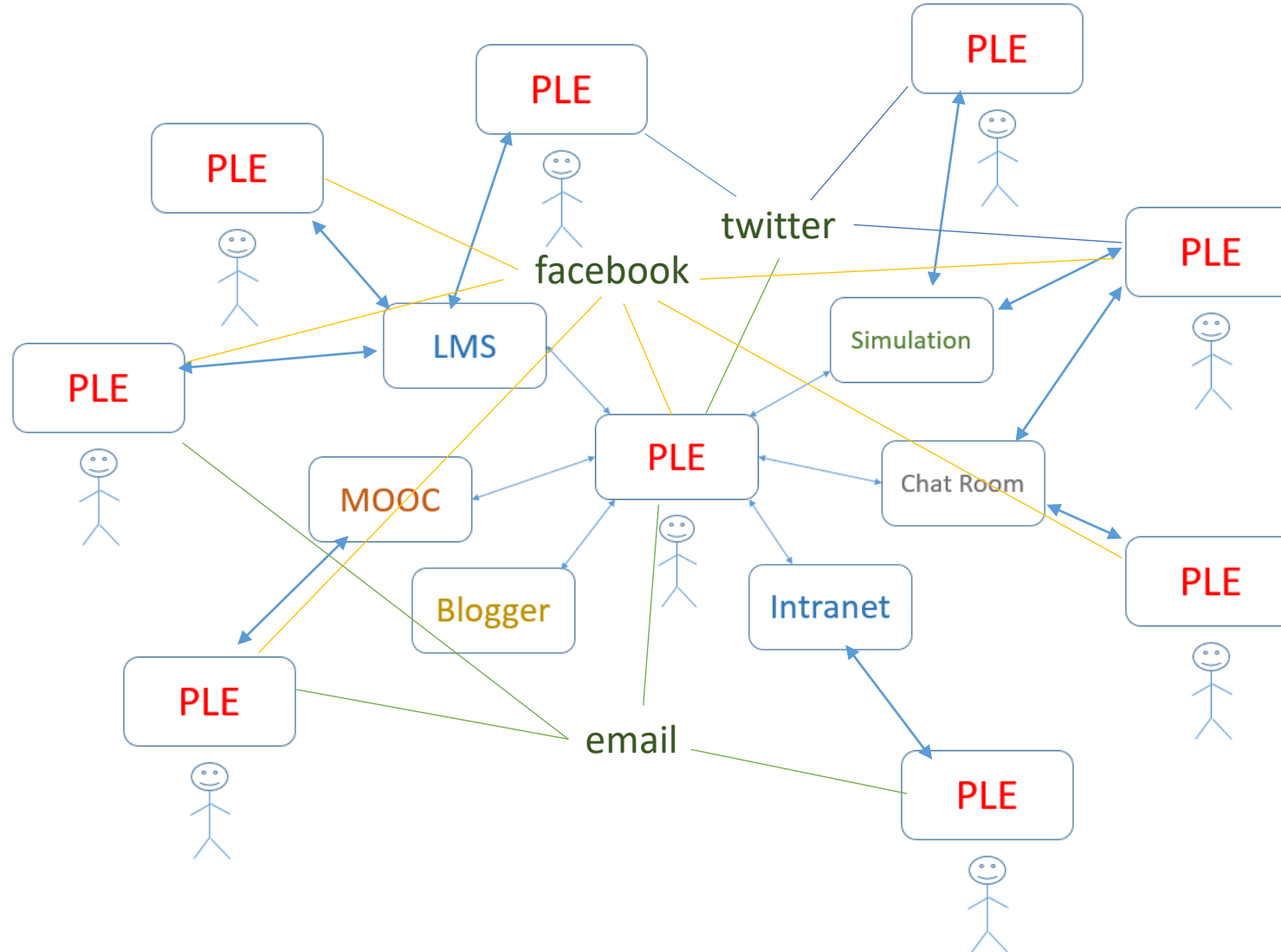


- What information should it record?
- Who owns the data? How private is it?
- What should it *do*?
- What would a person do with it?
- Where, exactly, is a PLE located?

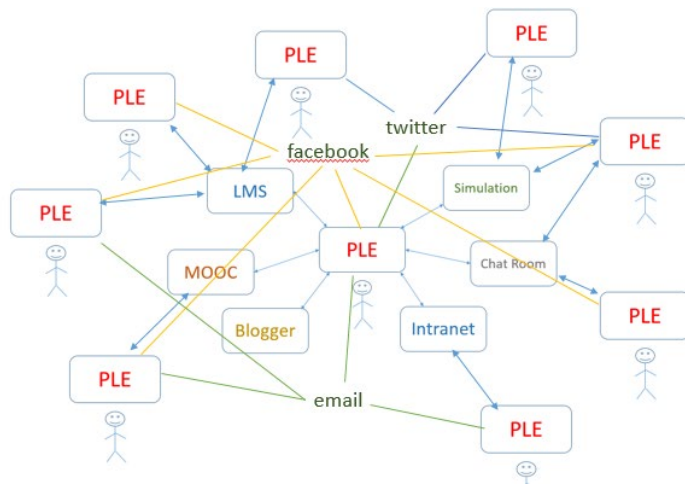
# The Network of PLEs



# The Social Network of PLEs



# Properties of the Network...



- How do people find each other? Services?
- How do they communicate? What do they share?
- How does a single PLE work with services?
- Do we need centralized registries?



# Why a personal learning environment?

- What is the *value proposition* for a PLE?
  - Note: value isn't what you can *do*, it's how you benefit
  - This is usually stated in financial terms (earn more, cost less)
  - Can also be stated in terms of quality: faster, bigger, better
  - And can be non-financial goods: satisfaction, happiness, memories

Many elements of the interactive exercises were drawn from Alain Désilets,  
**Envisioning the Right Thing How to facilitate a collaborative project visioning workshop**



# Value Proposition Workshop

# What is a PLE?

- Elements of a personal learning environment (interactive exercise to define major elements, e.g. resource network, personal learning record, learning assistant, analytics)
- What we want to do here is to ask ourselves what a PLE will *do*
- This involves asking why we want a PLE to begin with

So, back in your original groups, consider the following....

# The Value Proposition...

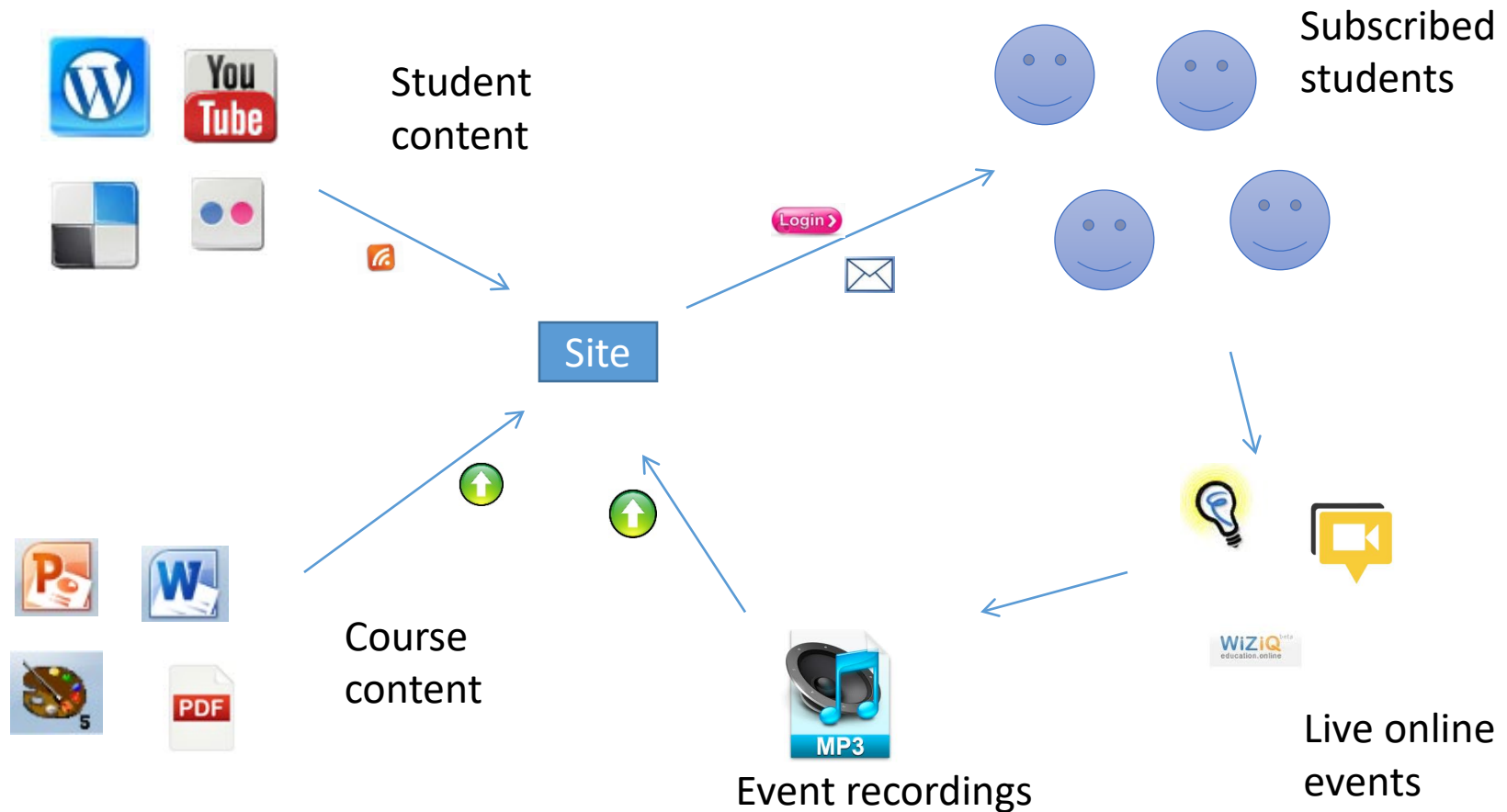
|                    |  |
|--------------------|--|
| For:               | Target user  |
| Who:               | Pressing need                                      |
| The PLE is:        | Name and type of product                           |
| That:              | 'Killer Feature'.... Reason to buy (or to pay for) |
| Contrarily to:     | Main alternative                                   |
| It allows them to: | Distinguishing feature                             |

# Value Proposition Workshop

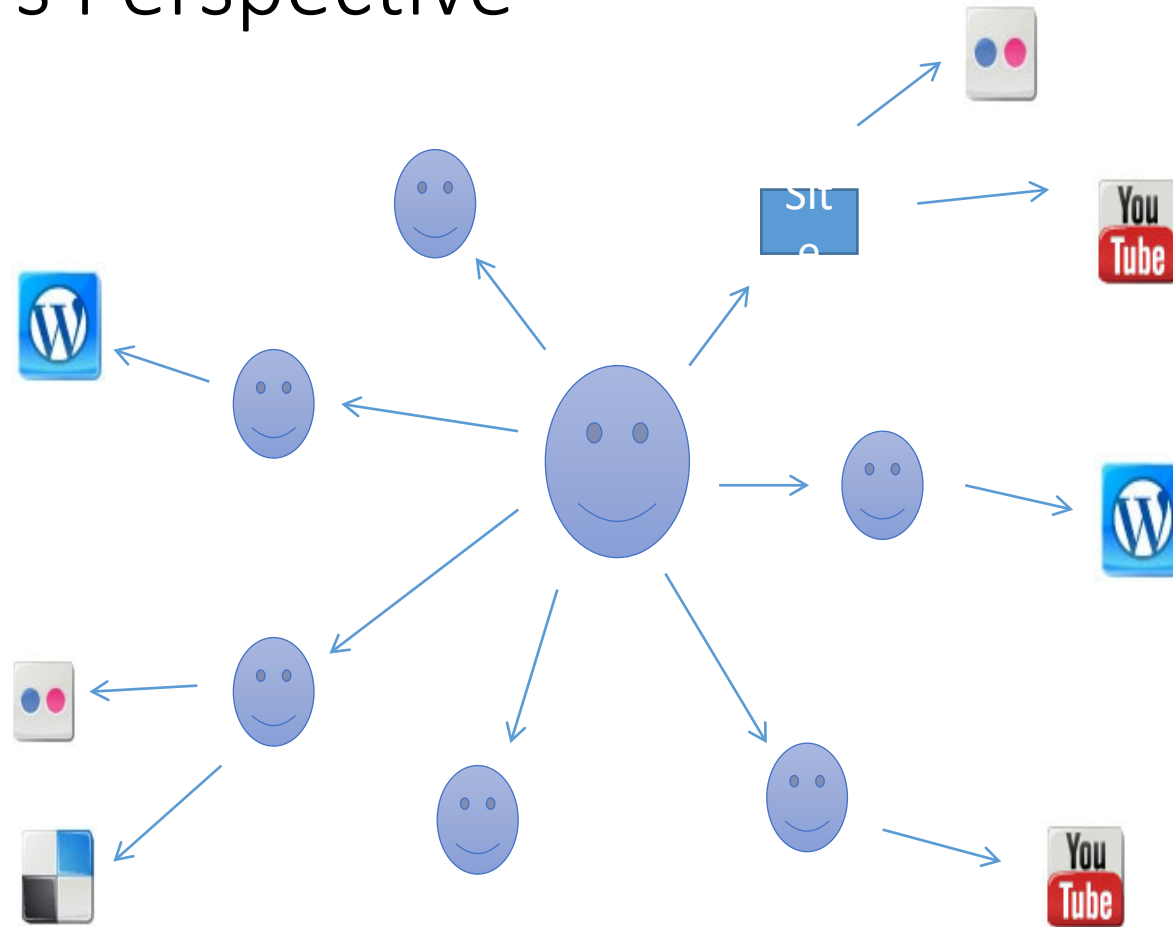
- Five new groups, each with a:
  - User
  - Sponsor
  - Developer
  - Marketer
  - Operator
- Draft value propositions and record them

# Elements of the PLE

# Course Provider Perspective



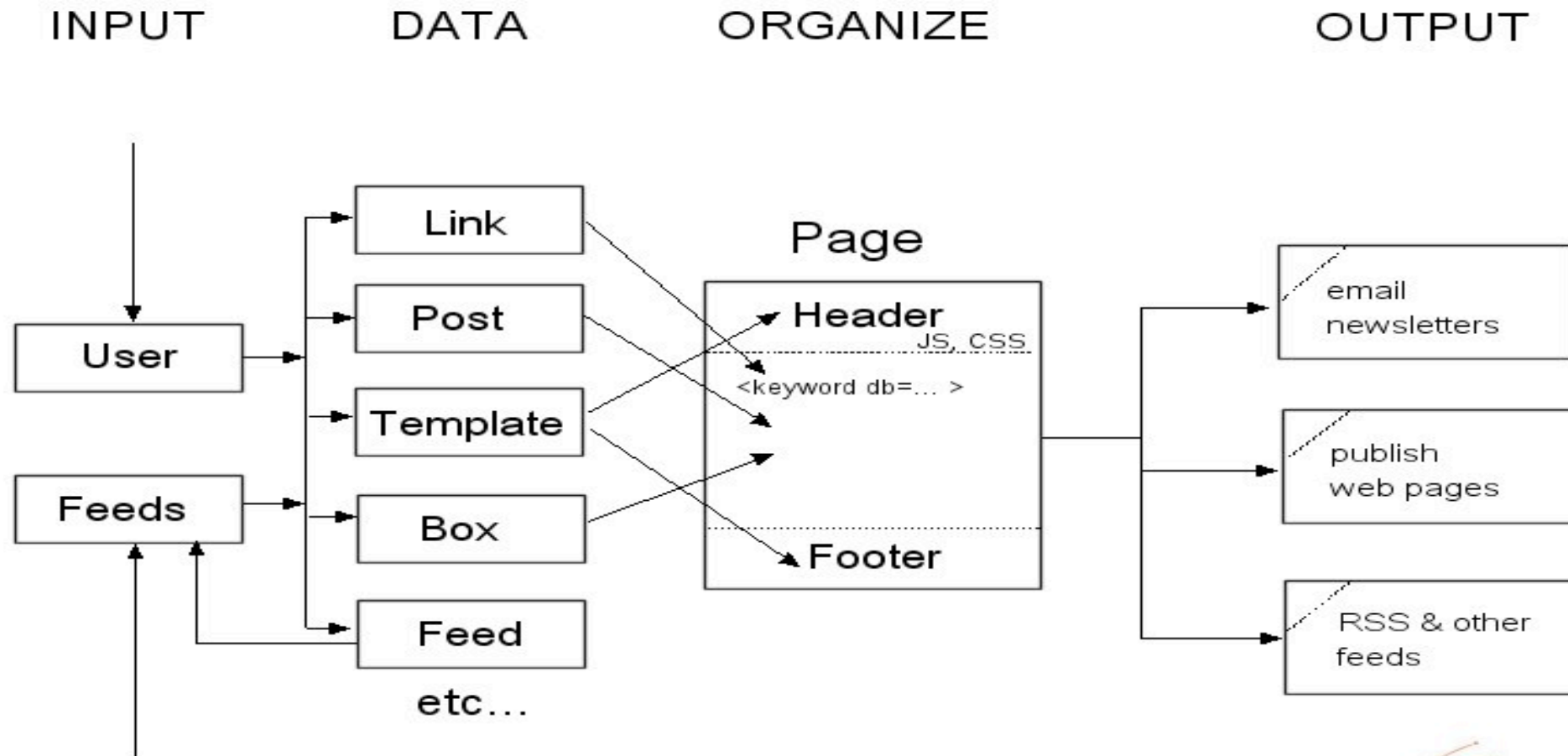
# The Student's Perspective



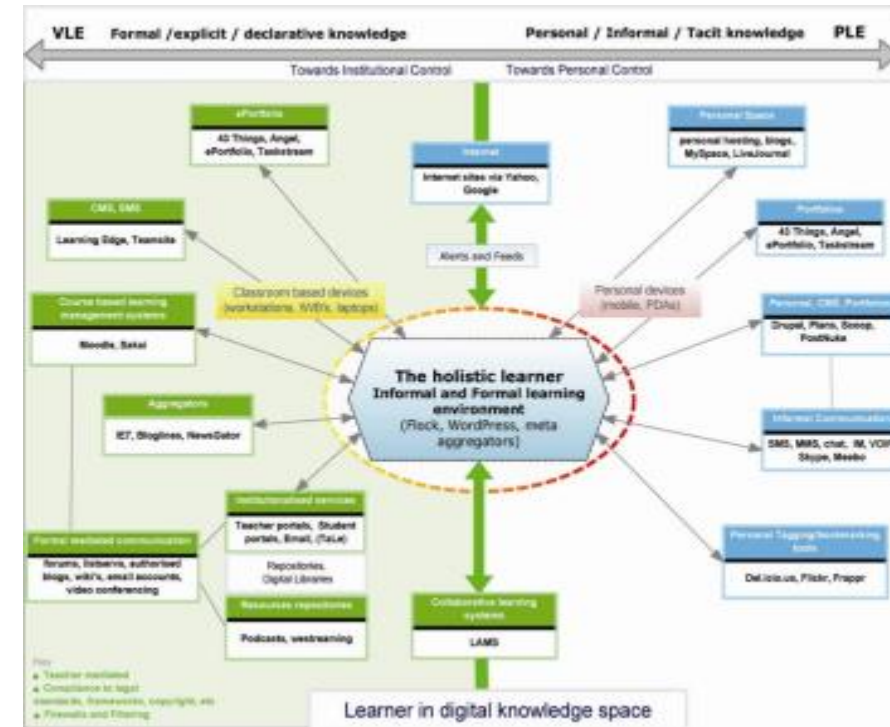
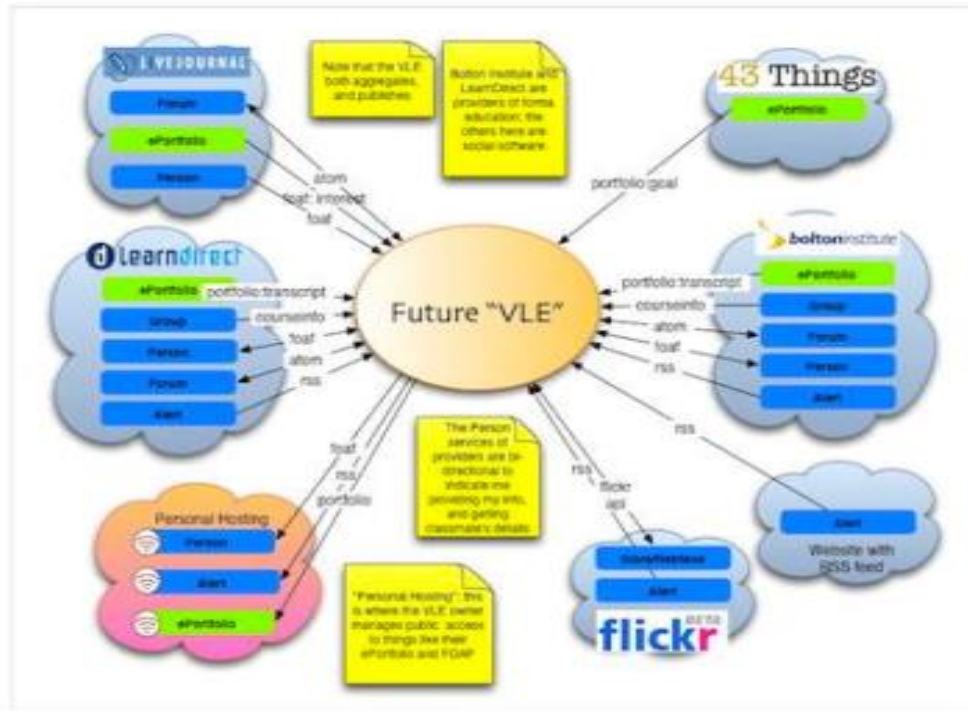
A range of different resources and services



# gRSShopper



# The design is based on putting the learner at the centre

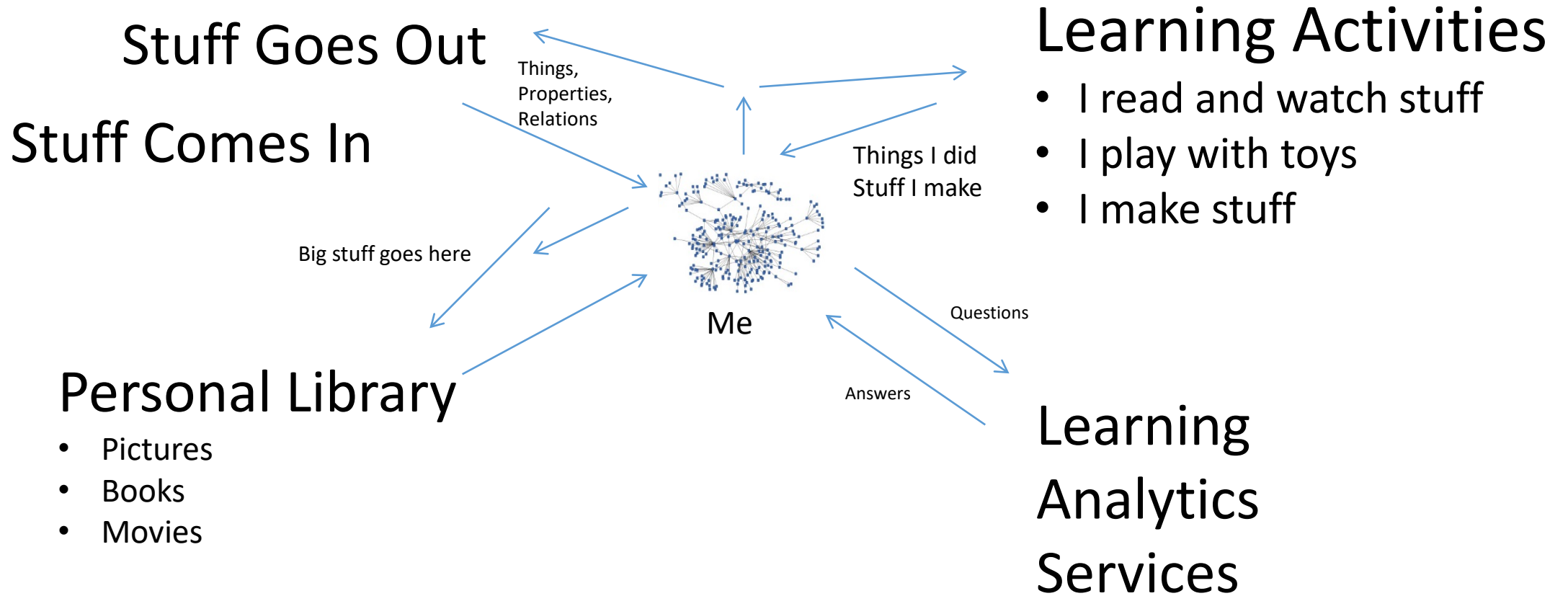


Scott Wilson (left), Tim Hand (right)

<https://www.google.com/search?q=ple+diagrams>

[http://www.edtechpost.ca/ple\\_diagrams/index.php/mind-map-3](http://www.edtechpost.ca/ple_diagrams/index.php/mind-map-3)

# Built Around the Personal Learning Record



# Roles and Tasks Workshop

# What Tasks Will Users Perform?

- Roles... what *role or function* will the PLE serve?
  - What are the *metrics* that will measure this role
- One you have found measurable roles, list them
- Then ask: what *tasks* must the PLE perform to fulfill this role

# What Role Does a PLE Fulfil?

As many roles as you want

| Role(s) | Metric #1 | Metric #2 | Metric #3 |
|---------|-----------|-----------|-----------|
|         |           |           |           |
|         |           |           |           |
|         |           |           |           |

# What Tasks Will Users Perform?

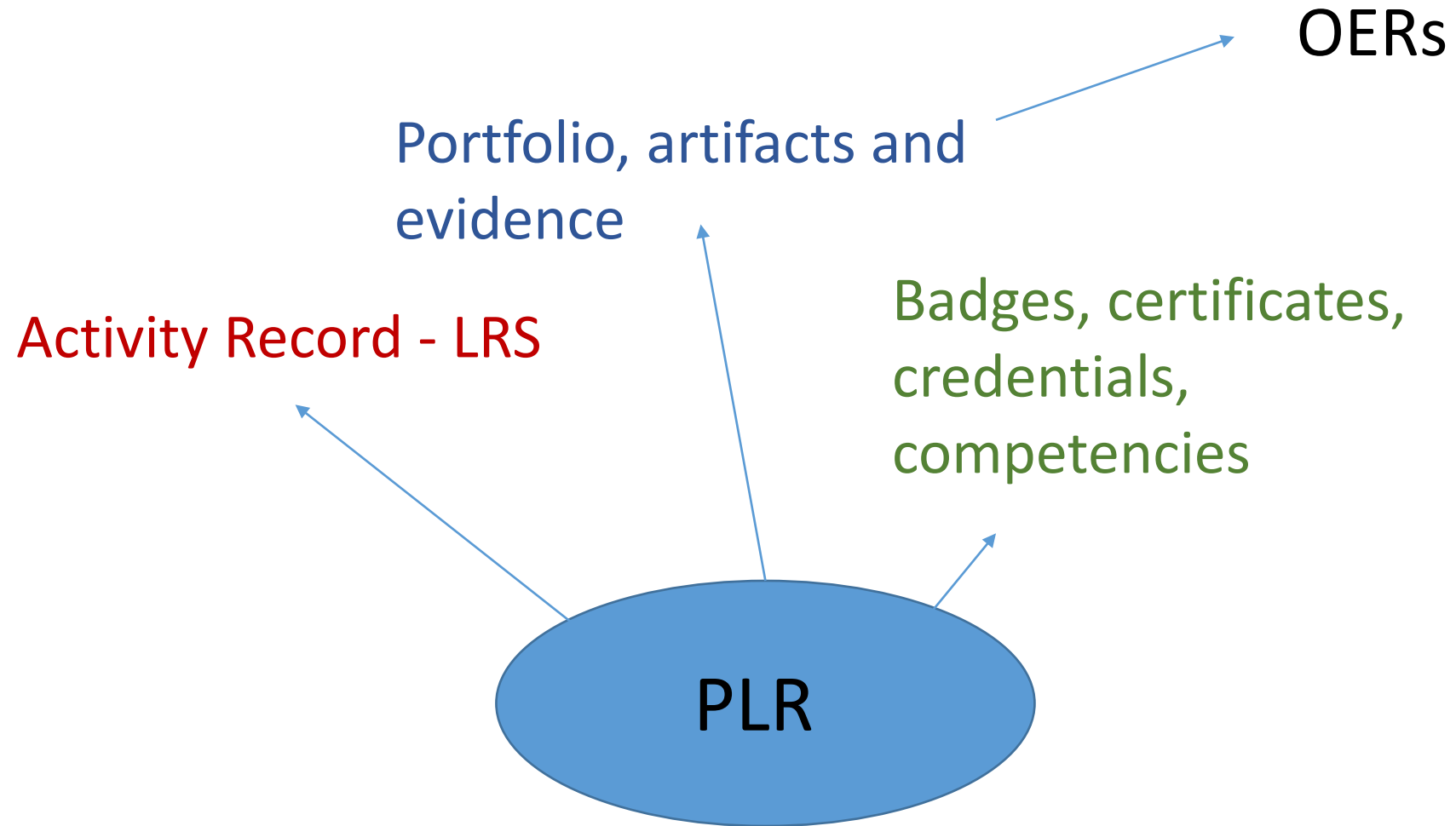
| Role(s) | Task #1 | Task #2 | Task #3 |
|---------|---------|---------|---------|
|         |         |         |         |
|         |         |         |         |

Don't Feel limited by only three tasks... make as many as you want  
Put each task on its on PostIt note

# Underlying Technologies

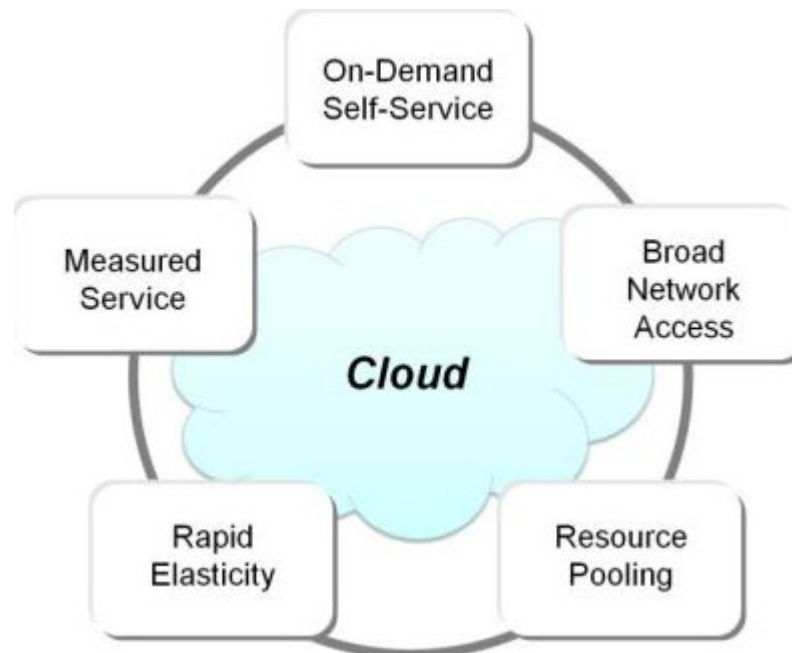


# Personal Learning Record

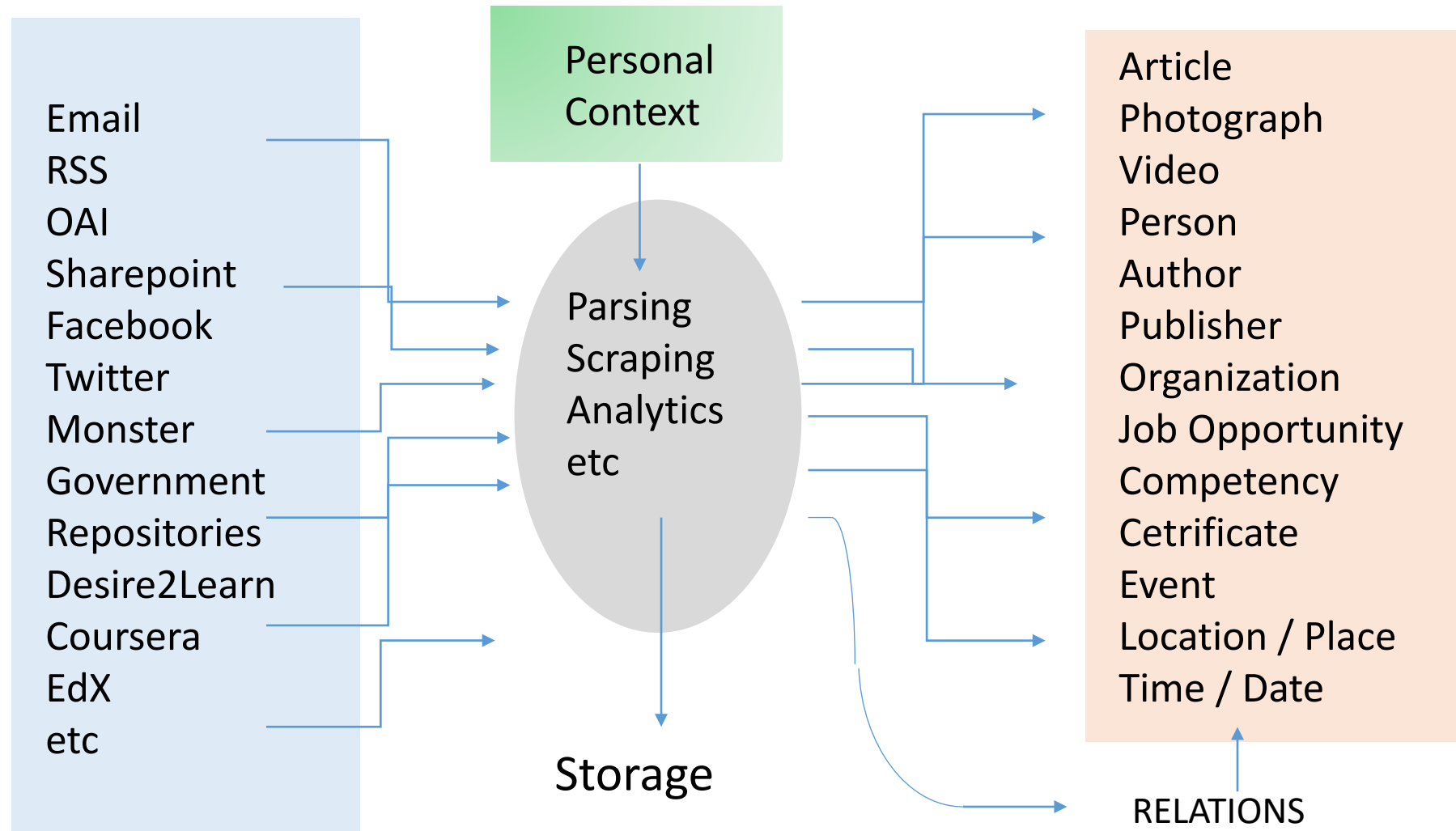


# Core interaction elements in cloud technologies

- Core interaction elements in cloud technologies (APIs, REST.JSON, OAuth, and related core technologies)

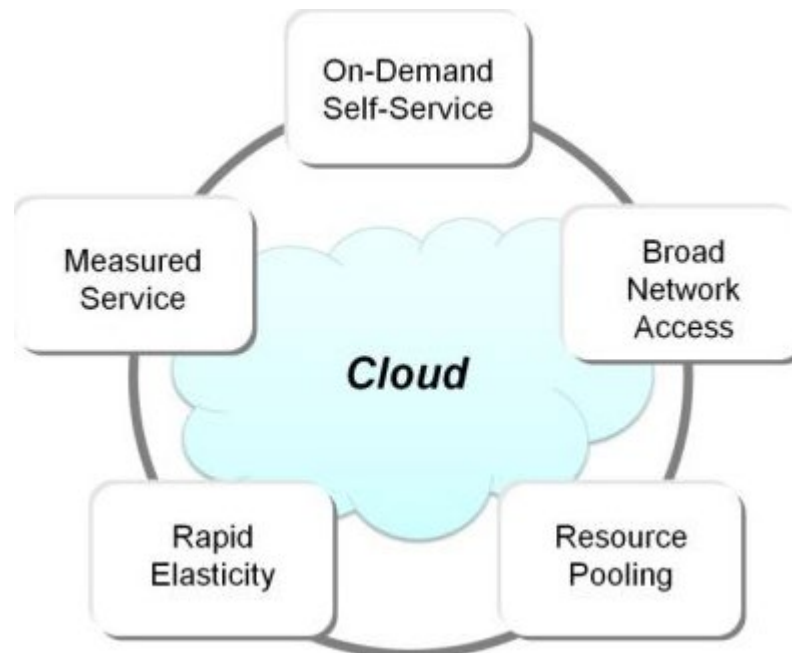


# RRN Aggregation and Storage

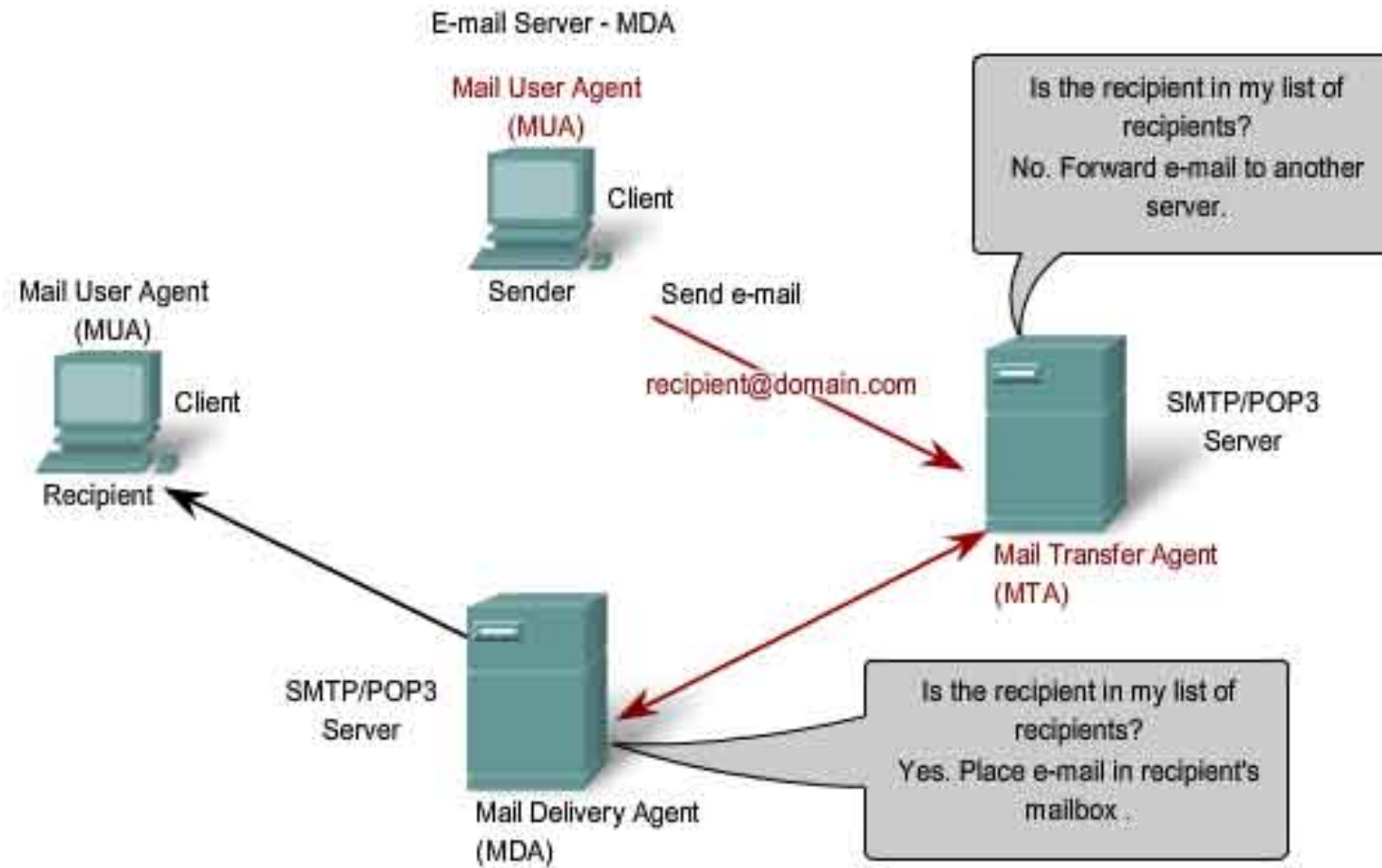


# Core interaction elements in cloud technologies

- Core interaction elements in cloud technologies (APIs, REST.JSON, OAuth, and related core technologies)

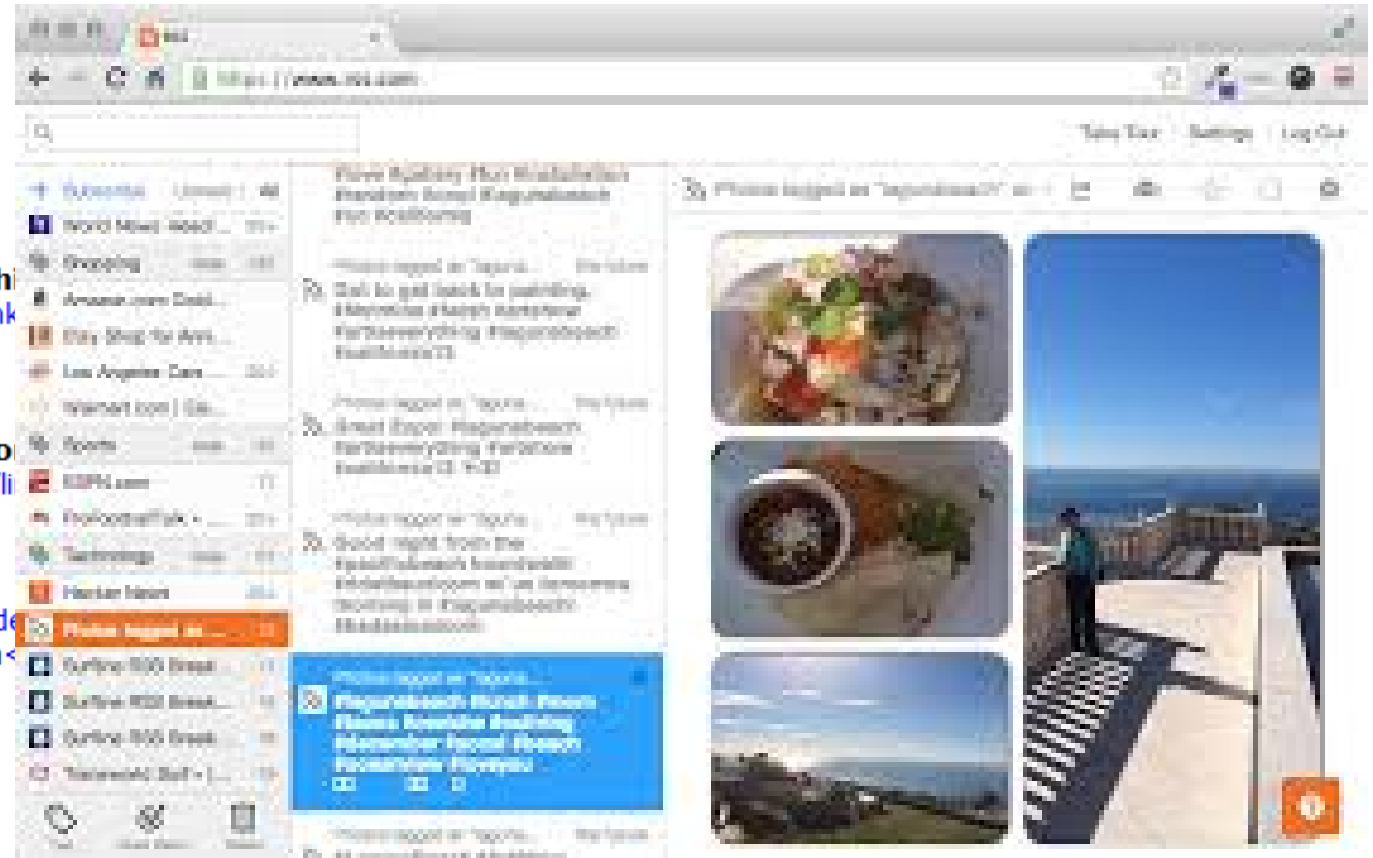


# Email – POP, IMAP, SMTP



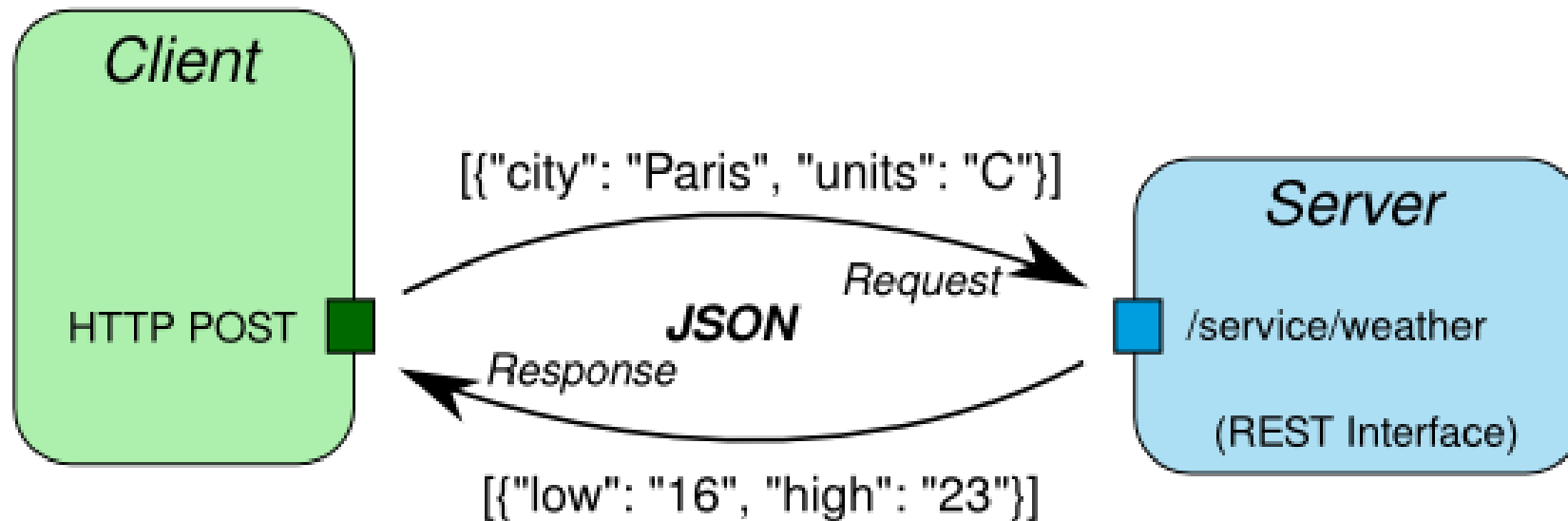
# RSS

```
<?xml version="1.0" encoding="utf-8"?>
<rss version="2.0">
  <channel>
    <title>Website Feed</title>
    <description>Website Feed coded manually</description>
    <link>http://www.yourdomain.com</link>
    <item>
      <title>Sale this week only</title>
      <description>All household products are 50% off th<
      <link>http://www.yourdomain.com/sales.htm</link>
    </item>
    <item>
      <title>A Special Event</title>
      <description>A Special Teleconference for our custo<
      <link>http://www.yourdomain.com/events.htm</li
    </item>
    <item>
      <title>Announcing new Products</title>
      <description>Announcing a new line of products</de
      <link>http://www.yourdomain.com/products.htm<
    </item>
  </channel>
</rss>
```

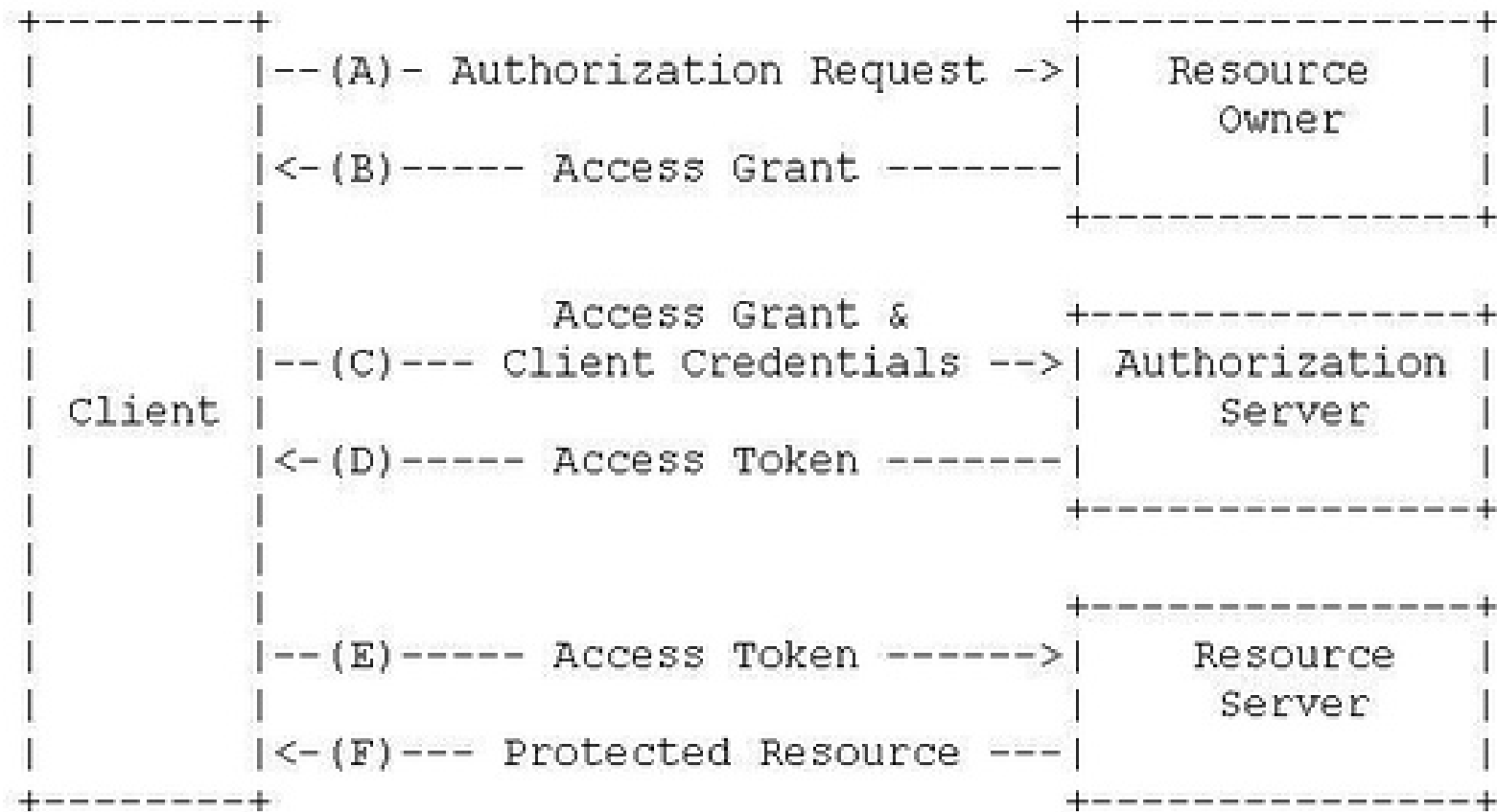


# API / REST / JSON

## JSON / REST / HTTP



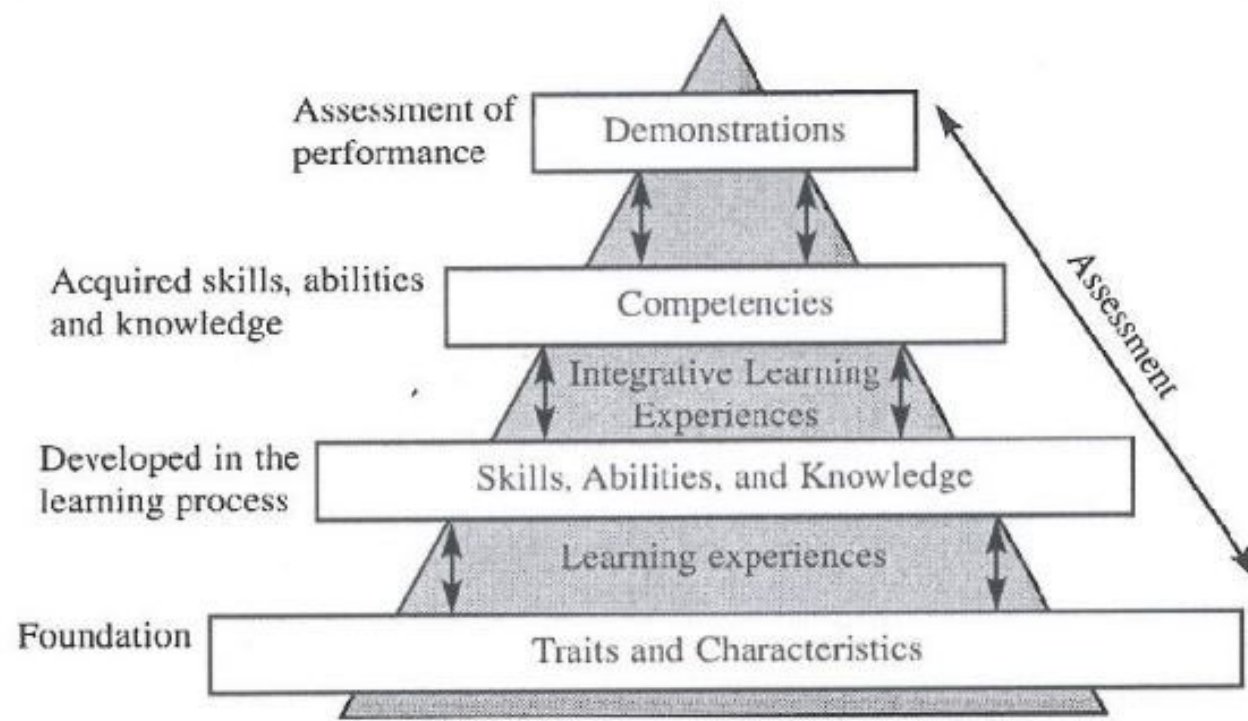
# OAuth





# Underlying common e-learning technologies

- Overview of xAPI, LTI and other e-learning tools interoperability



# Learning Resources – LOM, Packaging

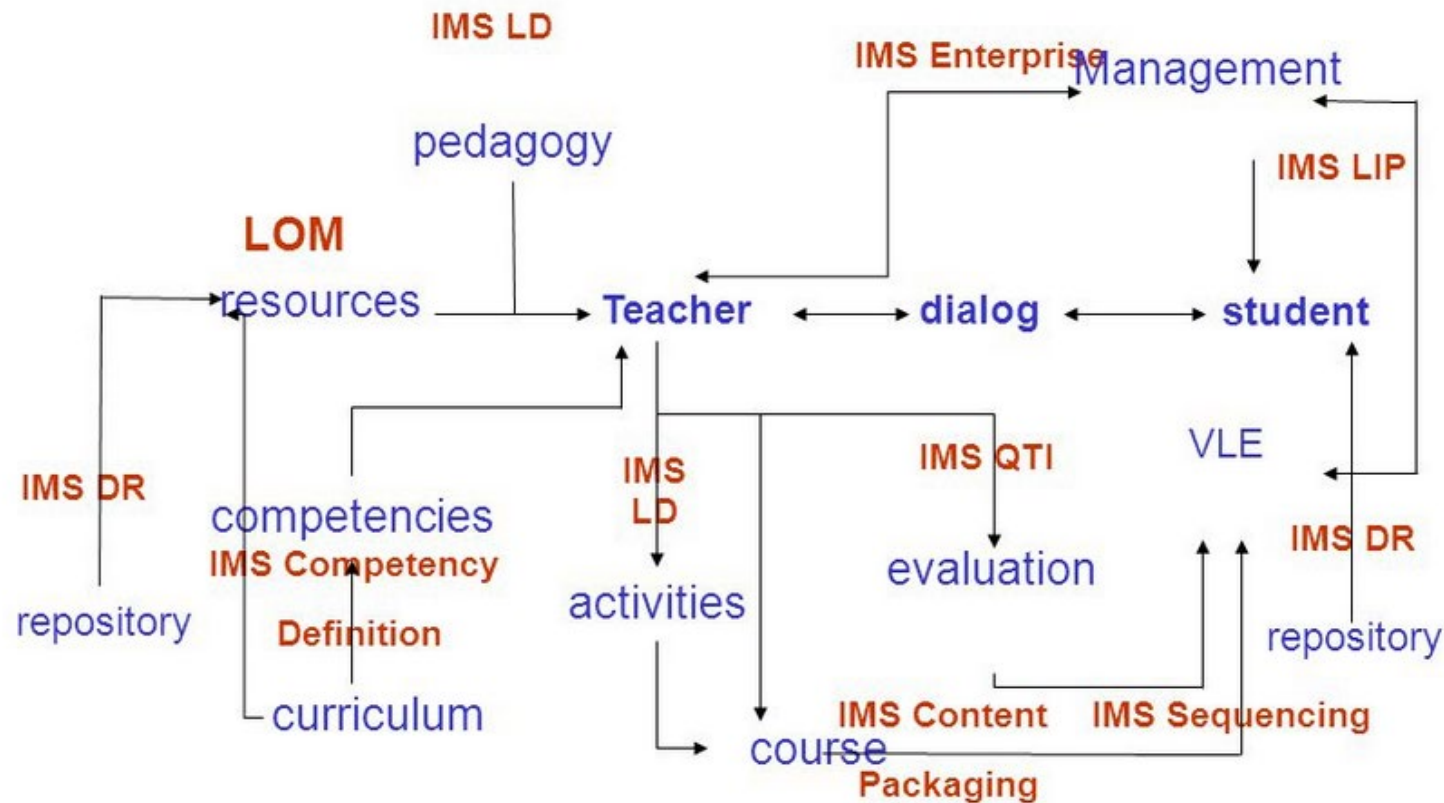
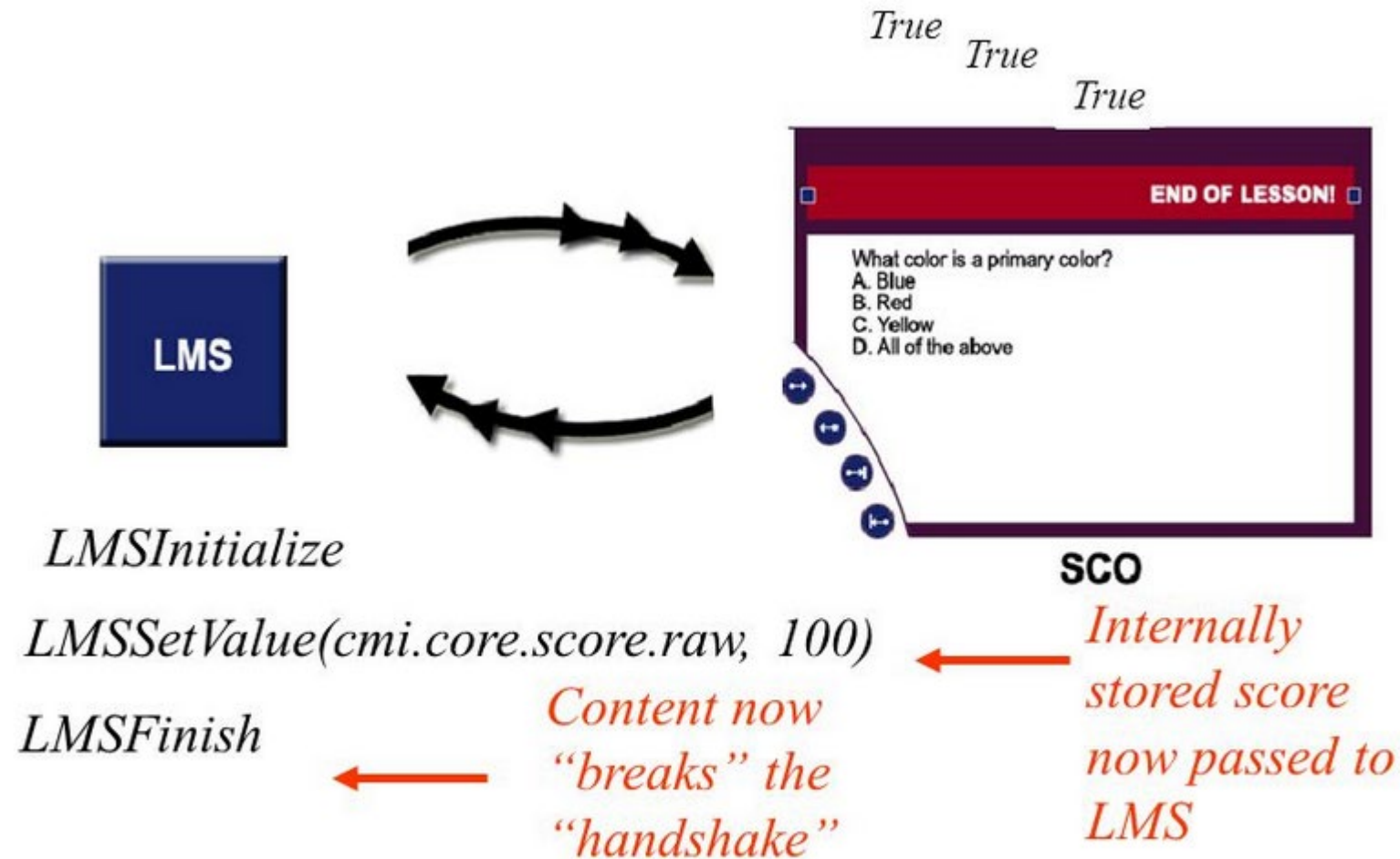
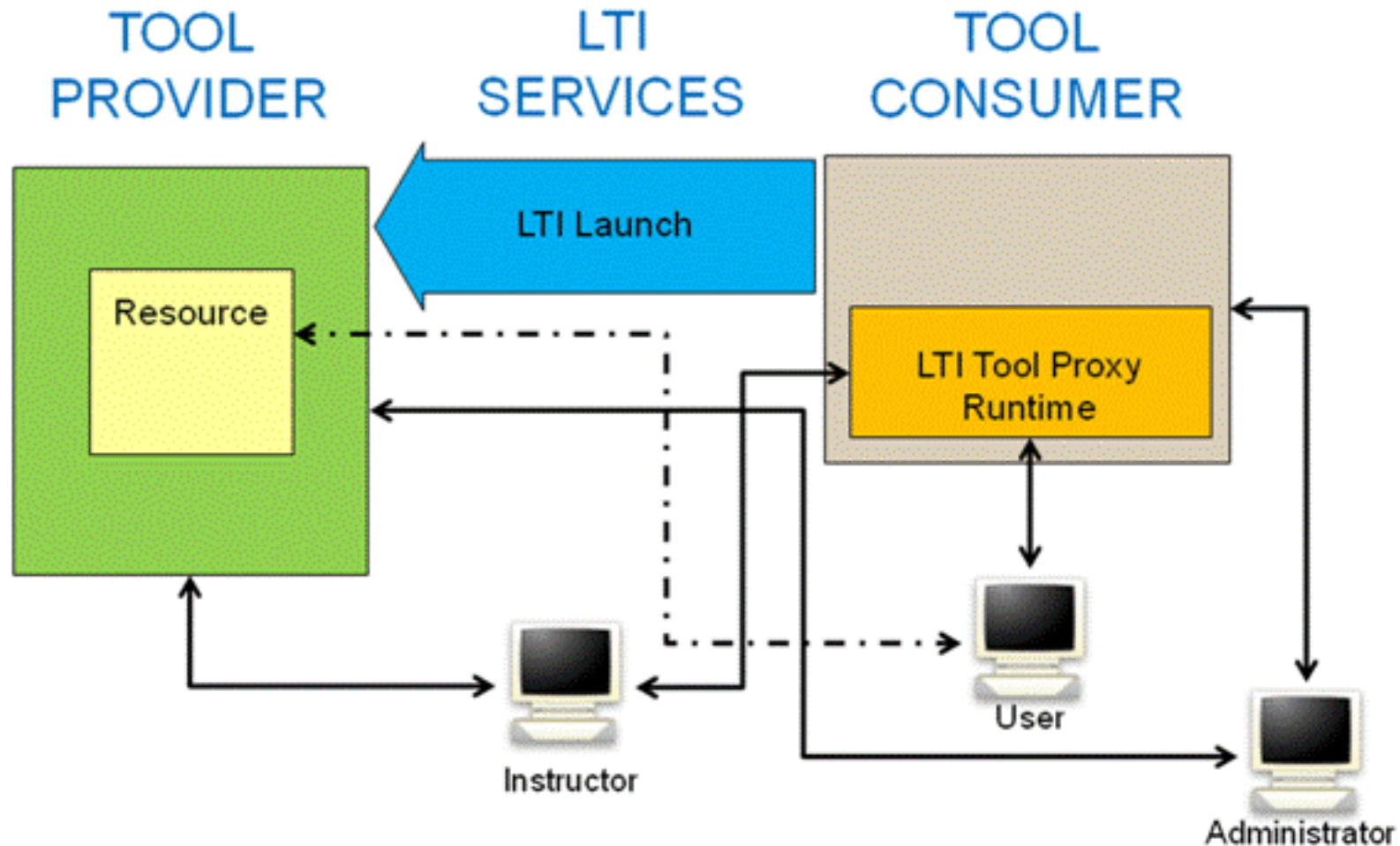


Diagrama original de C. Duncan

# Resources – SCORM Run Time Environment



# IMS Learning Tools Interoperability (LTI)



<https://www.imsglobal.org/specs/ltiv1p1/implementation-guide>

# The eXperience API

| Actor                                    | Verb  | Object   |
|--|---|--|
| Andy                                     | Listened to   | Great Expectations on Ebook  |
| <code>andy.johnson.ctr@adlnet.gov</code> | <code>http://www.adlnet.gov/verbs/<br/>listened_to</code> | <code>http://universallibrary.com/<br/>GreatExpectations_ISBN#ebook</code> |

<http://www.learningsolutionsmag.com/articles/1526/five-things-a-web-developer-needs-to-know-about-the-xapi>

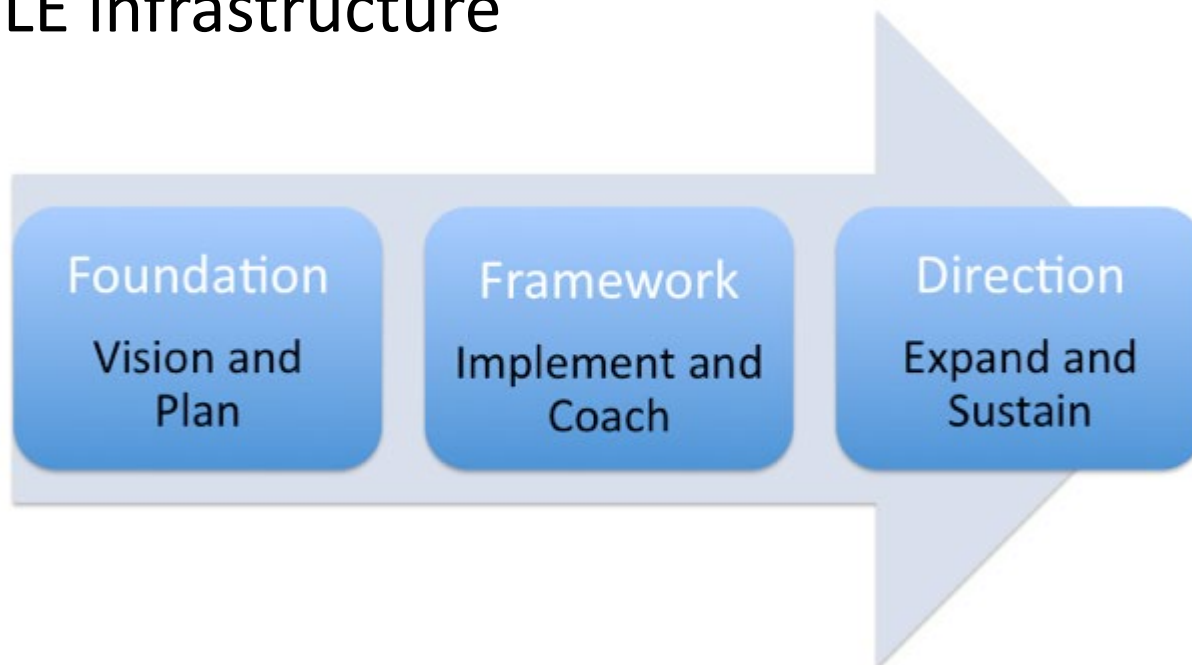
# Task Prioritization Exercise

# What Tasks Will Users Perform?

- Task prioritization process.....
  - Vote for the tasks you think are most important
  - Yes, you may vote more than once
  - We will select the top dozen or so tasks

# Building the PLE environment

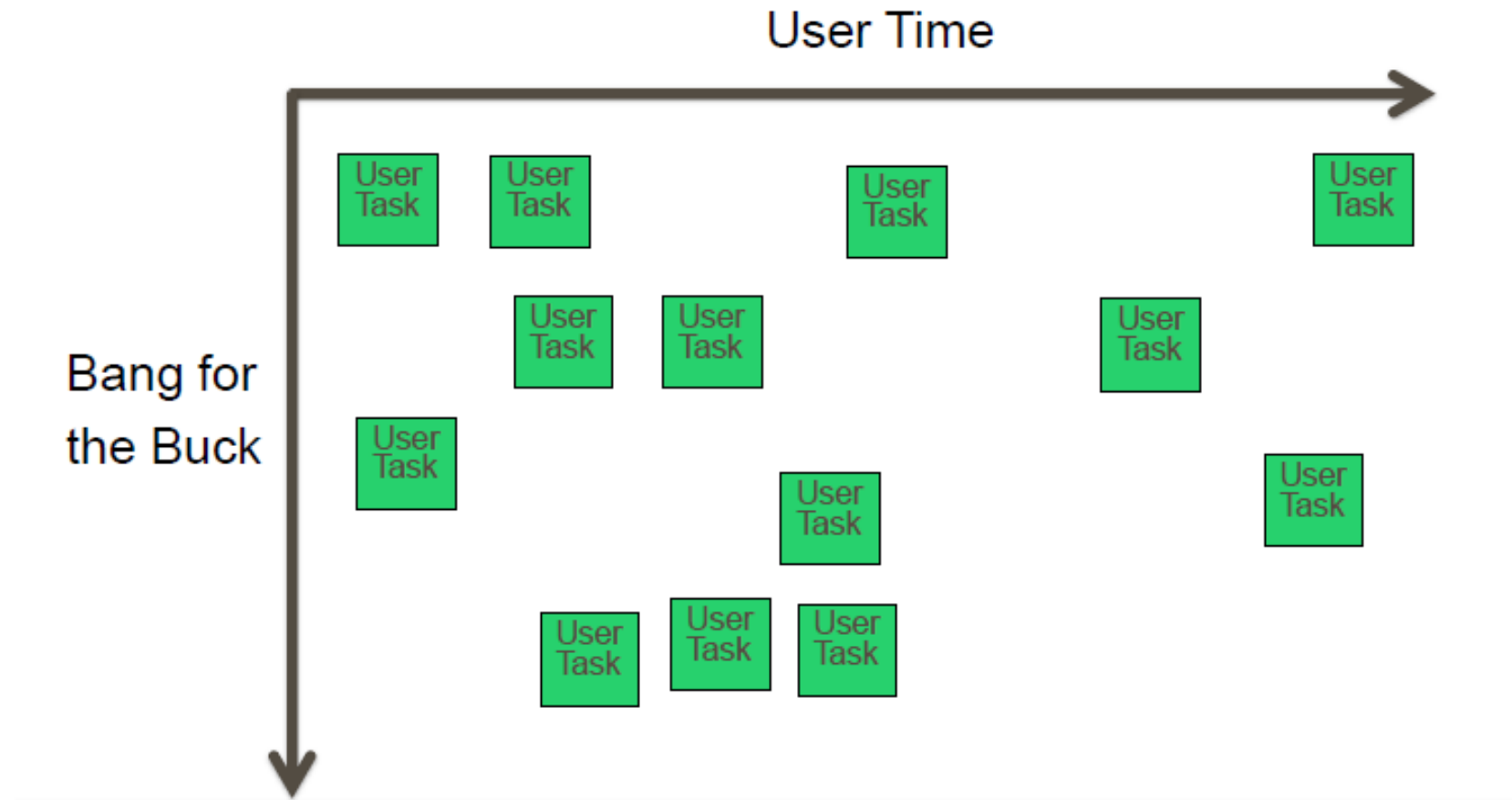
- With knowledge of e-learning interoperability technologies, we will 'moot' a PLE infrastructure





Building the PLE environment

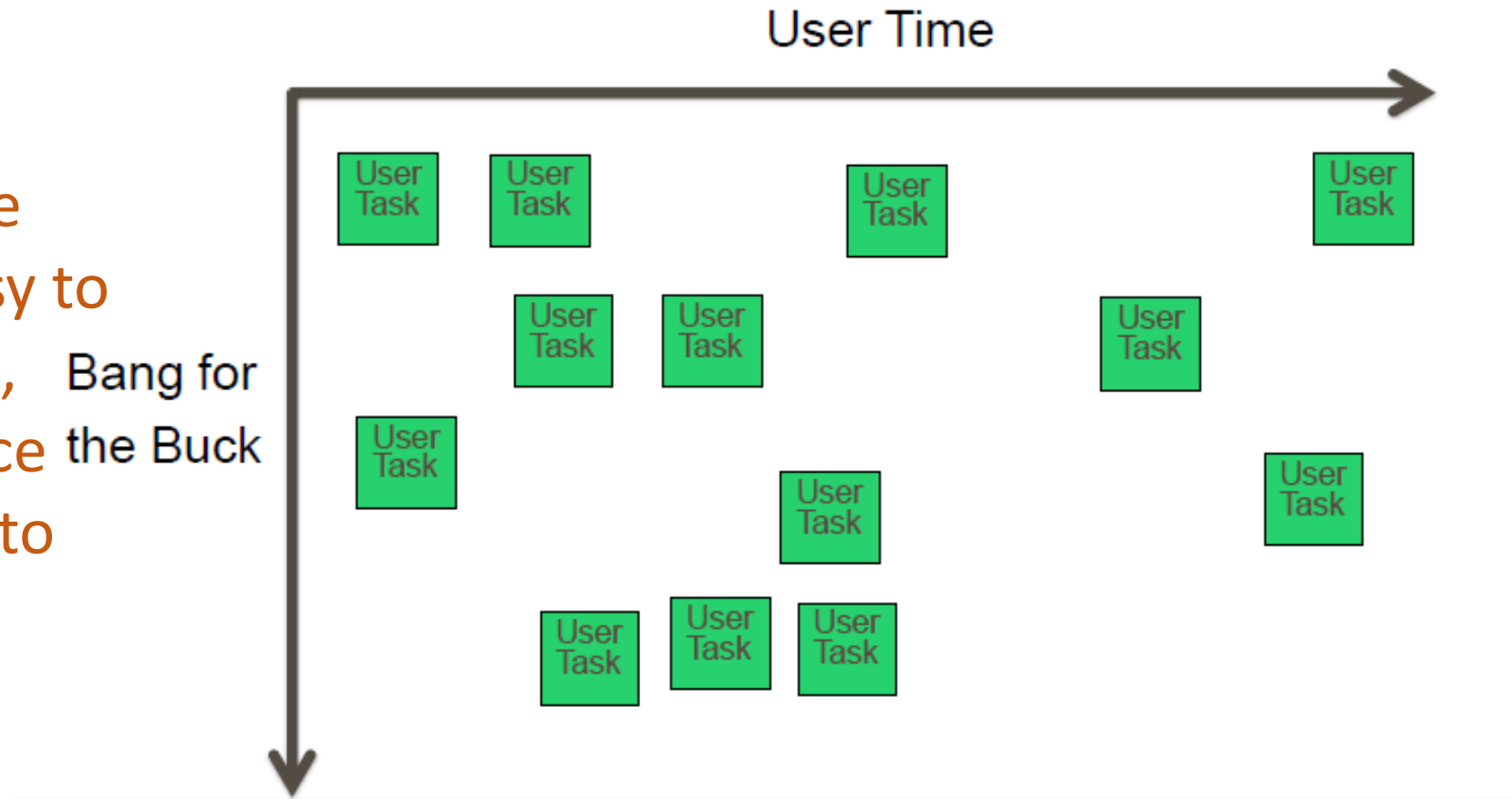
# Exercise: Plot Tasks



# Exercise: Plot Tasks

Users tend to do the tasks on the left before the tasks on the right

Tasks at the top are easy to implement, and produce high value to the user



# Results



Stephen Downes

<http://www.downes.ca>