

System Architecture

SA group:

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Introduction

➤ Objective

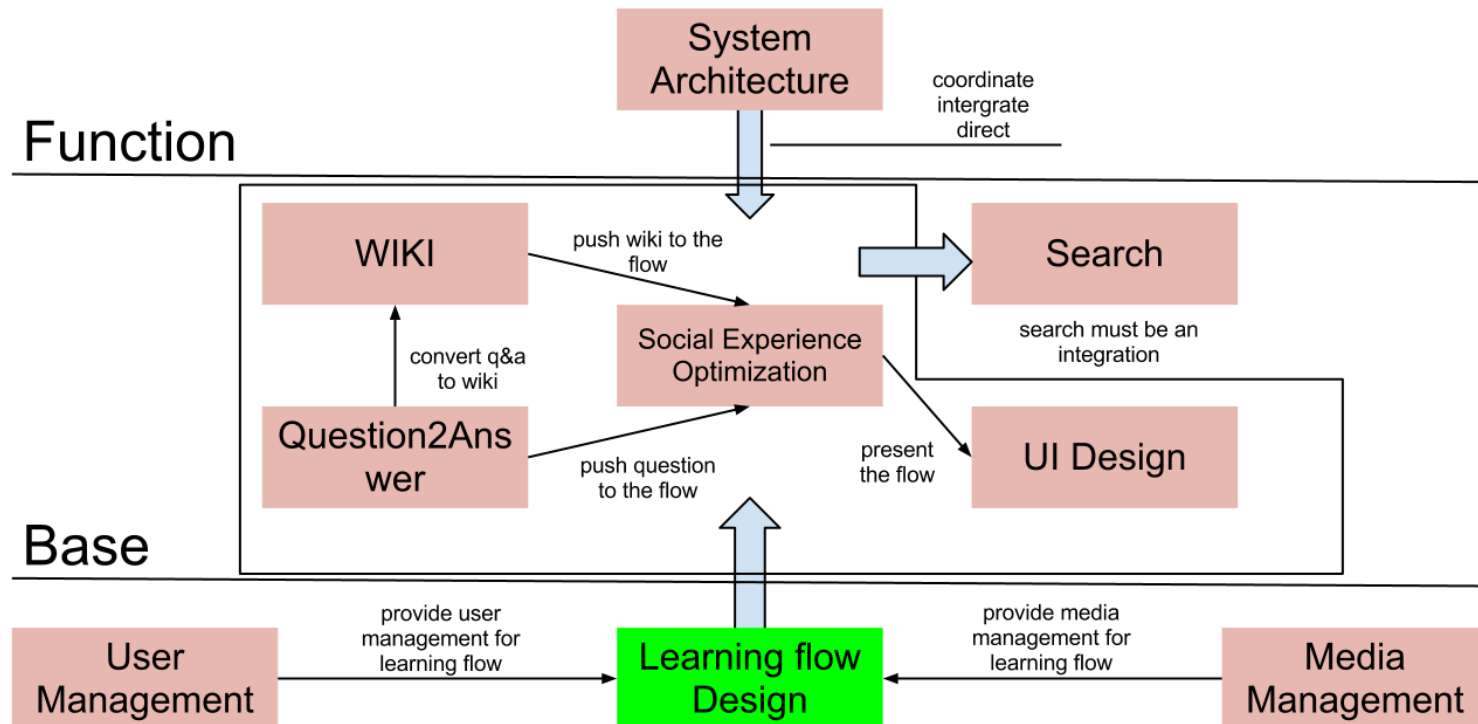
A web system to promote learners' learning.

➤ Learning Workflow

➤ Distributed

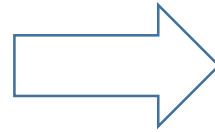
➤ DLWS:Distributed Learning Workflow System

Learning Workflow



Methodology

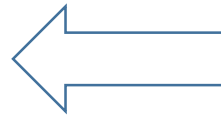
Naming



Classifi-
cation



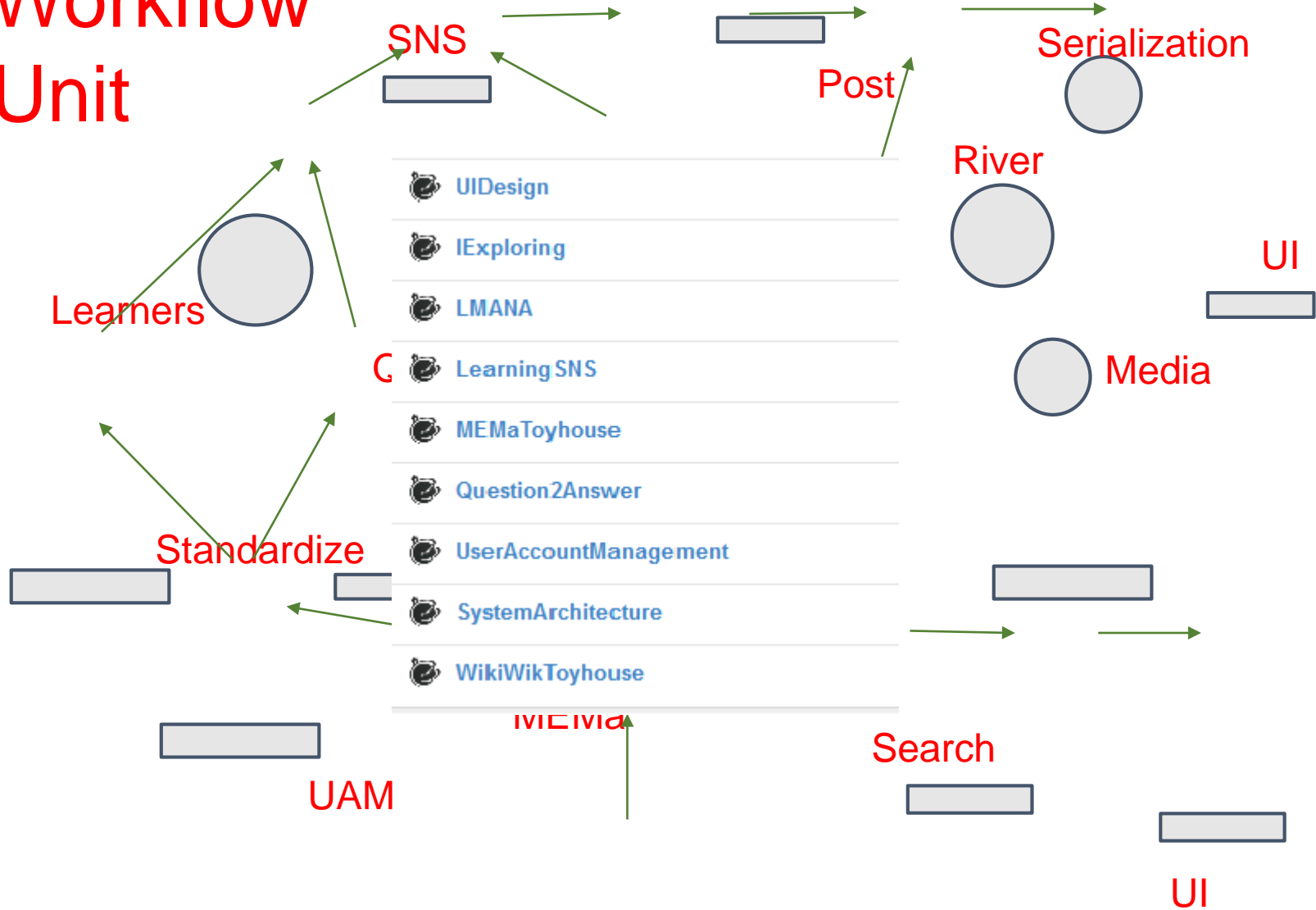
Validation



Mapping



Workflow Unit



Dilemma

- Complexity
- Socio-technical
- Project Management



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Recent questions and answers

请具体描述q2a的问题在哪？

answered 10 hours ago in Data base by [sophieyan](#) (220 points)

网络

1

answer



0

votes



help help help

asked 1 day ago by [zrx10](#) (160 points)

0

answers



0

votes



电工电子第4次实验报告关于饱和失真的原因是什么？

answered 4 days ago in Study by [zrx10](#) (160 points)

饱和失真

电工电子

1

answer



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数据库期末展示要搞什么呢？

answered 6 days ago in Data base by [sophieyan](#) (220 points)

数据库

1

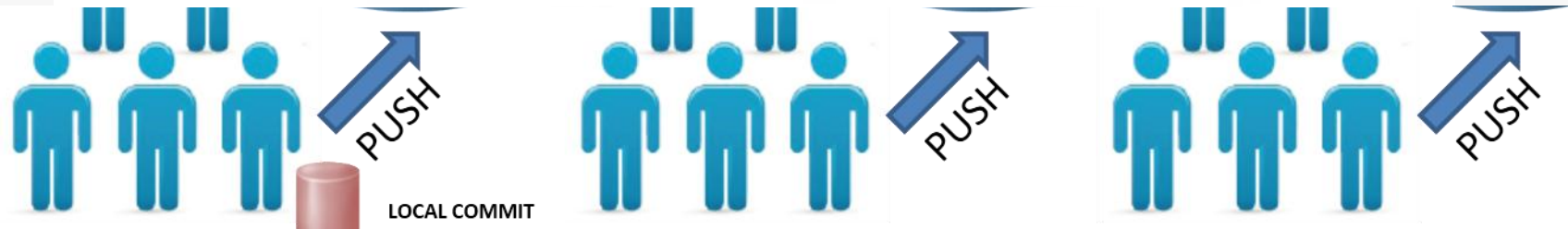
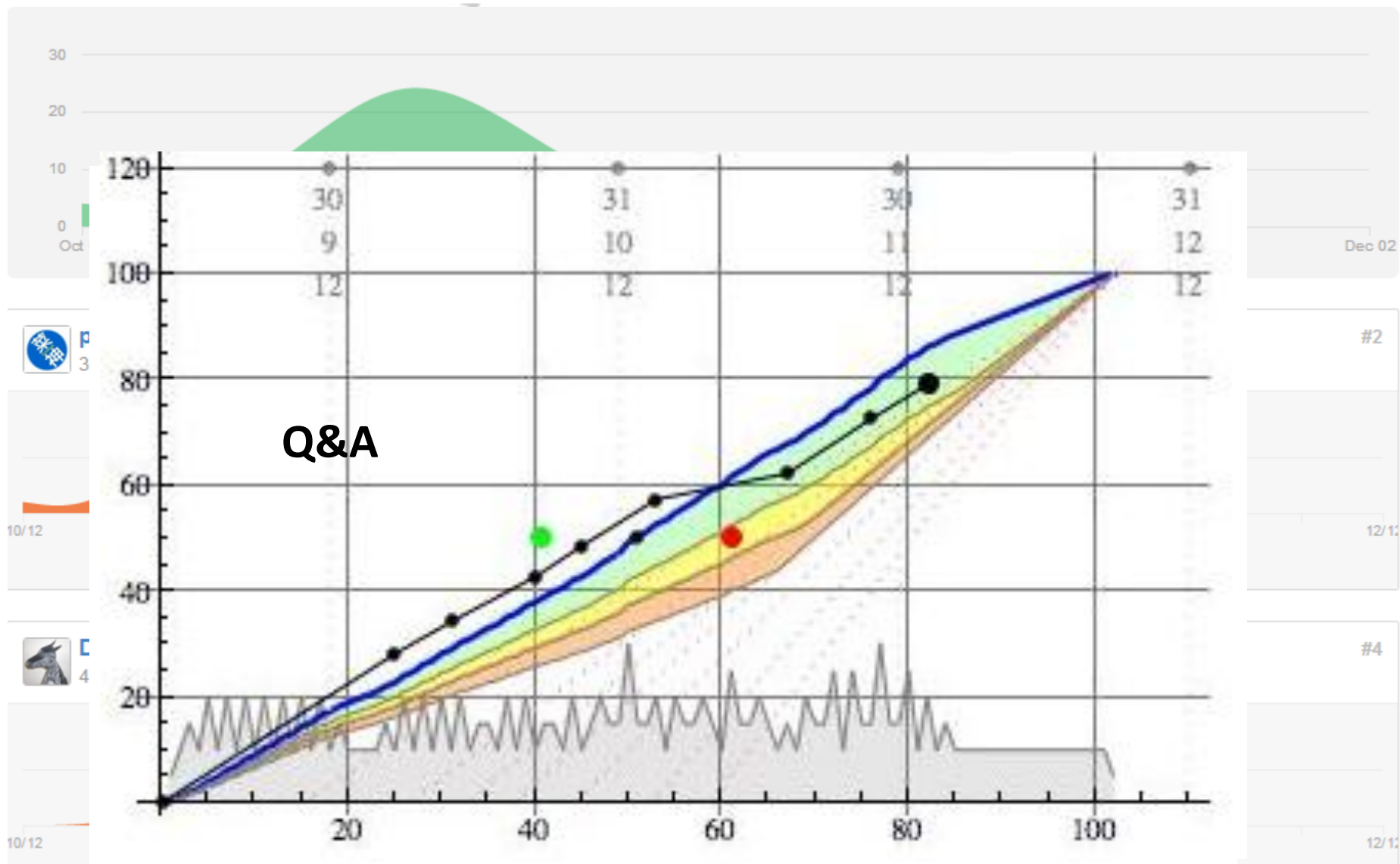
answer



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System architecture

“Architecture” denotes the stable properties of the system.

“A Meta Language for System Architectre”

Benjamin Koo, 2001

Stable properties for DLWS

➤ Objective

A web system to promote learners' learning.

➤ Learning Workflow

➤ Distributed Architecture

Wiki

Input:

rev_page, page_title,
page_id, access_id

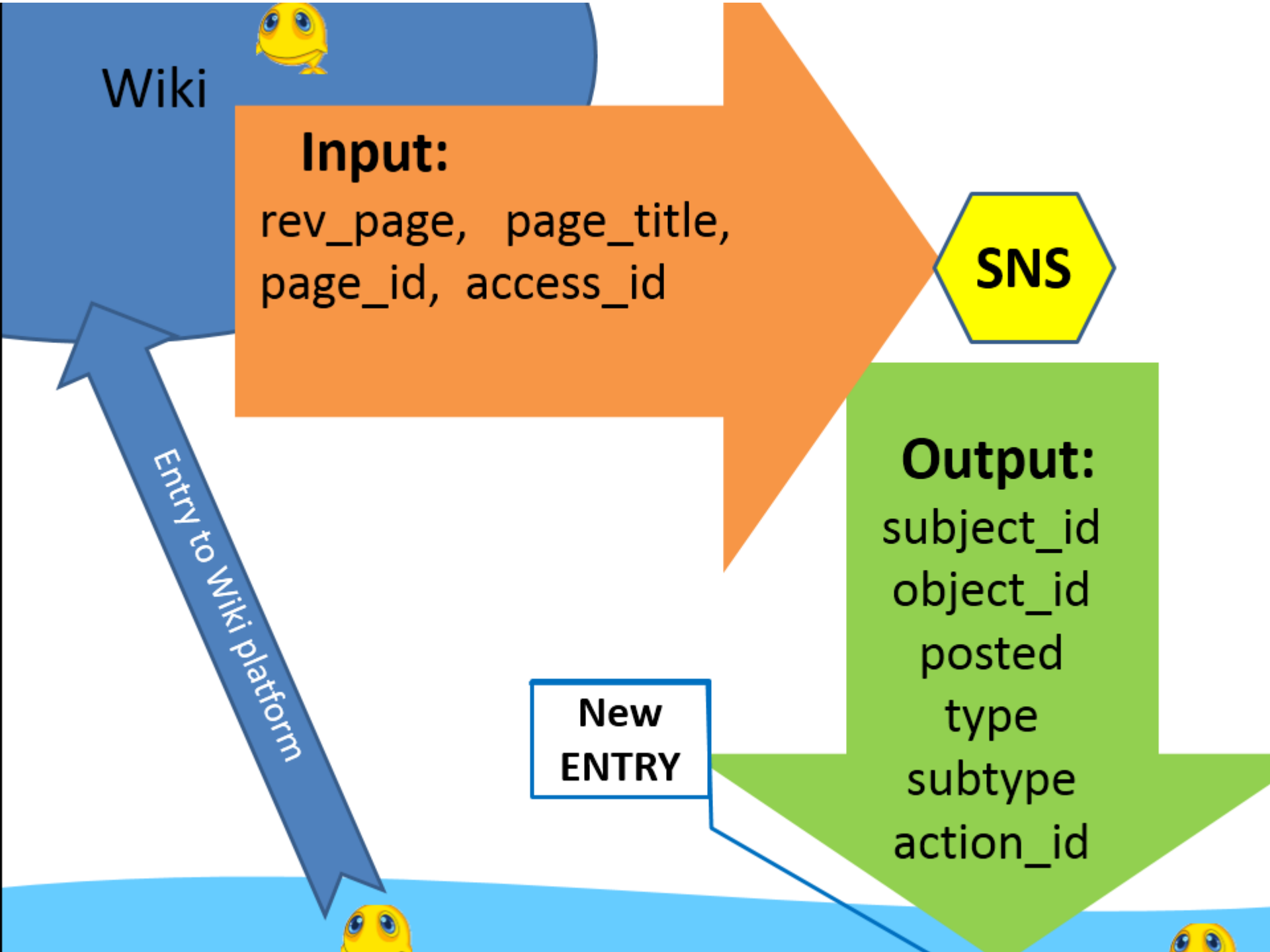
SNS

Output:

subject_id
object_id
posted
type
subtype
action_id

New
ENTRY

Entry to Wiki platform



Workflow-oriented Architecture

Workflow-oriented Architecture

- Workflow is a sequence of operations

ToyhouseChina

Questions

Unanswered

Tags

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Ask a Question

Ask a question

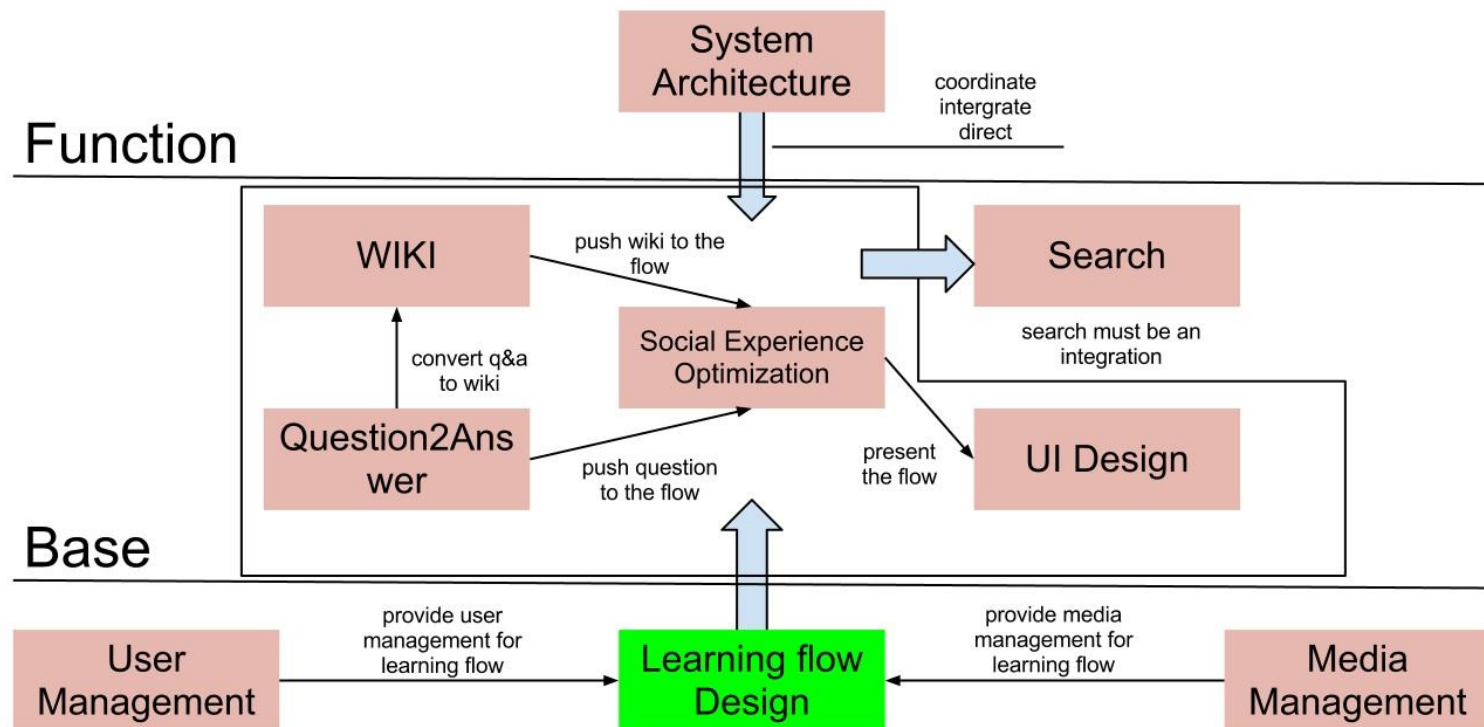
The question in one sentence:

Category: No category ▼

Workflow-oriented Architecture(cont'd)

- Treat any workflow unit as a whole.
- Ignore the implementation details.
- Each workflow unit communicates with each other only by **operation interfaces**.
- Workflow units must be loosely coupled.

Learning Workflow



Service-oriented
Architecture is needed!

Mandates of our project

- Give service interfaces

Query_friend (\$username1,\$username2)

➤ Use service interfaces

set_friend (\$username1,\$username2)

remove_friend (\$username1,\$username2)

- Only service interfaces

SOA(Service-oriented Architecture)

For our project based on SOA, our service

- is self-contained

```
set_password($realname, $username)
set_email($realname, $username)
set_realname($realname, $username)
```

Recent questions and answers

请具体描述q2a的问题在哪？

answered 11 hours ago in Data base by [sophieyan](#) (220 points)

网络

1

answer



0

votes

The Basic Components of SOA

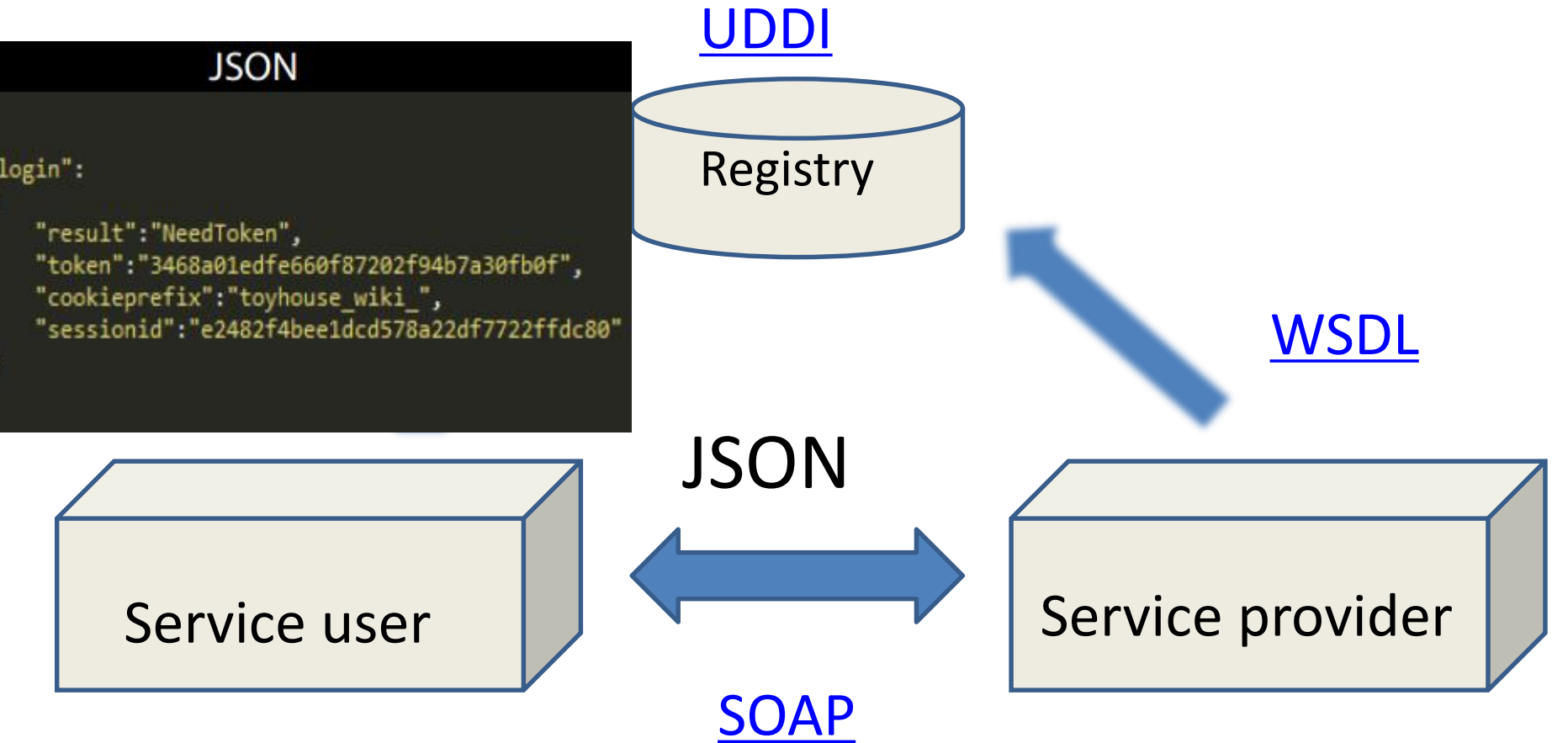
➤ Service user

Elements invoke services provided by others

➤ Service provider

Elements offer services to be used by others

Implementation



WSDL(Web Services Description Language)

```
<interface name="RESTfulInterface">
  <fault name="ClientError" element="tns:response"/>
  <fault name="ServerError" element="tns:response"/>
  <fault name="Redirection" element="tns:response"/>
  <operation name="Get" pattern="http://www.w3.org/ns/wsd1/in-out">
    <input messageLabel="In" element="tns:request"/>
    <output messageLabel="Out" element="tns:response"/>
  </operation>
  <operation name="Post" pattern="http://www.w3.org/ns/wsd1/in-out">
    <input messageLabel="In" element="tns:request"/>
    <output messageLabel="Out" element="tns:response"/>
  </operation>
  <operation name="Put" pattern="http://www.w3.org/ns/wsd1/in-out">
    <input messageLabel="In" element="tns:request"/>
    <output messageLabel="Out" element="tns:response"/>
  </operation>
  <operation name="Delete" pattern="http://www.w3.org/ns/wsd1/in-out">
    <input messageLabel="In" element="tns:request"/>
    <output messageLabel="Out" element="tns:response"/>
  </operation>
</interface>
```

1g



UDDI(Universal Description Discovery and Integration)

UDDI is a **platform-independent , XML-based** registry by which businesses worldwide can list themselves on the Internet , and a mechanism to register and locate web service applications.



SOAP(Simple Object Access Protocol)

SOAP is a protocol specification for exchanging structured information in the implementation of Web Services in computer networks.



Challenges

SOA performance is negatively impacted

Security

Testing

High reliability

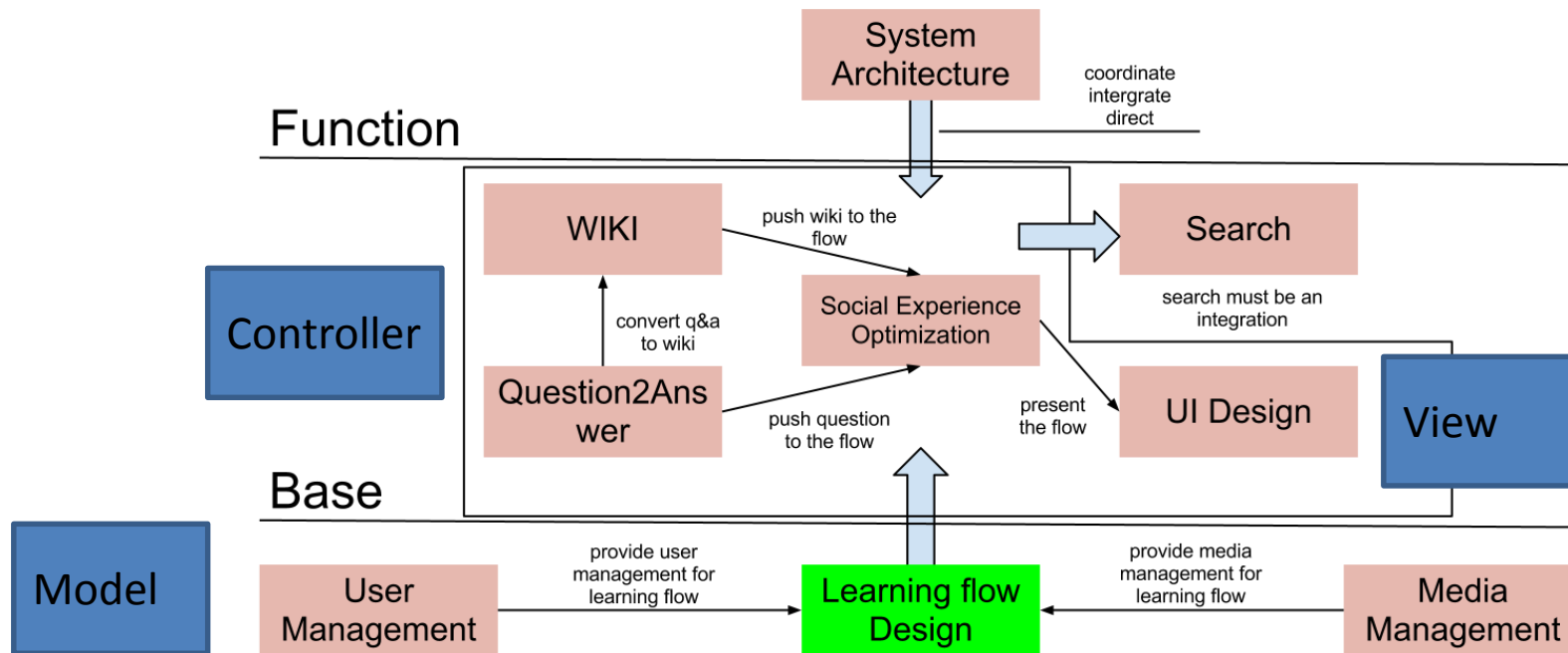
Definition of MVC

- **Model–View–Controller** (MVC) is an architecture pattern that separates the representation of information from the user's interaction with it.

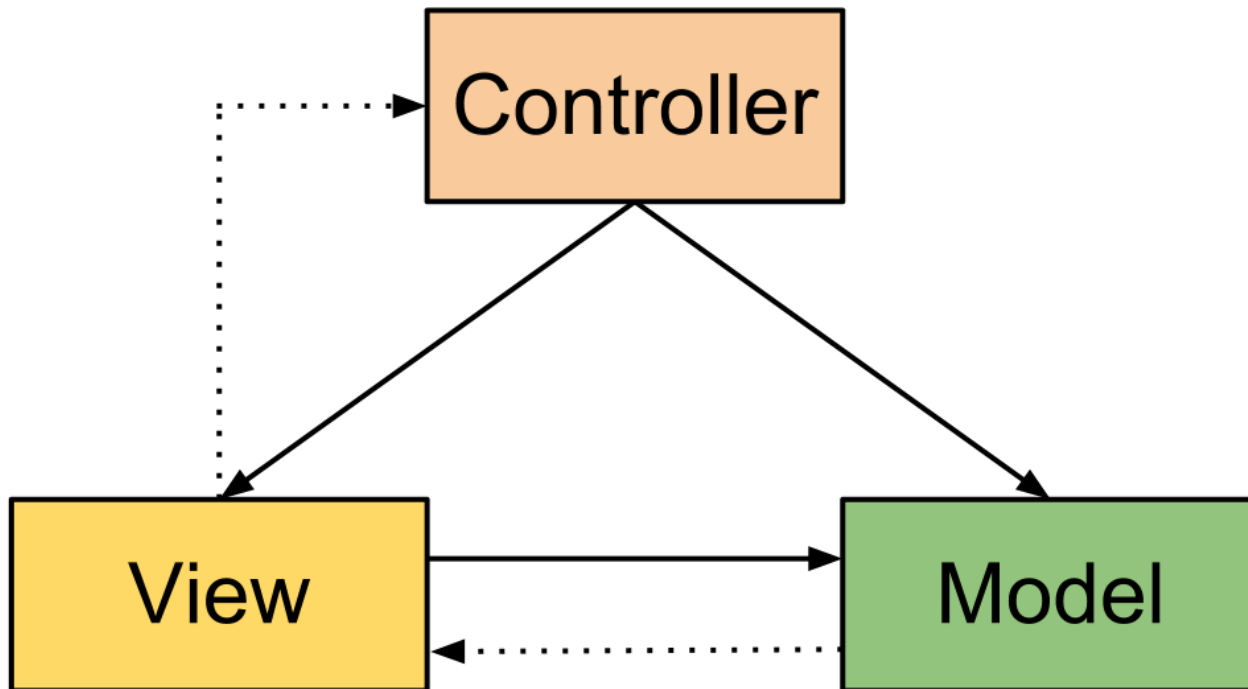
Definition of MVC(cont'd)

- **Model:** Object that consists of application data and business rules.
- **View:** Object that can be any output representation of data.
- **Controller:** Object that mediates input, converting it to commands for the model or view.

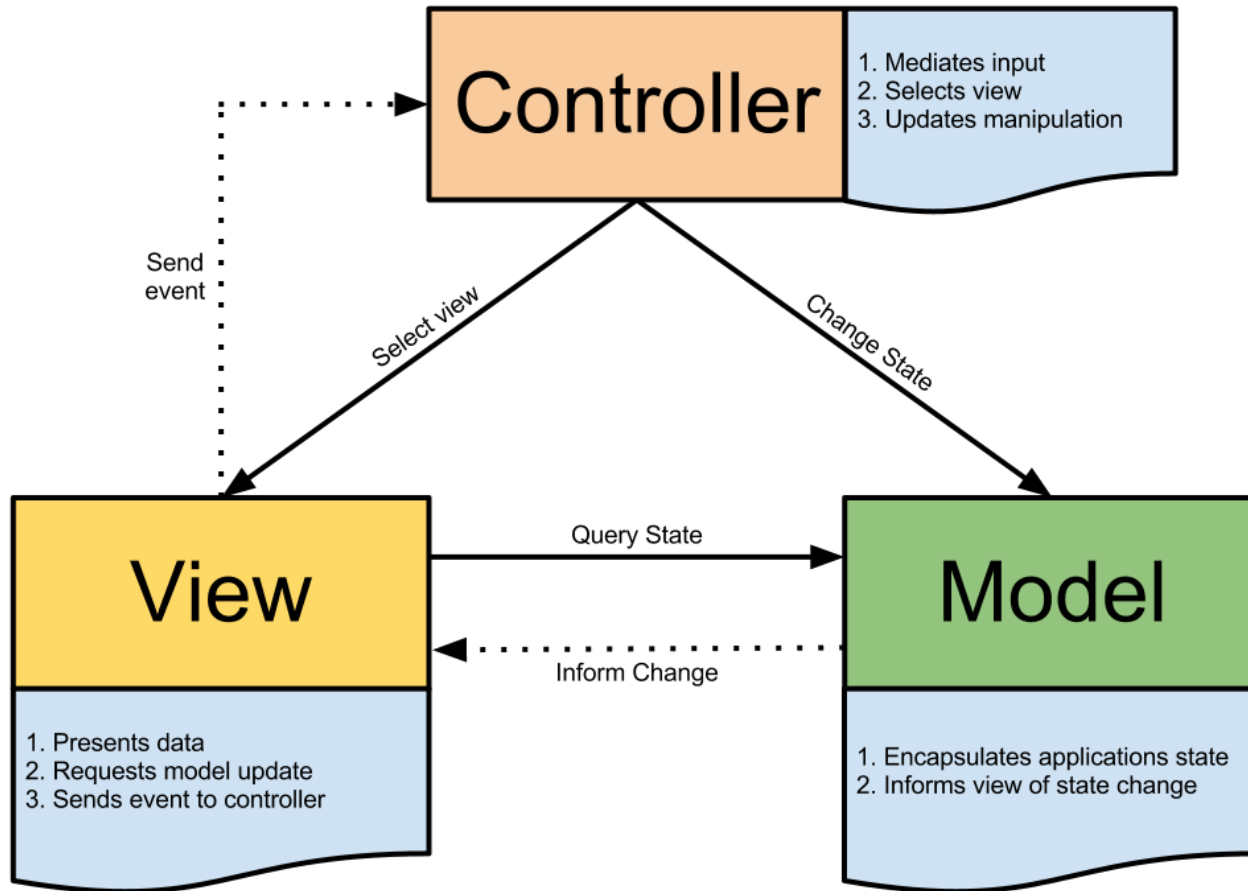
Definition of MVC(cont'd)



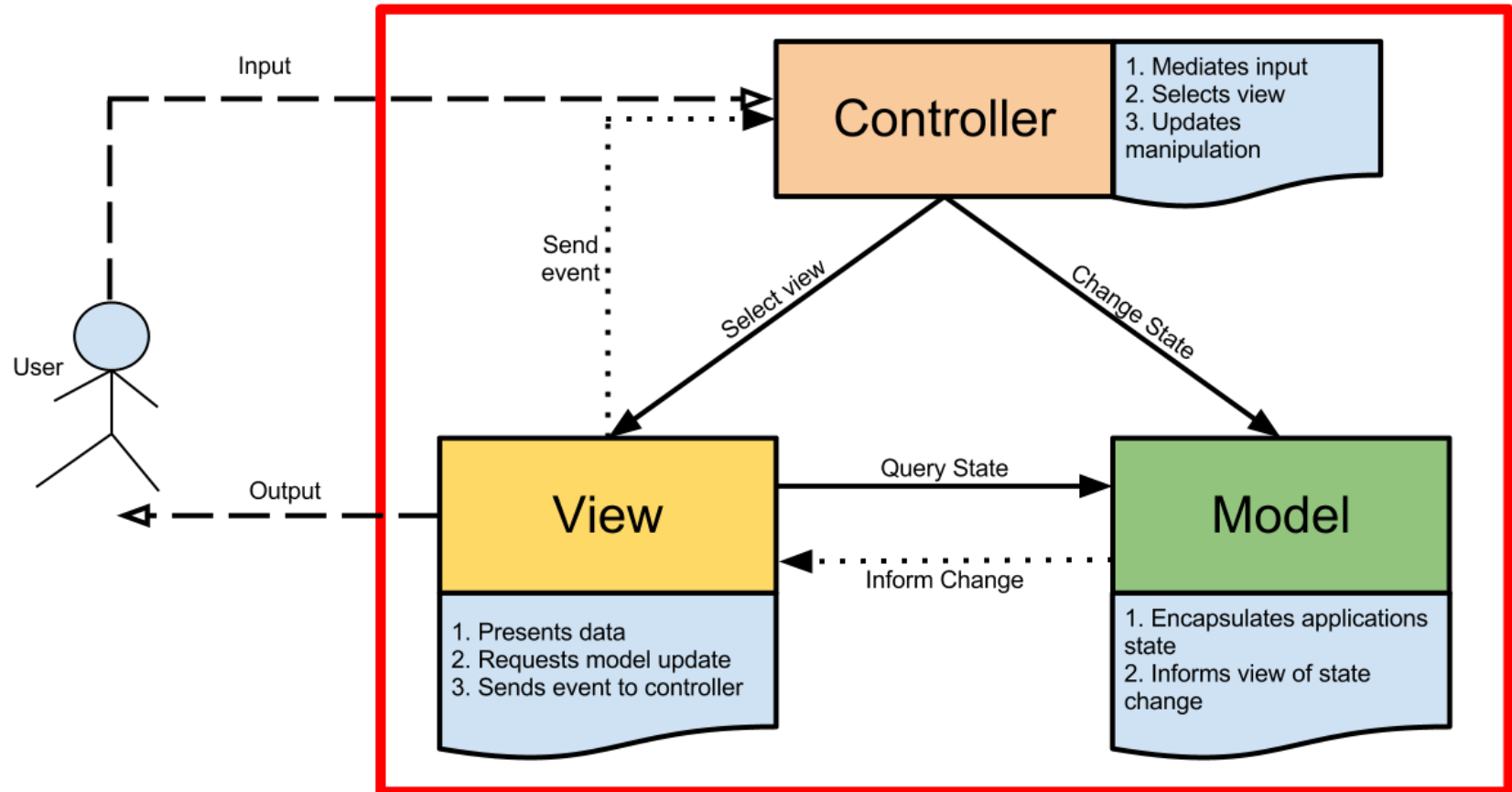
Component Interactions



Component Interactions(cont'd)



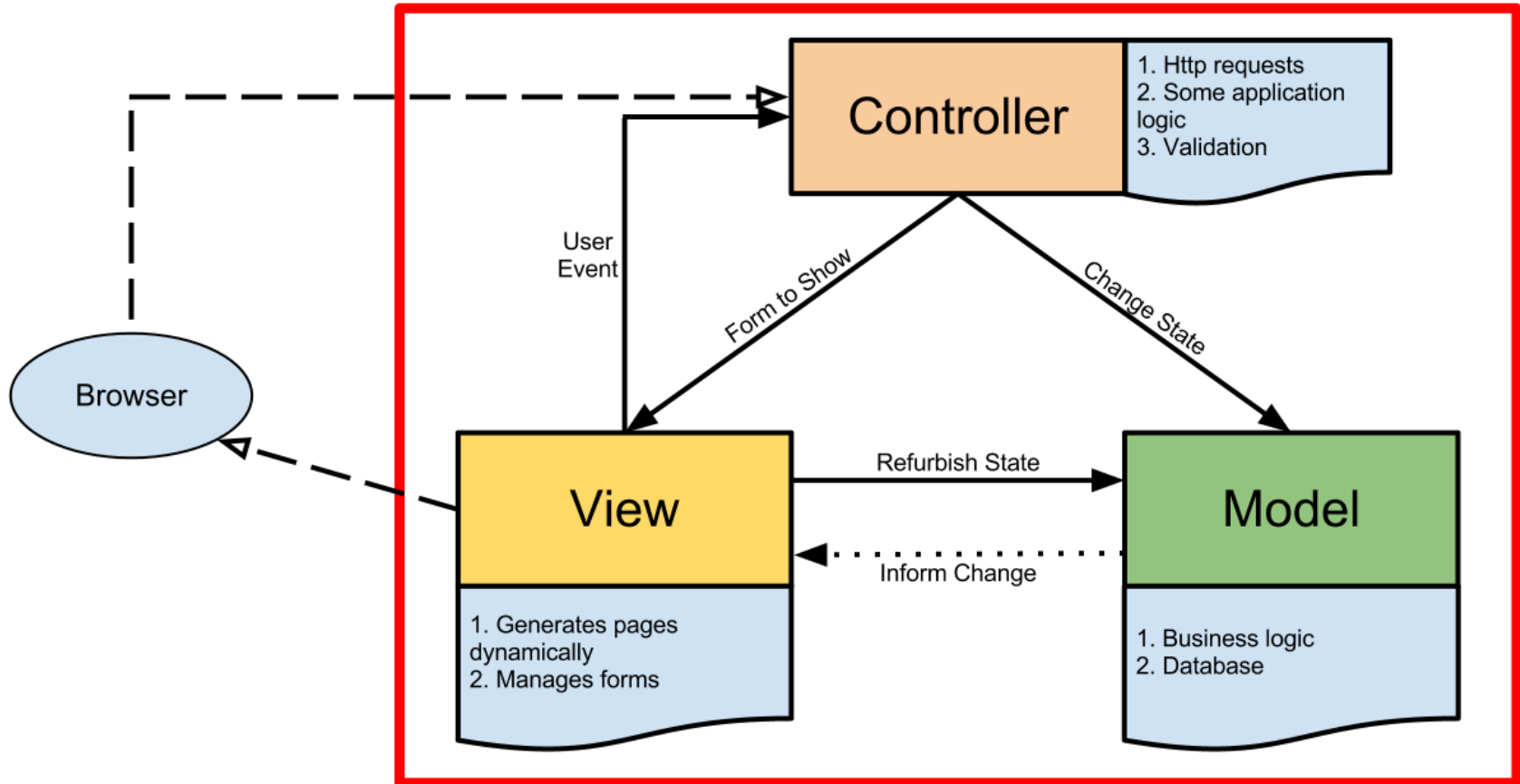
Component Interactions(cont'd)



Component Interactions(cont'd)

- A model notifies its associated views and controllers when there has been a change in its state.
- A view requests from the model the information that it needs to generate an output representation.
- A controller can send commands to its associated view to change the view's presentation of the model.

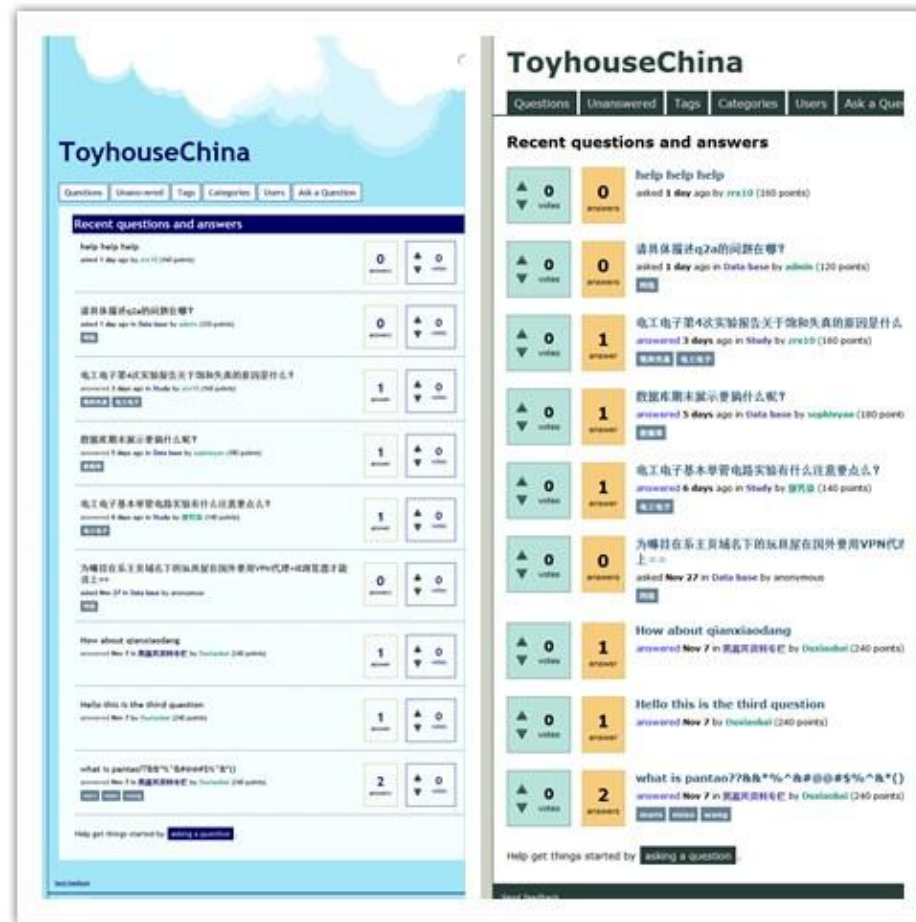
MVC in Web Application



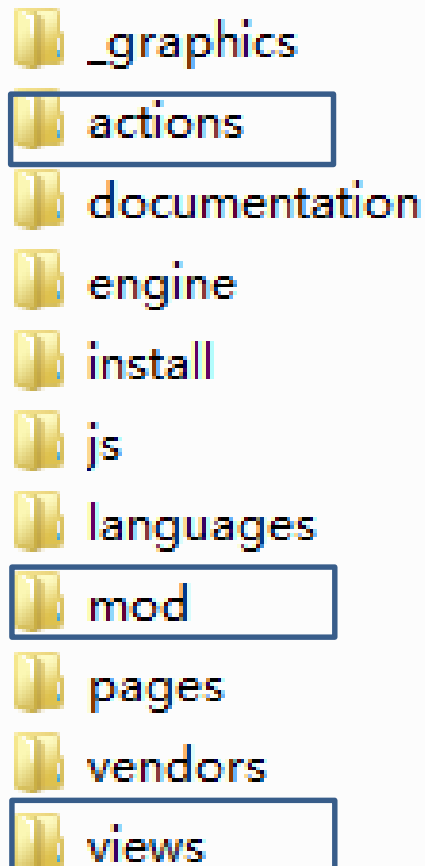
MVC in Web Application(cont'd)

Standard MVC	MVC in Web(Ruby on Rails)
Model	Model + Controller
View	View
Controller	Allocator + Controller(part)

Example: Question2Answer



Example: Elgg



Why use MVC?

Merits

- Separation of view from model
- Separation of controller from view
- Easy to change view
- A model corresponding to multiple views
- Multiple views can respond
- Easy to test

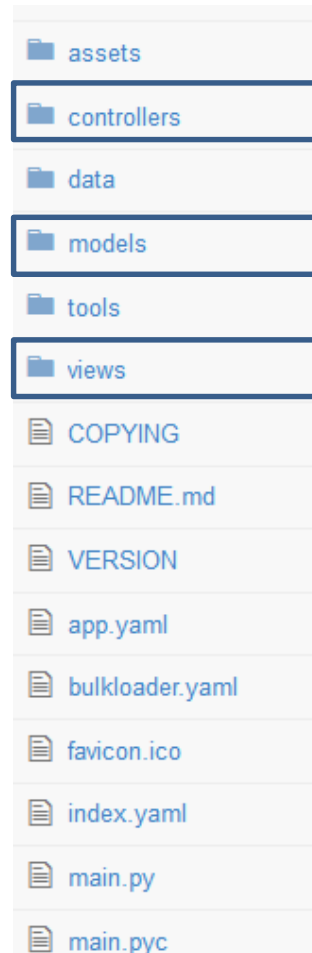
Demerits

- Complexity
- Strong correlation
- Hard to understand

MVC frameworks

- Almost any programming language
- Slightly different from each other
- Reduce complexity

Example: Google Course Builder



Combining

- The architecture of a software system is almost never limited to a single architecture pattern, but is often a combination of architecture patterns that make up the complete system.

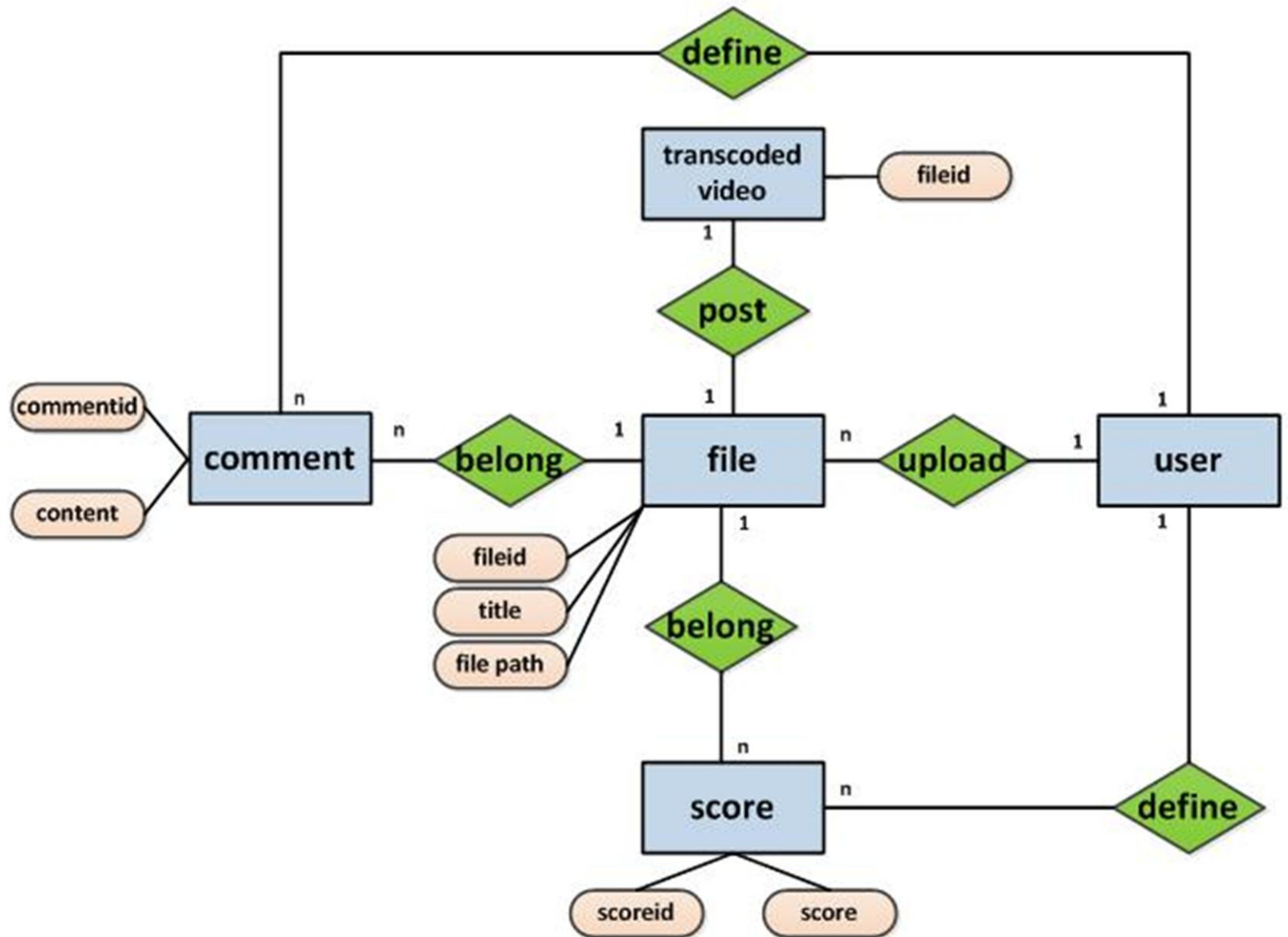
Workflow-oriented Architecture

- A combination of SOA, MVC and Client/Server architecture pattern.

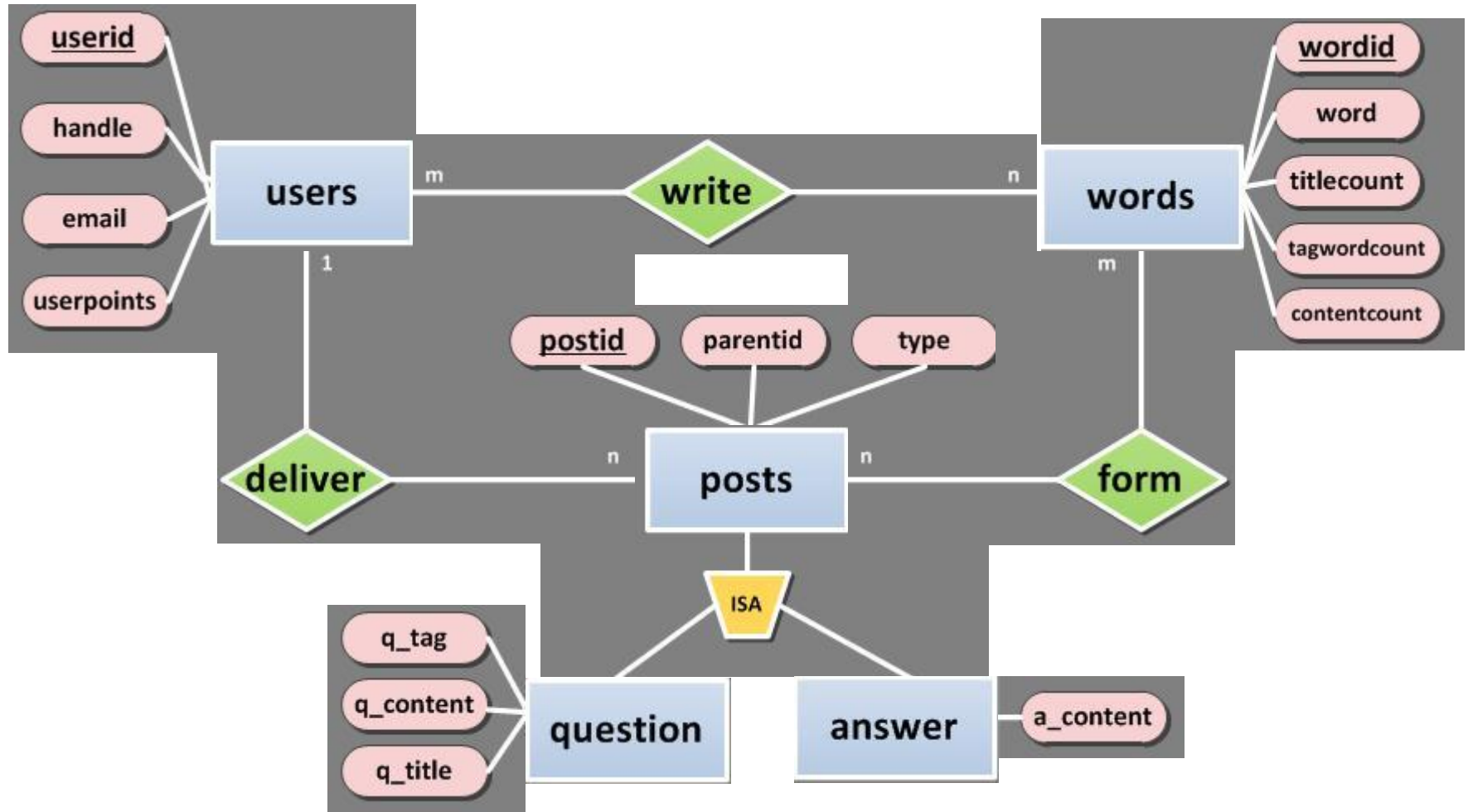
Architecture Pattern

- An Architecture pattern is a concept that solves and delineates some essential cohesive elements of a software architecture.
- Not an architecture.
- Strictly described and commonly available.

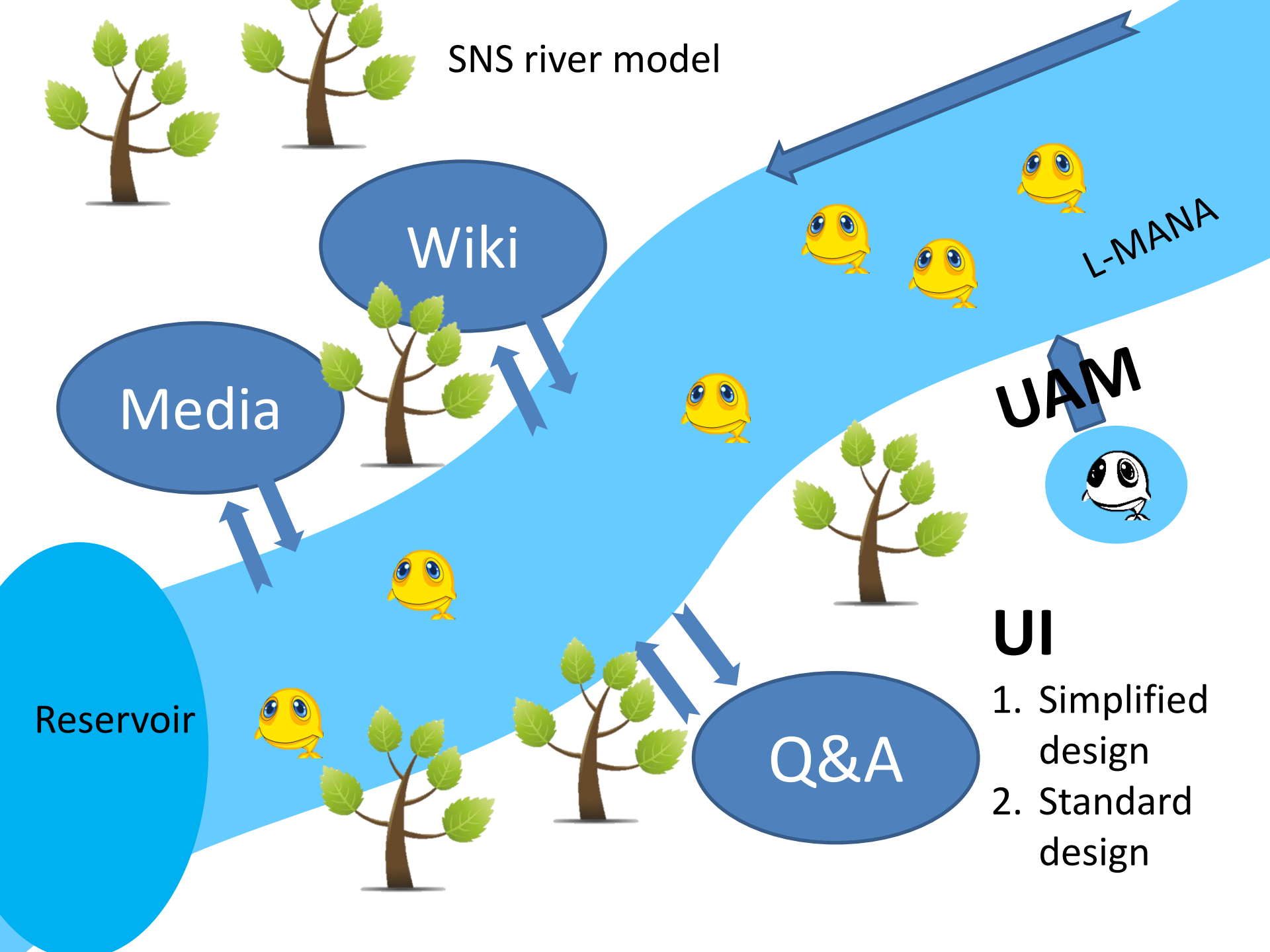
Media ER model



Q&A extended ER model



SNS river model



Architecture Description Language

Concept

In the system engineering community, an ADL is a language and/or conceptual model used to describe and represent system architectures.

Architecture Description Language

Function

With box-and-line drawing, it can effectively demonstrate components, properties, semantics of connections and overall system architecture.

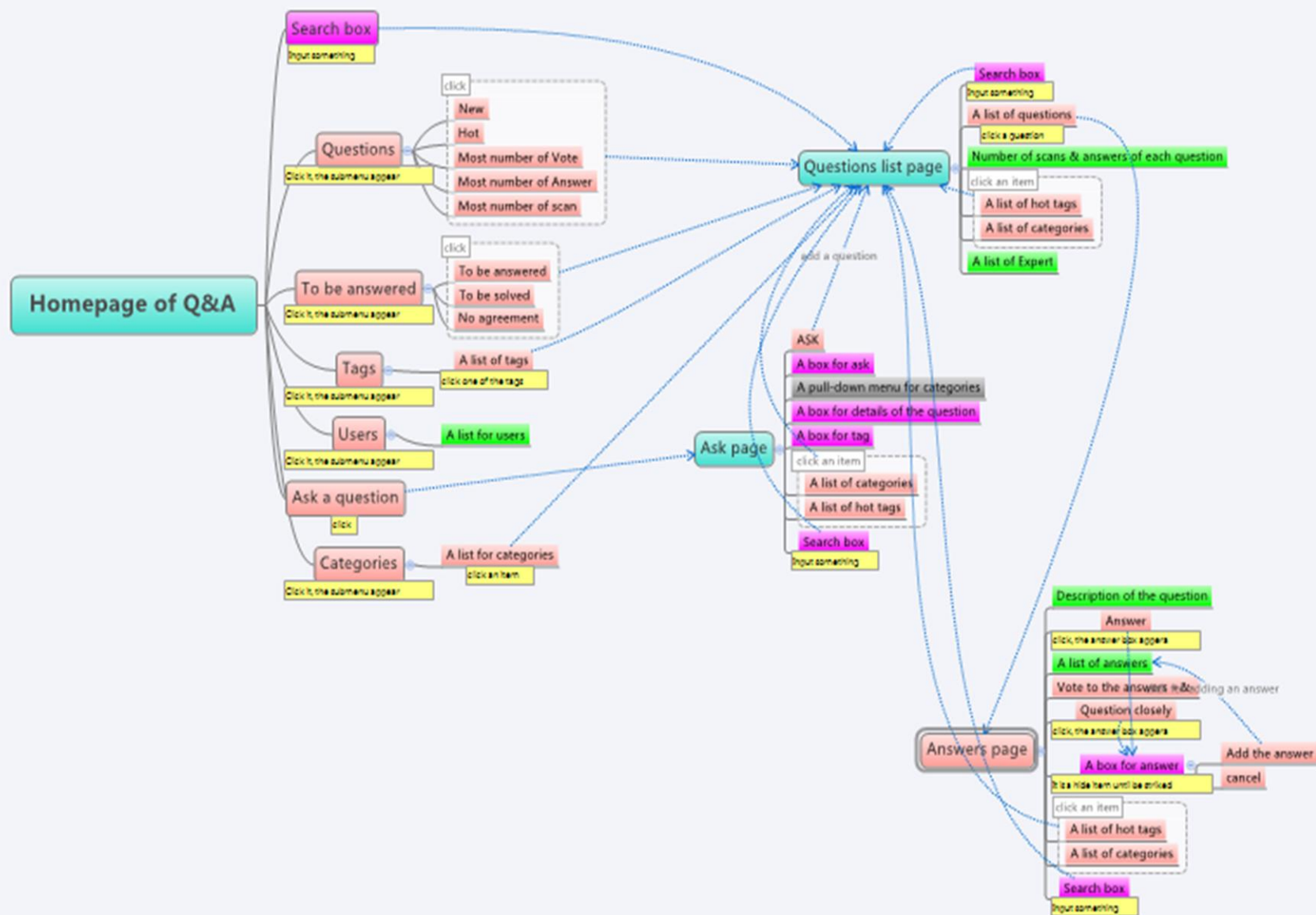
Representative

ACME, ADML, CMU, Petri net, UML (controversial)

Petri Net

Concept

The petri net is one of several mathematical modeling languages for the description of distributed systems



Petri Net

Definition

$C = (P, T, I, O)$

P: places $= \{p_1, p_2, p_3 \dots p_n\}$

T: transition $= \{t_1, t_2, t_3 \dots t_n\}$

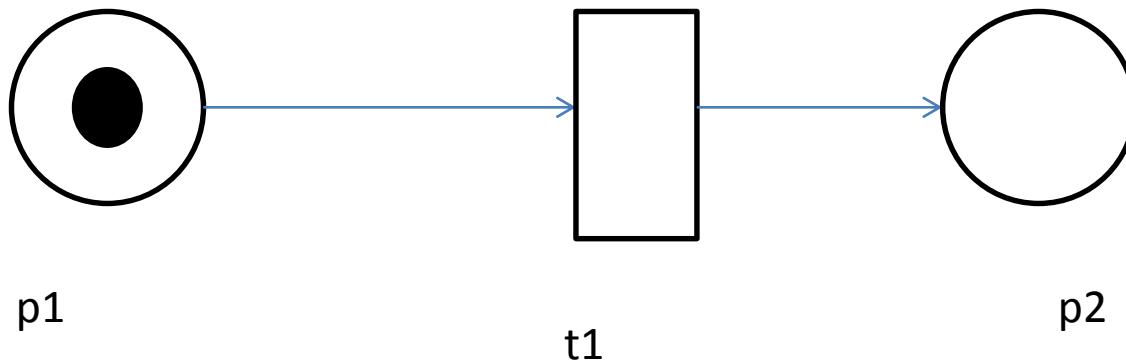
I: input $T \rightarrow P^r$ (r=number of places)

O: output $T \rightarrow P^q$ (q=number of places)

Petri Net


Basic

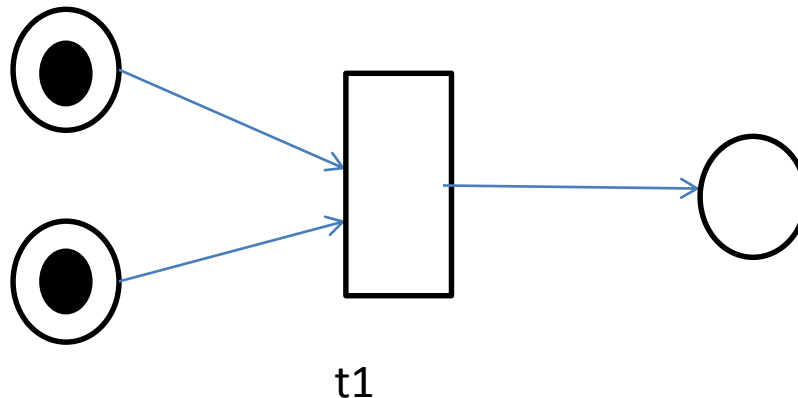
- two kinds of nodes: places and transitions, represented respectively with circle and bars
- arc existing only from places to transitions and vice versa
- tokens represented with dots



Petri Net


Property

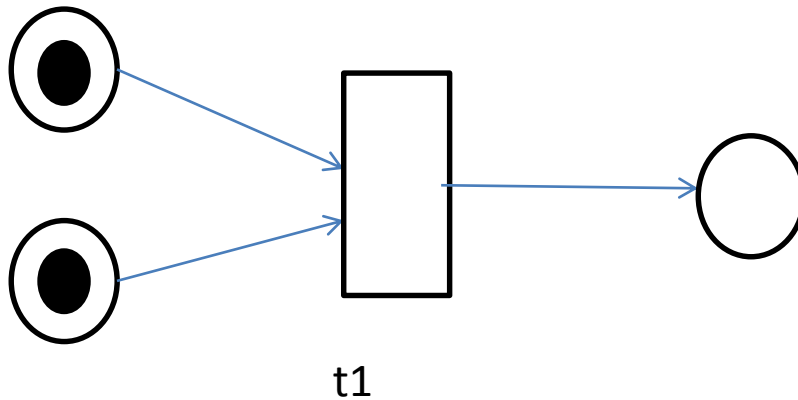
 Synchronization : t1 can be ready to fire only when there's at least one token at each of its input places



Petri Net

Property

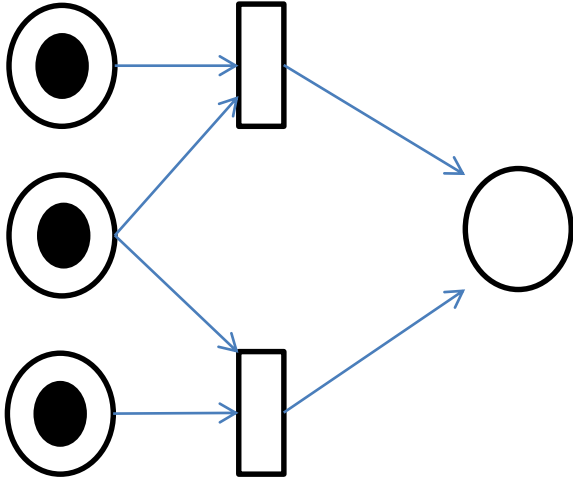
 Merging: when tokens from several places arrive at the same transition, the tokens merge into a whole



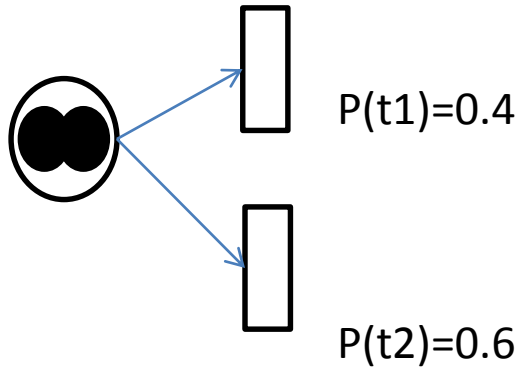


Conflict

in the following model

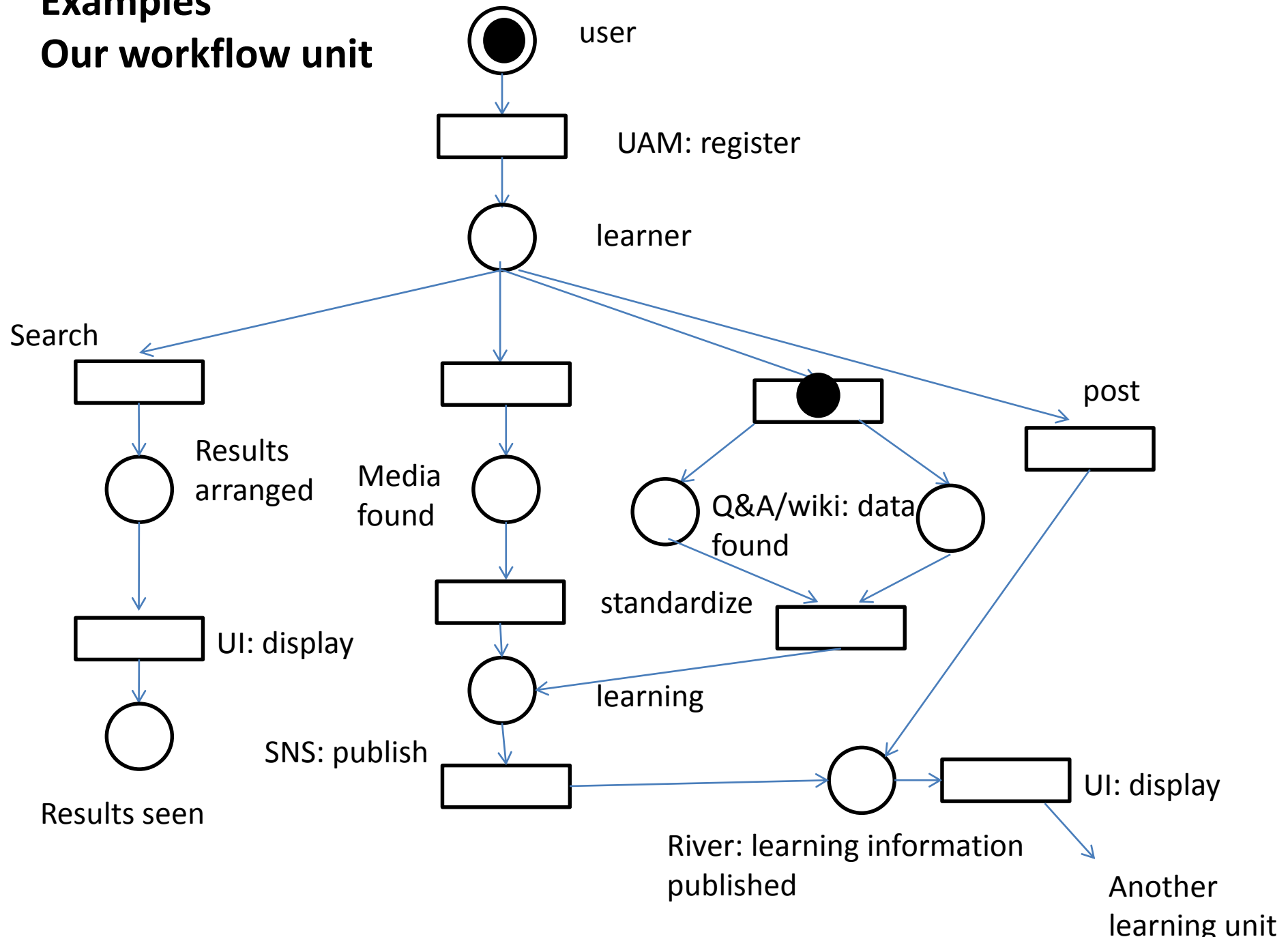


The problem can be solved in a probabilistic way:

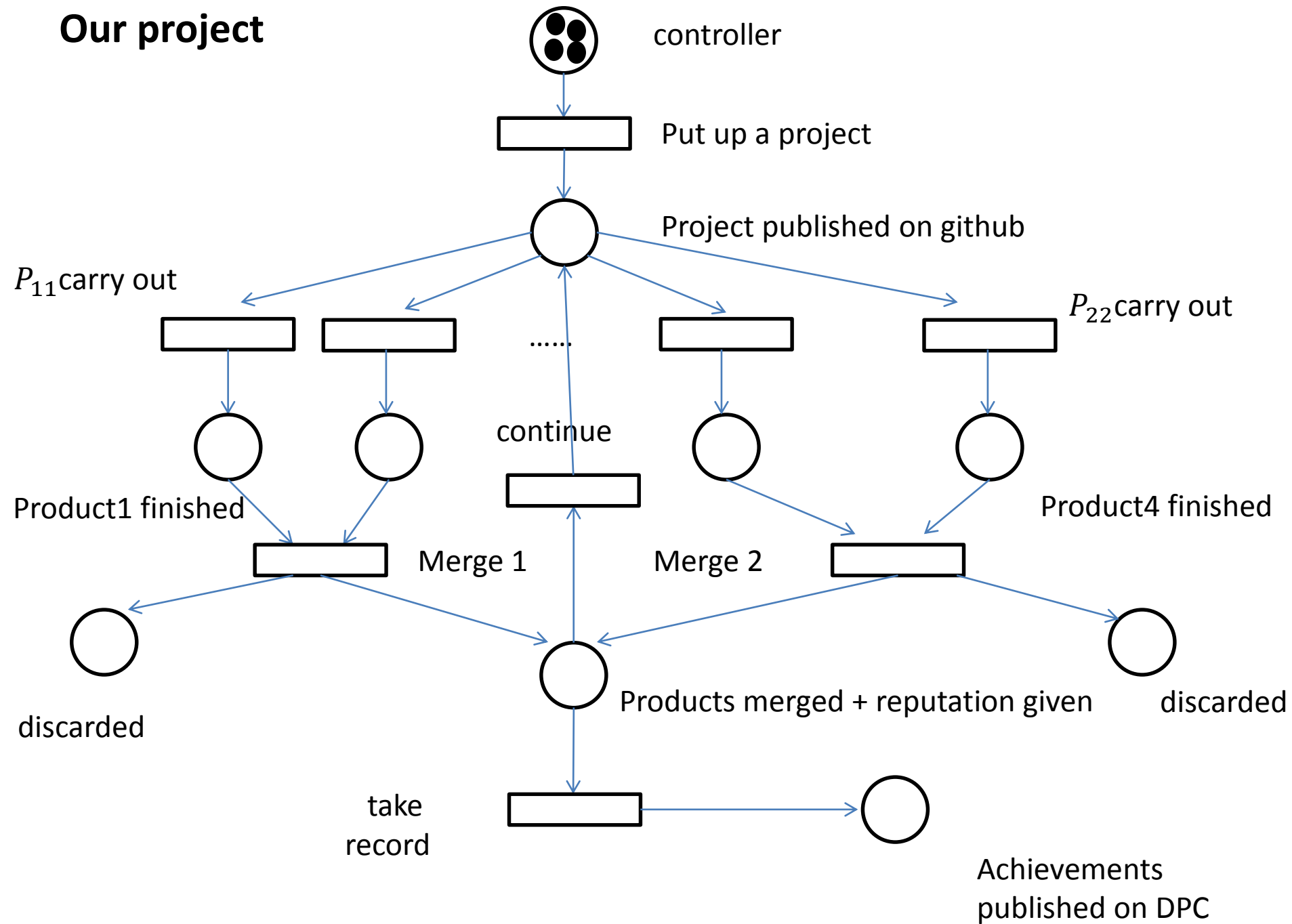


Examples

Our workflow unit



Our project



Conclusion

```
#!/bin/bash
basedir=/root/database-2012/backup/daily

PATH=/bin:/usr/bin:/sbin:/usr/sbin; export PATH
export LANG=C

xampp=$basedir/xampp
mysql=$basedir/mysql

basefile_xampp=$xampp/xampp.$(date +%Y-%m-%d).tar.bz2
basefile_mysql=$mysql/mysql.$(date +%Y-%m-%d).sql

for dirs in $xampp $mysql
do
    [ ! -d "$dirs" ] && mkdir -p $dirs
done

cd /opt/lampp
tar -jpc -f $basefile_xampp htdocs
cd $mysql
/opt/lampp/bin/mysqldump -u root -pRUNrun,pantaovay toyhouse > $basefile_mysql
```

[Google course bulider](#) and [GitHub](#). They are on the way to you.

Power by *We Are SA* ! Any question, please contact [pantaovay@C](#)

answer

votes

what is pantao??@%*^@#@#%*^@*()

answered Nov 7 in 男嘉宾资料专栏 by Duxiaobai (240 points)

[mars](#) [miao](#) [wang](#)2
answers0
votes

Help get things started by [asking a question](#).

Architecture is a process not a
result and we enjoy the process of
leading the world.

Thanks to:

Mr. Koo

Yelong Liqian

And all the listeners!