

MAX

Realtime messaging and activity stream engine

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Víctor Fernández de Alba (@sneridagh)

Víctor

- Senior Python Developer and IT architect
- Plone Foundation member
- Plone core developer since 2010
- Author of Plone 3 intranets book (2010, PacktPub)

@sneridagh

Carles

- Python and JavaScript lover
- Working with python for the last 8 years
- Occasional Erlang coder (when on drugs)
- Regex freak

@sunbit

Python @UPCnet and @BarcelonaTech



UPCnet



UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH

DEMO!

History

- First commit on August, **2011**
- Initially designed as the **key feature** for the Universitat Politècnica de Catalunya (BarcelonaTech) university concept of **social intranet**
- Today, MAX is used by more than 30.000 students and 8.000 university staff integrated in the online campus and the institutional collaboration tools

What is MAX?

- RESTful API
- 88 (and growing) endpoints
- Multi-source user and application **activity stream**
- Asynchronous **messaging** and **conversations**
- GPL Licensed

Old styled forums

Forum

Topic

Post

Post

Post



phpBB yourdomain.com
A short text to describe your forum

14 Search **Search**
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First part of topic

NEWTOPIC [Search this forum](#) **Search** Mark topics read • 8 topics • Page 1 of 1

TOPICS	REPLIES	VIEWS	LAST POST
Topics are also known as threads (this has a report) by Fghoet on Sun Sep 14, 2008 10:07 am	3	7	by User 01 on Sun Sep 14, 2008 10:04 am
A thread with a gull by Fghoet on Sun Sep 14, 2008 10:12 am	0	2	by Fghoet on Sun Sep 14, 2008 10:12 am
Other topic: 00 (part II) by Fghoet on Sun Sep 14, 2008 10:10 am	0	1	by Fghoet on Sun Sep 14, 2008 10:10 am
Other topics: 00 by Fghoet on Sun Sep 14, 2008 10:09 am	0	1	by Fghoet on Sun Sep 14, 2008 10:09 am
Another topic by Fghoet on Sun Sep 14, 2008 10:07 am	0	1	by Fghoet on Sun Sep 14, 2008 10:07 am
First Topic by Fghoet on Sun Sep 14, 2008 10:06 am	0	3	by Fghoet on Sun Sep 14, 2008 10:06 am

Display topics from previous: **All Topics** Sort by **Post time** **Descending** **36**

NEWTOPIC Mark topics read • 8 topics • Page 1 of 1

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WHO IS ONLINE
Users browsing this forum: **Fghoet** and 0 guests

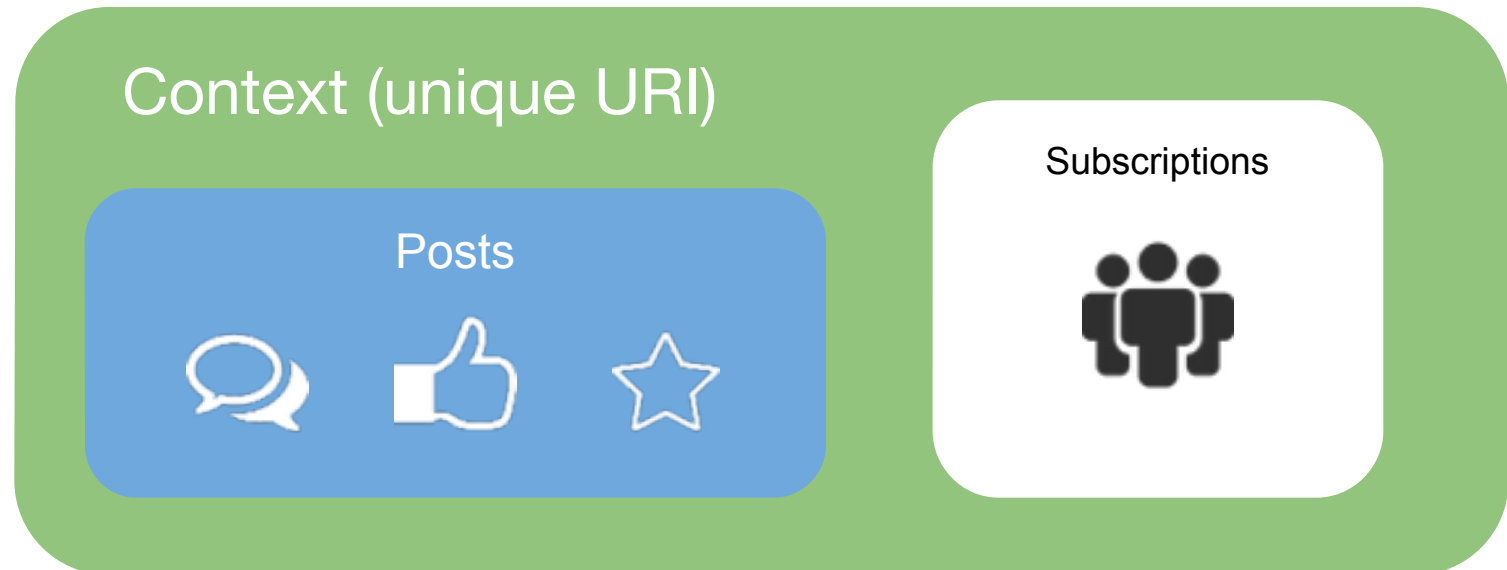
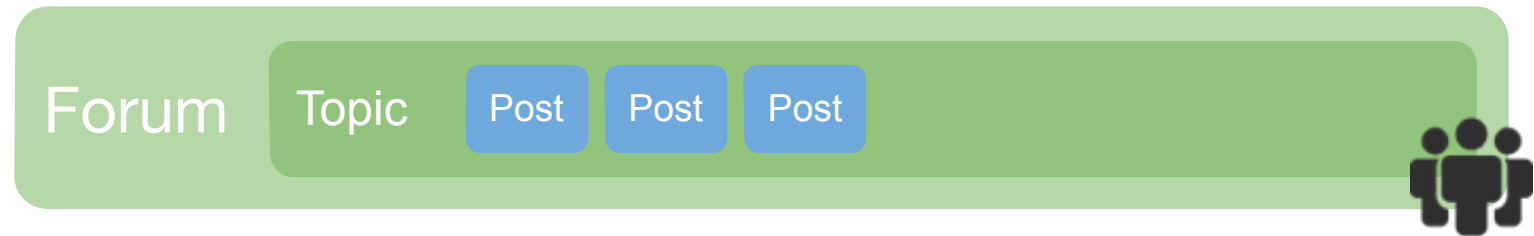
FORUM PERMISSIONS
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You **can** reply to topics in this forum
You **can** edit your posts in this forum
You **can** delete your posts in this forum
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Administration Control Panel

What is a context?



Contexts

- Identified by unique URIs
- Permissions per context
 - read
 - write
 - subscribe
 - unsubscribe
 - invite
 - kick
 - delete
 - flag
- Multiple context types based on permissions variations
- Granular permissions per user
 - Overriding the default ones defined by the context
 - Grant / Revoke

Real life examples

Communities site

Institutional events

Institutional news

Alumni

Sell your stuff

Online campus

Applied maths III

Signal theory

Compilers

Faculty news

Real life examples (II)

Community types



Open

Everyone can
join and leave
at will



Closed

The owner
should invite me
to join and I can
leave at will



Institutional

The site admin
subscribes
people, no one
can leave

Features



Activity Stream

- Stores **activity** from users and **applications**
- Usual **social** actions
 - Comments
 - Likes
 - Favorites
- **Images** and **files** support

Features



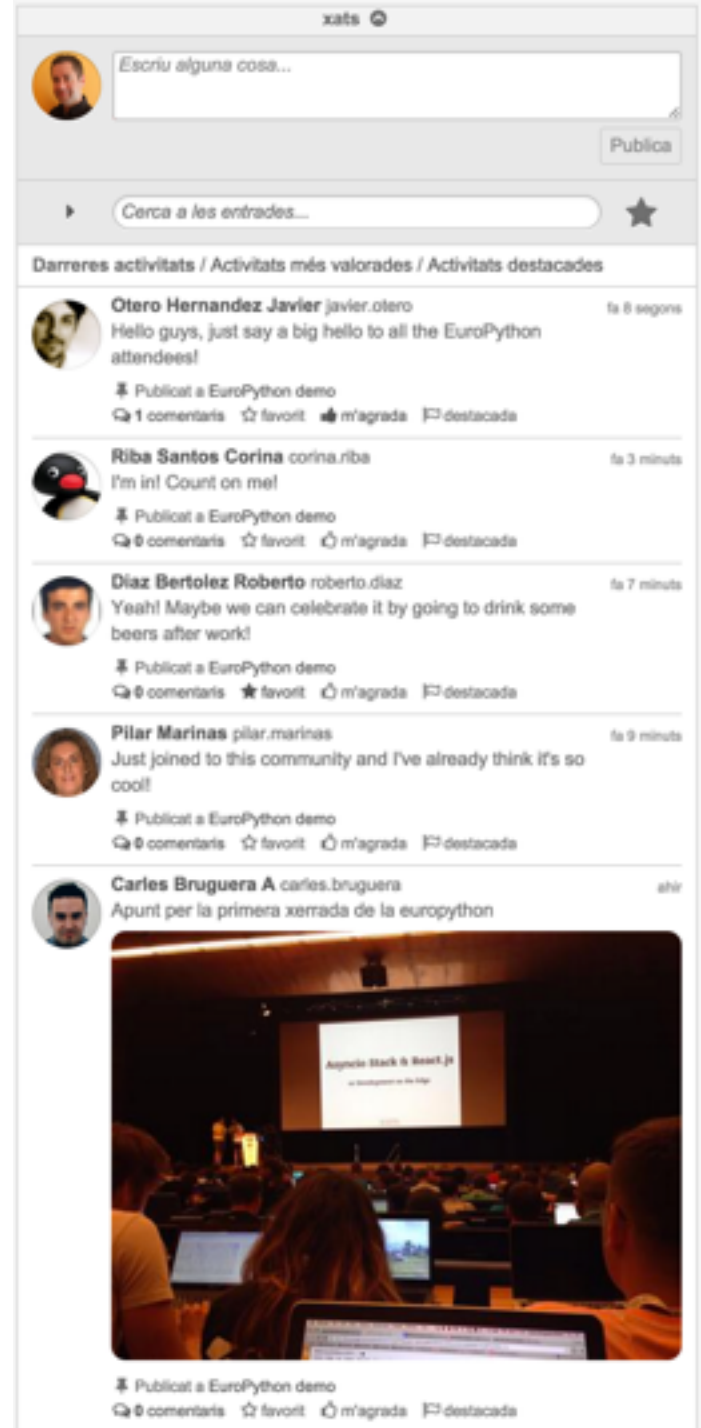
Conversations

- Realtime **conversations** and **private messaging**
- One to one
- **Groups**
- **Images** and **files** support

Features

JS

Javascript
UI widget



Features



Notifications

- Platform specific **push** notifications



- **Internal** notifications
 - Double check
 - others

Features



External sources aggregation

Features



Fully deployable on premises

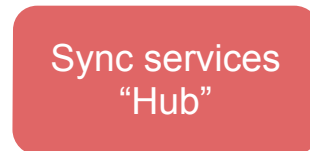
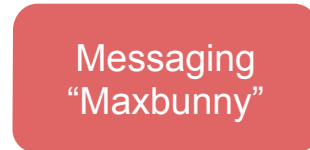
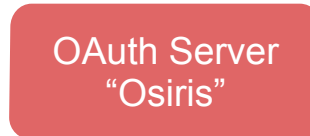
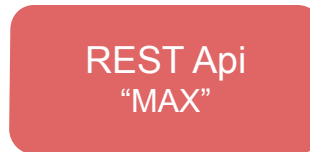
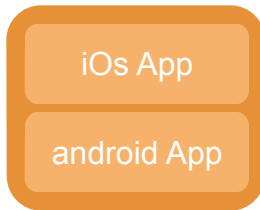
- Addresses any **security** concerns
- Absolute customer data **privacy**
and **ownership**
- “**Corporate whatsapp**”

Features Summary

JS



Components overview



Osiris



- Minimal OAuth2 server implementation
- Build on top of pyramid
- Resource Owner Credentials Flow
- Tokens stored on MongoDB
- /token endpoint to generate token for a user
- /checktoken endpoint to verify a token
- Base LDAP user storage implementation
- Pluggable repoze.who based alternative user storage implementations

MAX



- REST(ful) api
- Also build on top of pyramid
- Hybrid URL-dispatch + traversal routing
- ACL policy with fine-grained permissions per endpoint
- Customized venusian decorator to configure endpoints
- Tweens used for several tasks
- Per-exception catching to provide detailed JSON error messages
- Per-request caching of variables

MAX (Routing)

- Route definition

```
RESOURCES['avatar'] = dict(route='/people/{username}/  
avatar', filesystem=True, category='User', name='User  
avatar', traverse='/people/{username}')
```

- Endpoint definition

```
@endpoint(route_name='avatar', request_method='POST',  
permission=modify_avatar)  
def postUserAvatar(user, request):  
    """  
        Upload user avatar  
    """
```

MAX (Tweens)

- exception catcher
- post tunneling
- compatibility check

```
def compatibility_checker_factory(handler, registry):
    def compatibility_checker_tween(request):
        requested_compat_id = request.headers.get('X-Max-Compat-ID', None)
        if requested_compat_id is None:
            response = handler(request)
            return response

        expected_compat_id = str(request.registry.settings.get('max.compat_id'))
        if expected_compat_id == requested_compat_id:
            response = handler(request)
            return response
        else:
            return JSONHTTPPreconditionFailed(
                error=dict(
                    objectType='error',
                    error="CompatibilityIDMismatch",
                    error_description='X-Max-Compat-ID header value mismatch, {} was
expected'.format(expected_compat_id)))
    return compatibility_checker_tween
```


MAX (Exception handling)

- Known error use cases are raised as custom exceptions:

```
raise ObjectNotFound("User {} doesn't have role {}".format(user, role))
```

- And rendered as a JSON message

```
@view_config(context=ObjectNotFound)
def object_not_found(exc, request):
    return JSONHTTPNotFound(error=dict(objectType='error',
error=ObjectNotFound.__name__, error_description=exc.message))
```

- Non-handled exceptions are logged with request information



Carles Bruguera A
Manager

Navigation

Dashboard

Users

Contexts

Apl

Exceptions

Exception hash: df97a345acbc35f85337f1679e2c264e882a6b08

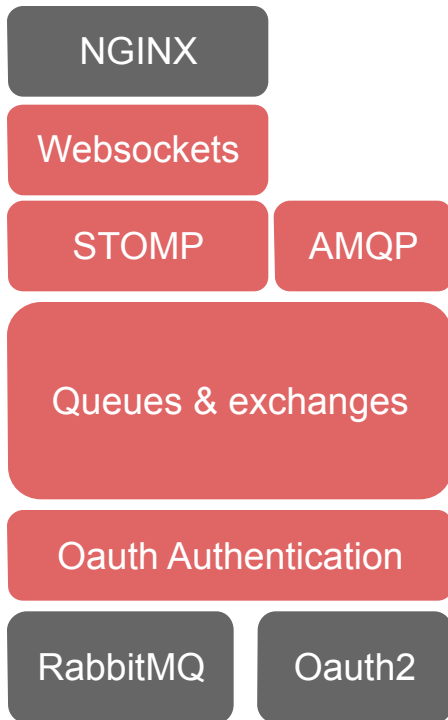
Raised on: 2015/07/21 11:27:46

```
POST /tokens HTTP/1.0
Accept-Encoding: gzip
Connection: close
Content-Length: 0
Content-Type: application/json
Host: max.upc.edu
User-Agent: Dalvik/2.1.0 (Linux; U; Android 5.1.1; Nexus 4 Build/LMY47V)
X-Forwarded-For: 147.83.182.8
X-Max-Compat-Id: 2
X-Oauth-Scope: widgetcli
X-Oauth-Username: marc.calvet
X-Virtual-Host-Uri: https://max.upc.edu
```

Traceback (most recent call last):

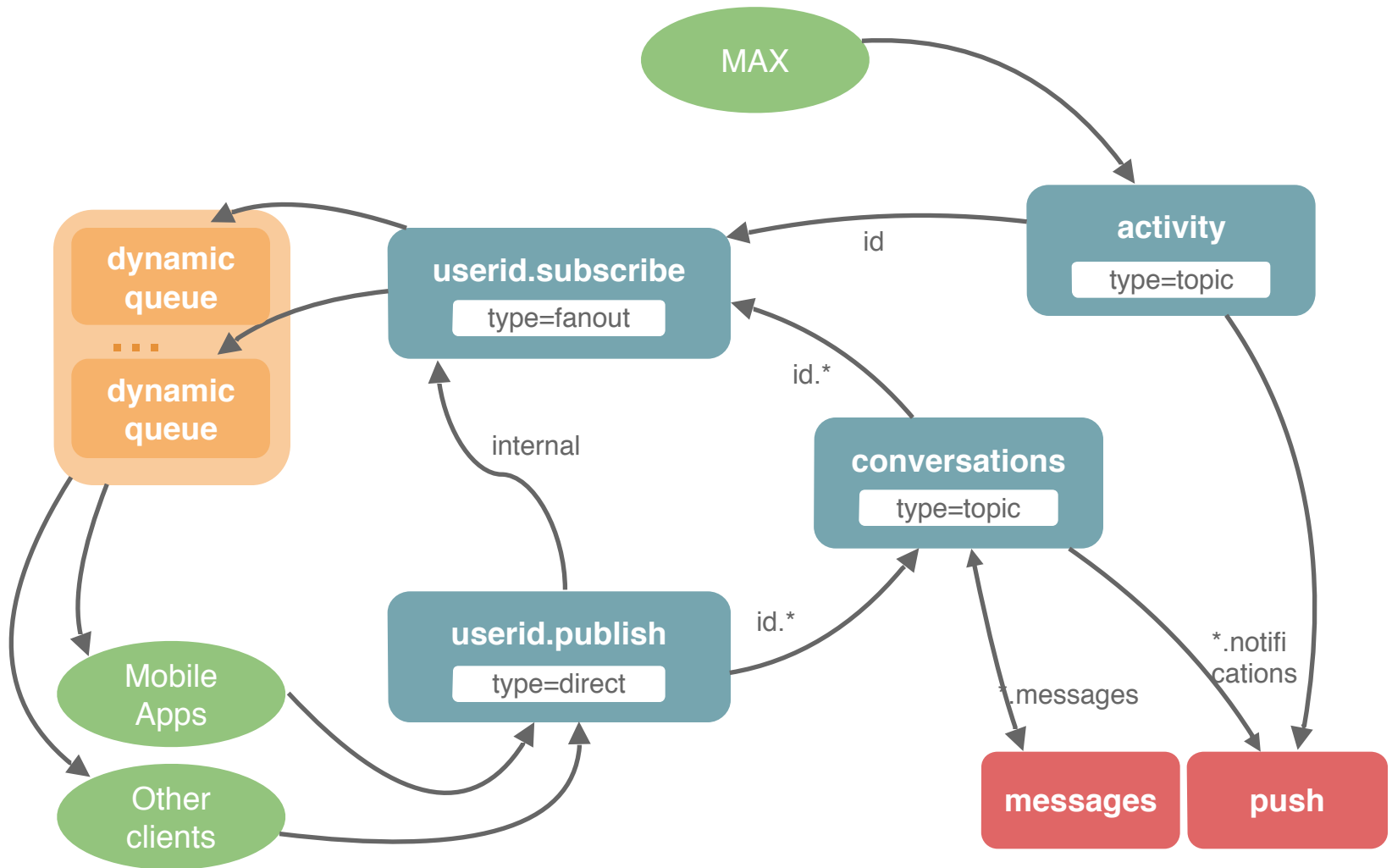
```
File "/var/max.upc.edu/upc/eggs/max-5.3.2-py2.7.egg/max/tweens.py", line 91, in excview_tween
    response = handler(request)
File "/var/max.upc.edu/upc/eggs/max-5.3.2-py2.7.egg/max/tweens.py", line 125, in compatibility_checker_tween
    response = handler(request)
File "/var/max.upc.edu/upc/eggs/max-5.3.2-py2.7.egg/max/tweens.py", line 155, in post_tunneling_tween
    response = handler(request)
File "/var/max.upc.edu/upc/eggs/max-5.3.2-py2.7.egg/max/tweens.py", line 175, in deprecation_wrapper_tween
    return response_wrapper(response)
File "/var/max.upc.edu/upc/eggs/max-5.3.2-py2.7.egg/max/deprecations.py", line 256, in wrapper
    response.body = json.dumps(request.actor.getInfo())
File "/var/python/python2.7/lib/python2.7/json/__init__.py", line 243, in dumps
    return _default_encoder.encode(obj)
File "/var/python/python2.7/lib/python2.7/json/encoder.py", line 207, in encode
    chunks = self.iterencode(o, _one_shot=True)
File "/var/python/python2.7/lib/python2.7/json/encoder.py", line 270, in iterencode
    return _iterencode(o, 0)
File "/var/python/python2.7/lib/python2.7/json/encoder.py", line 184, in default
    raise TypeError(repr(o) + " is not JSON serializable")
TypeError: datetime.datetime(2014, 7, 17, 6, 56, 30, 901000) is not JSON serializable
```

RabbitMQ & messaging



- Exchange-to-exchange routing
- STOMP over WS using rabbitmq plugins
- “Public” end-user stomp endpoints
- Message delivery and security through routing key bindings
- Oauth authentication via erlang plugin
- Easy plug-in of temp queues for debugging

Messaging Design



MaxCarrot

```
{ "uuid": "005fab55bee84",  
  "user": {  
    "username": "johndoe",  
    "displayname": "John Doe"  
  },  
  "action": "add",  
  "object": "message",  
  "data": {  
    "text": "Hello world!"  
  },  
  "source": "ios",  
  "domain": "demo",  
  "version": "4.0.1",  
  "published": "2015-07-21" }
```

MaxCarrot

- JSON based message format
- Used on messages routed through RabbitMQ
- Packed and unpacked versions
- Metadata/debugging fields
- Purpose related fields
- Encapsulates messaging logic

MaxCarrot

(Rules)

- Map field combinations to actions
- Pack messages following spec
- Ignore any message not matching any mapping

```
"source": {  
  "id": "s",  
  "type": "char",  
  "values": {  
    "ios": { "id": "c" },  
    (...)  
    "max": { "id": "m" }  
  }  
}
```

```
"version": {  
  "id": "v",  
  "type": "string",  
}
```

MaxCarrot

(human-readable)

```
{ "uuid": "005fab55bee84",  
  "user": {  
    "username": "johndoe",  
    "displayname": "John Doe"  
  },  
  "action": "add",  
  "object": "message",  
  "data": {  
    "text": "Hello world!"  
  },  
  "source": "ios",  
  "domain": "demo",  
  "version": "4.0.1",  
  "published": "2015-07-21" }
```


MaxCarrot

(nerd-readable)

```
{ 'a': 'a', 'd':  
{ 'text': 'Helloworld  
!'}, 'g': '005fab55be  
e84', 'i': 'demo', 'o':  
'm', 'p': '2015-07-2  
1', 's': 'i', 'u':  
{ 'u': 'johndoe', 'd':  
'JohnDoe' }, 'v': '4.0  
.1' }
```

MaxBunny



- Pluggable multiprocess domain-aware queue consumer
- A multiprocess runner runs N process for each consumer defined.
- Each consumer binds to a queue and consumes messages
- Runner provides a shared pool of WSGI MaxClient instances, one for each domain.

MaxClient

- Opinionated Wrapper for REST api's
- Wraps endpoint resources based on endpoint list definition.

```
RESOURCES['activity'] = dict(route='/people/{username}/activities')
```

- Accesses endpoints in a pythonic way

```
>>> client.people['username'].activities.get(qs={'limit':2})
```

- Creates json bodies from “nested” kwargs (with optional sensible defaults)

```
>>> client.activities.post(object_content='Hello')
{
    "object": {
        "objectType": "note",
        "content": "Hello"
    }
}
```

MaxClient

- Raises a custom RequestError exception on 5xx and 4xx responses
- Returns None on 404 responses
- Returns parsed JSON body on success responses

WSGI MaxClient

- WSGI version
- Subclassed MaxClient that makes calls to a “fake” wsgi server
- Actual MAX Codebase is run by the client
- Requests don't stress main api servers, only database
- Limitations:
 - User must have privileges on “real” max server
 - Computer from where client is run must have access to storage backed

Twitter external aggregation

- Backend process listens twitter streaming service
- Selected tweets are queued and processed
- Valid tweets are injected into max activity stream
- Max users linked with twitter usernames
- Aggregation of content as a context

Current integrations

UPCnet uLearn Communities

UPCnet uLearn Campus

iOS & Android apps



Sou a: Inídi > EuroPython demo

EuroPython demo

7 entrades



✎ Editar la comunidad

Comunitats

Desenvolupadors Ge...



EuroPython demo



● Veure més comunitats

Persones



Cerca



● Administrar portlets

Activitat

Documents

xats



Escriu alguna cosa...

Publica

Cerca a les entrades...



Darreres activitats / Activitats més valorades / Activitats destacades



Otero Hernandez Javier javier.otero

fa 8 segons

Hello guys, just say a big hello to all the EuroPython attendees!

✎ Publicat a EuroPython demo

🗨️ 1 comentaris ☆ favorit 🍑 m'agrada 📄 destacada



Riba Santos Corina corina.riba

fa 3 minuts

I'm in! Count on me!

✎ Publicat a EuroPython demo

🗨️ 0 comentaris ☆ favorit 🍑 m'agrada 📄 destacada



Diaz Bertolez Roberto roberto.diaz

fa 7 minuts

Yeah! Maybe we can celebrate it by going to drink some beers after work!

✎ Publicat a EuroPython demo

🗨️ 0 comentaris ☆ favorit 🍑 m'agrada 📄 destacada



Pilar Marinas pilar.marinas

fa 9 minuts

Just joined to this community and I've already think it's so cool!

✎ Publicat a EuroPython demo

🗨️ 0 comentaris ☆ favorit 🍑 m'agrada 📄 destacada



Carles Bruguera A carles.bruguera

ahir

Apunt per la primera xerrada de la europython



Agenda

21
DimartsAvui no hi ha
esdeveniments

< juliol 2015 >

Di	Dt	Dc	Dj	Dv	Ds	Dg
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2

● Veure més esdeveniments

📅 Crear un evento

Estadístiques

7

Entrades

0

Comentaris

0

Documents

0

Enllaços

0

Media

● Veure més estadístiques

● Administrar portlets



STREAM



Search in posts...



Latest activity / Most valued activity / Flagged activity



Jose A. Tébar jose.antonio.tebar 23 October
Texecution : Death Penalty given by the state of Texas. <http://bit.ly/1yoC2yn>

Published in **English 2.0**
1 comments ☆ favorite ♡ like



Jose A. Tébar jose.antonio.tebar 14 October
The superpowers of the future <http://bit.ly/11jzfvB>

Published in **English 2.0**
1 comments ☆ favorite ♡ like



Elena Gracia Comas elena.gracia 20 September
To think about it: <http://bit.ly/1sJMjQT>

Published in **English 2.0**
0 comments ☆ favorite ♡ like



M. Carmen Romo Martin mari.carmen.romo 5 September
Hi, I found this website: <http://bit.ly/1pRjXlr>

Published in **English 2.0**
2 comments ☆ favorite ♡ like



Oriol B. oriol.bosch 18/7/2014
[Offtopic] A bit of OS history: <http://bit.ly/1nhDJM3>

Published in **English 2.0**
0 comments ☆ favorite ♡ like



Paco Orozco paco.orocho 30/8/2014
This could be a test, but please click here: <http://bit.ly/1pDMou0>

Published in **English 2.0**
0 comments ☆ favorite ♡ like

My courses

English 2.0

Teacher: Albert Cabot

Bones pràctiques TIC



BONES PRÀCTIQUES

Bones Pràctiques

Aquest campus vol ser un espai per compartir tot el que es refereix al bon ús dels recursos TIC, siguin corporatius o personals.

Teacher: Joaquin Albert Julve | Teacher: Guillermo Gonzalez | Teacher: Alfonso Gonzalez Fernandez | Teacher: David Levy Bunan | Teacher: Jose Luis Montero Saez

Stream



Otero Hernandez Javier

⌚ 10 minutes ago

📍 EuroPython demo

Hello guys, just say a big hello to...



Riba Santos Corina

⌚ 12 minutes ago

📍 EuroPython demo

I'm in! Count on me!



Diaz Bertolez Roberto

⌚ 17 minutes ago

📍 EuroPython demo

Yeah! Maybe we can celebrate it...



Pilar Marinas

⌚ 18 minutes ago

📍 EuroPython demo

Just joined to this community and...



Stream



Chats



Subscription



More

Chats



Otero Hernandez Javier

⌚ less than a minute ago

See you tomorrow!



Janet Durà Pipó

⌚ 2 minutes ago

I'm so tired...



Carles Bruguera A

⌚ 4 minutes ago

Just a test for the demo!



T7 Check-in

⌚ 4 hours ago



Marcos Montero Torres

⌚ March 6, 2015

Donde estáis?



Ribas Roca Ana

⌚ January 22, 2015

Eoooo



Stream



Chats




Subscription



More


11:47

< **U** Stream




Víctor Fernández de Alba
🕒 11 desembre
📌 Consultoria

Taller comunitats Nexus 24. Abigail on fire! Gogogo



💬 1 👍 4 ★



Laura Requena | [laura.requena](#)
🕒 11 desembre

Hi ha quorum!!!

➤



11:48

< **U** Bosch Comas Oriol  


Oriol Bosch
em reps o no?
11/06/14

Oriol Bosch
que estic parlant al de grup del utalk i la gent no em fot ni cas.. no sé si arriba
11/06/14

ara si
11/06/14

havia sortit i m'ha petat al carrer xats
11/06/14

Oriol B.
eo, canvia't la foto! que amb la nova versió ja no surt pixelada
17/07/14



➤



Potential integrations

<place your web|app|whatever thingy name here>



<place the screenshots here>

Whishlist

- Social interactions (Follow/share)
- Finish & polish documentation
- Microservices / Dockerization
- Redis backed cache
- RabbitMQ SSL without NGINX
- Python3 / asyncio
- Explore JSON-LD (HATEOAS)
- Encryption

Community building?

Absolutely!

Let's do it!

Contact us, PR are welcome!

Resources

<https://upcnet.github.io/max>

<https://github.com/UPCnet/max>

<https://github.com/UPCnet/maxserver>

Thanks / Gràcies

@sunbit

@sneridagh