Thrift

serviços para comunicação inter-linguagens

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Remote Procedure Call

Comunicação inter-processos

Sintaxe “familiar”

"Distributed objects era of the 90s"

(91) Corba

(93) Microsoft COM

(97) Java RMI

(98) XML-RPC (depois SOAP)

(99) EJB

overhead

REST

Roy Fielding, 2000

“estado” abstraído para “recurso”

sintaxe universal para links

operações e content-types bem definidos

stateless, layered, cacheable

Thrift

Facebook, 2007

RPC

(de novo)

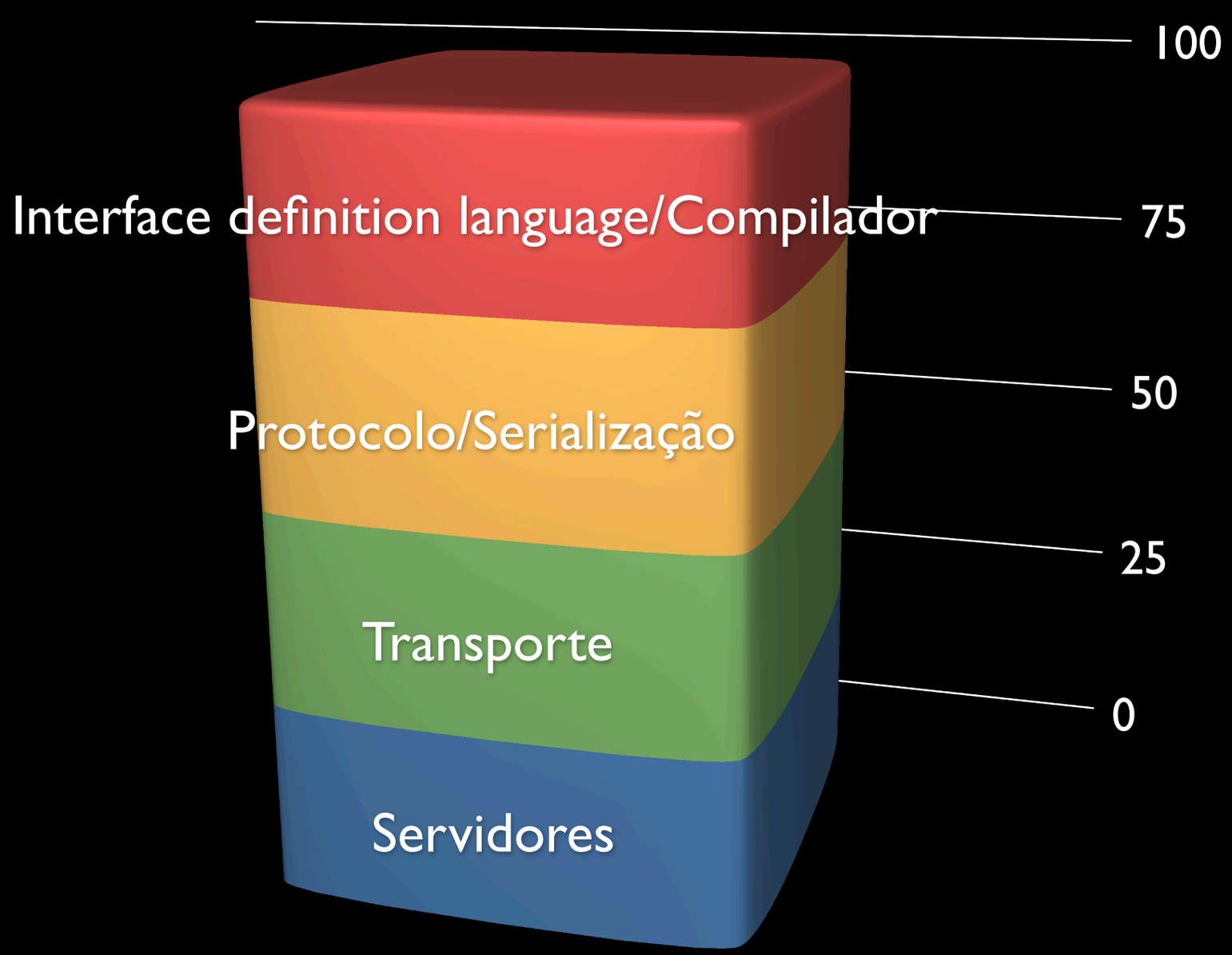
Adotado pelo Apache Incubator (2008)

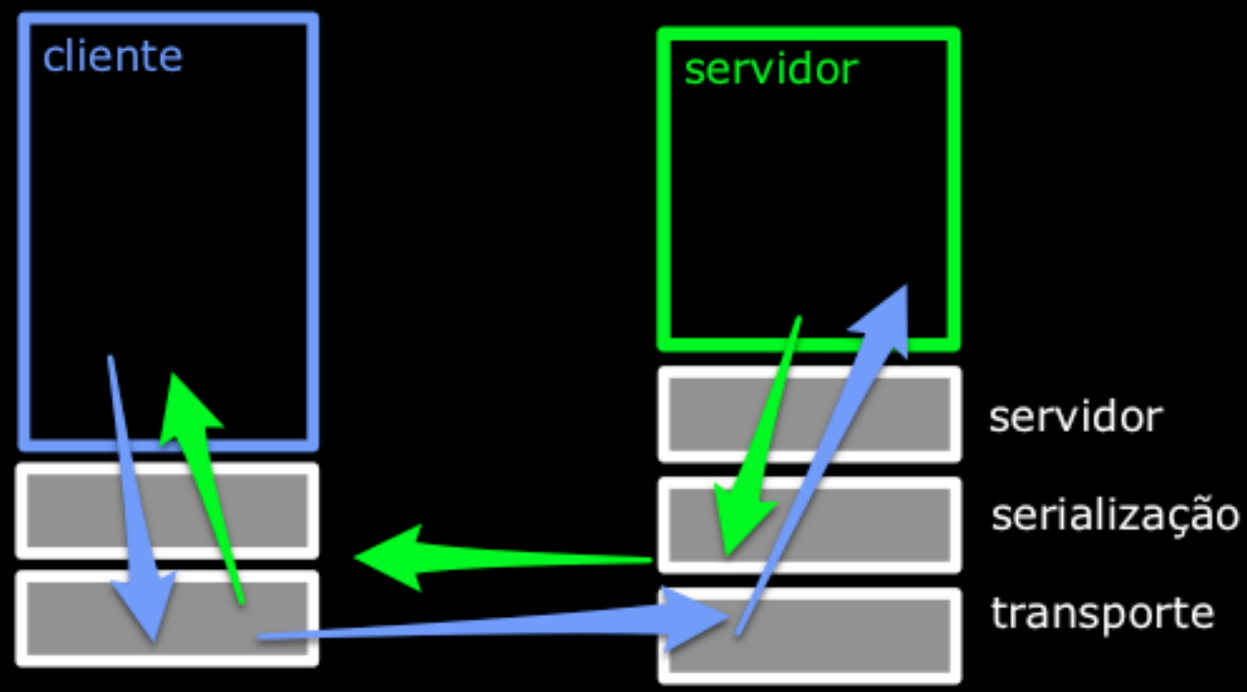
C++, Java, Python, PHP, Ruby, Erlang, Perl, Haskell, C#, Cocoa, Smalltalk, OCaml, ...

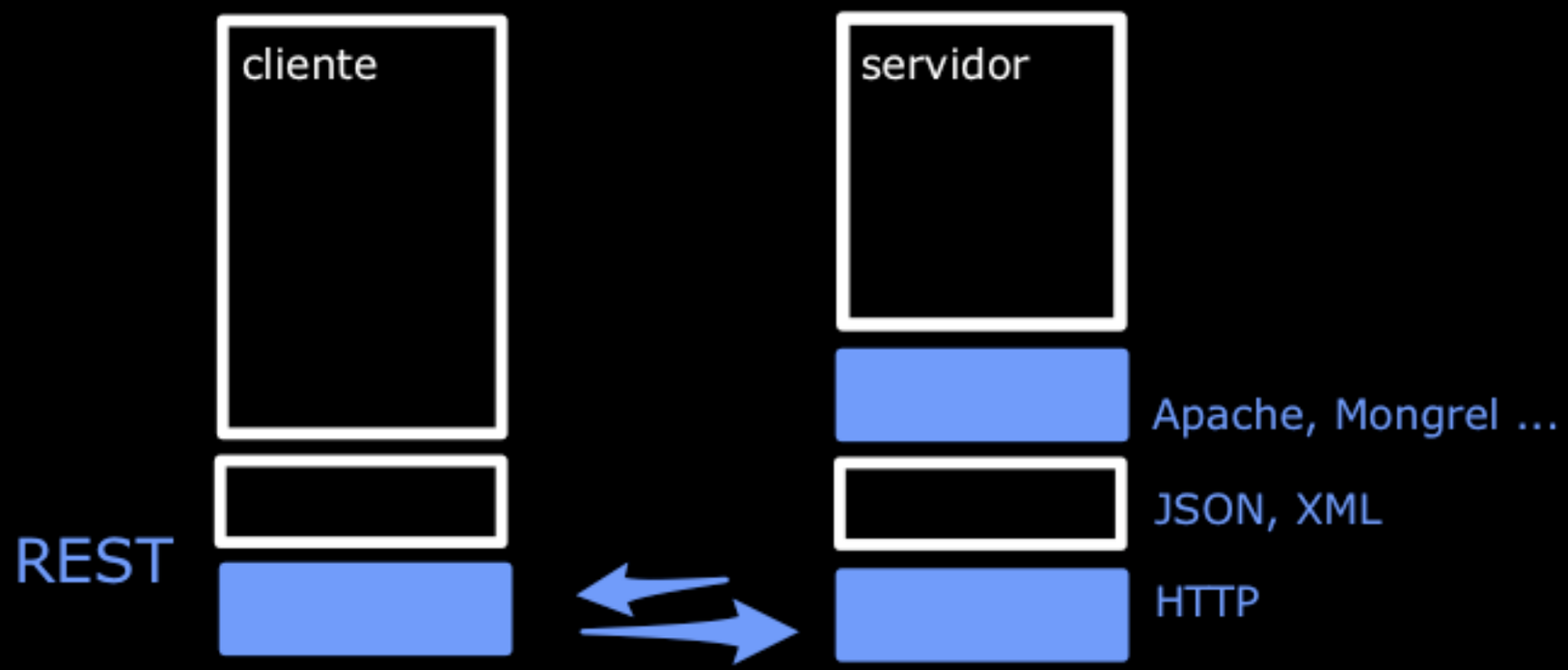
“Rápido, realmente rápido”

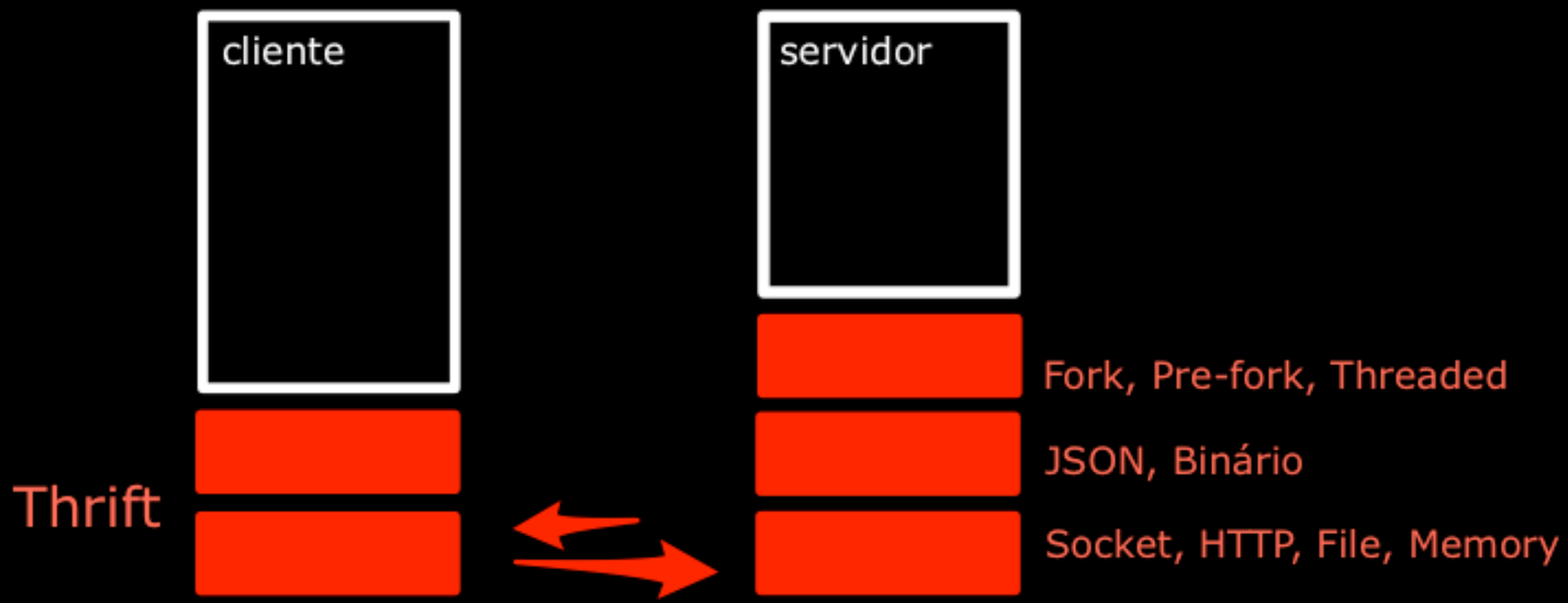
hein?

Thrift


100
75
50
25
0
Interface definition language/Compilador
Protocolo/Serialização
Transporte
Servidores


cliente
servidor
servidor
serialização
transporte


cliente
servidor
Apache, Mongrel ...
JSON, XML
REST
HTTP


cliente
servidor
Thrift
Fork, Pre-fork, Threaded
JSON, Binário
Socket, HTTP, File, Memory

Interface Definition Language

compilador/gerador de código

Tipos

Traduzidos em tipos “nativos”

Sem tipos especiais ou wrappers

Básicos

bool

byte

i16, i32, i64

double

string

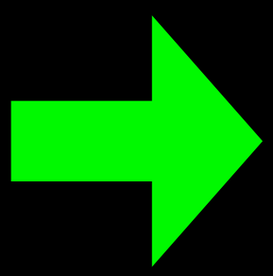
Containers

list<type>

set<type>

map<type1, type2>

list<type>



[ ] Ruby/Python

array( ) PHP

STL vector C++

ArrayList Java

Structs

```
struct Example {
  1:i32     number=10,
  2:i64     big_number,
  3:double  decimal,
  4:string  name="thrifty"
}
```

```
# examples.thrift
```

Ruby

```ruby
class Example
  include ::Thrift::Struct

  ::Thrift::Struct.field_accessor self, :number, :big_number, :decimal, :name

  ...
end
```

Python

```python
class Example(object):

  def __init__(self, number=10, big_number=None, decimal=None, name="thrifty",):
    self.number = number
    self.big_number = big_number
    self.decimal = decimal
    self.name = name

  ...
```

PHP

```php
<?php
class Example {
  public $number = 10;
  public $big_number = null;
  public $decimal = null;
  public $name = "thrifty";

  public function __construct($vals=null) {
    if (is_array($vals)) {
      if (isset($vals['number'])) {
        $this->number = $vals['number'];
      }
      if (isset($vals['big_number'])) {
        $this->big_number = $vals['big_number'];
      }
      if (isset($vals['decimal'])) {
        $this->decimal = $vals['decimal'];
      }
      if (isset($vals['name'])) {
        $this->name = $vals['name'];
      }
    }
  }
}
?>
```

Java

```java
public class Example implements TBase, java.io.Serializable, Cloneable {
  public int number;
  public long big_number;
  public double decimal;
  public String name;

  public Example() {
    this.number = 10;
    this.name = "thrifty";
  }

  public Example(int number, long big_number, double decimal, String name)
  {
    this();
    this.number = number;
    this.big_number = big_number;
    this.decimal = decimal;
    this.name = name;
  }

  ...
}
```

Exceções

```
 8 exception ExampleException {
 9   1:i32     number=10,
10   2:i64     big_number,
11   3:double  decimal,
12   4:string  name="thrifty"
13 }
14
```

```
# examples.thrift
```

Python
```
class ExampleException(Exception):
```

Java
```
public class ExampleException extends Exception {
```

PHP
```
class ExampleException extends TException {
```

Ruby
```
class ExampleException < ::Thrift::Exception
```

Serviços

```
15 service RemoteHashMap {
16     void          set(1:i32 key, 2:string value),
17     string        get(1:i32 key) throws (1: KeyNotFound knf),
18     async void delete(1:i32 key)
19 }
20
```

```
# examples.thrift
```

Protocolo

Métodos para leitura e escrita

Encoding dos tipos básicos, structs e containers

TProtocol

readMessageBegin()

writeMessageBegin(name, type, seq)

readStructBegin()

writeStructBegin(name)

readI16()

writeI16()

readI32()

...

TBinaryProtocol

TCompactProtocol

TJSONProtocol

...

Transporte

Transferência de dados

Duas interfaces

TTransport

open

close

isOpen

read

write

flush

TServerTransport

open

listen

accept

close

TSocket

TFileTransport

TMemoryBuffer

THttpClient

...

Servidores

TThreadedServer

TThreadPoolServer

TForkingServer

...

Fim.

WS-*, alguém?

SOAP (formerly known as Simple Object Access Protocol)
SOAP Message Transmission Optimization Mechanism
WS-Notification
WS-BaseNotification
WS-Topics
WS-BrokeredNotification
WS-SoapOverUDP
WS-Addressing
WS-Transfer
WS-Eventing
WS-Enumeration
WS-MakeConnection
WS-Policy
WS-PolicyAssertions
WS-PolicyAttachment
WS-Discovery
WS-Inspection
WS-MetadataExchange
Universal Description, Discovery, and Integration (UDDI)
WSDL 2.0 Core
WSDL 2.0 SOAP Binding
Web Services Semantics (WSDL-S)
WS-Resource Framework (WSRF)
WS-Security
XML Signature
XML Encryption
XML Key Management (XKMS)
WS-SecureConversation
WS-SecurityPolicy
WS-Trust
WS-Federation
WS-Federation Active Requestor Profile
WS-Federation Passive Requestor Profile
Web Services Security Kerberos Binding
Web Single Sign-On Interoperability Profile
Web Single Sign-On Metadata Exchange Protocol
Security Assertion Markup Language (SAML)
XACML
ISO/IEC 20000-2:2005 Information technology

P3P
WS-ReliableMessaging
WS-Reliability
WS-RM Policy Assertion
Web Services Resource Framework
WS-BaseFaults
WS-ServiceGroup
WS-ResourceProperties
WS-ResourceLifetime
WS-Transfer
Resource Representation SOAP Header Block
WS-I Basic Profile
WS-I Basic Security Profile
Simple Soap Binding Profile
WS-BPEL
WS-CDL
Web Services Choreography Interface
WS-Choreography
XML Process Definition Language
WS-BusinessActivity
WS-AtomicTransaction
WS-Coordination
WS-CAF
WS-Transaction
WS-Context
WS-CF
WS-TXM
WS-Management
WS-Management Catalog
WS-ResourceTransfer
WSDM
Web Services for Remote Portlets
WS-Provisioning
Devices Profile for Web Services (DPWS)
ebXML
ISO/IEC 19784-2:2007 Information technology
ISO 19133:2005 Geographic information
ISO/IEC 20000-1:2005 Information technology
ISO/IEC 25437:2006 Information technology

Na prática

1. Definir as estruturas

```
3
4 enum MartialArt {
5   AIKIDO    = 1,
6   KARATE    = 2
7 }
8
9 struct UserProfile {
10   1: i32           uid,
11   2: string        name,
12   3: MartialArt    style
13 }
14
15 service UserStorage {
16   void          store(1: UserProfile user),
17   UserProfile   retrieve(1: i32 uid)
18 }
19
```

```
# service.thrift
```

1. Definir as estruturas

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15 service UserStorage {
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17   UserProfile   retrieve(1: i32 uid)
18 }
19
```

Enum!

```
# service.thrift
```

2. Gerar código “stub”

```
$ thrift --gen rb --gen java service.thrift
```

2. Gerar código “stub”

```
$ thrift --gen php --gen py:new_style service.thrift
```

3. Implementar lógica do serviço

```
16
17 class UserStorageHandler:
18     def __init__(self):
19         pass
20
21     def store(self, user):
22         print "stored " + str(user)
23
24     def retrieve(self, id):
25         print "retrieved " + str(id)
26         return UserProfile(
27             uid=id,
28             name="Ralph Waldo Emerson",
29             style=MartialArt.KARATE
30     )
31
```

```
# server.py
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30     )
31


# server.py
```

código gerado!

4. Escolher o servidor

```
32
33 handler = UserStorageHandler()
34 processor = example.UserStorage.Processor(handler)
35 transport = TSocket.TServerSocket(9090)
36 tfactory = TTransport.TBufferedTransportFactory()
37 pfactory = TBinaryProtocol.TBinaryProtocolFactory()
38
39 server = TServer.TThreadedServer(processor, transport, tfact...
40
41 print 'Starting the server...'
42 server.serve()
43
```

```
# server.py
```

4. Escolher o servidor

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32
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40
41 print 'Starting the server...'
42 server.serve()
43
```

opções de servidor!

```
# server.py
```

5. Implementar o cliente

```
17  $socket = new TSocket('localhost', 9090);
18  $transport = new TBufferedTransport($socket, 1024, 1024);
19  $protocol = new TBinaryProtocol($transport);
20  $client = new UserStorageClient($protocol);
21
22  $transport->open();
23
24  $user = $client->retrieve(1);
25  var_dump($user);
26
27  $new_user = new example_UserProfile(array(
28    "uid" => '123',
29    "name" => "Ralph Waldo Emerson",
30    "style" => example_MartialArt::KARATE
31  ));
32  $client->store($new_user);
33
34  $transport->close();
```

```
# client.php
```

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código gerado!

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código gerado!

```
# client.php
```

6. Deploy!

```
$ python server.py
```

٢١

invocação remota

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```

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... e caímos aqui

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de volta!

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invocação remota


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```

bingo!

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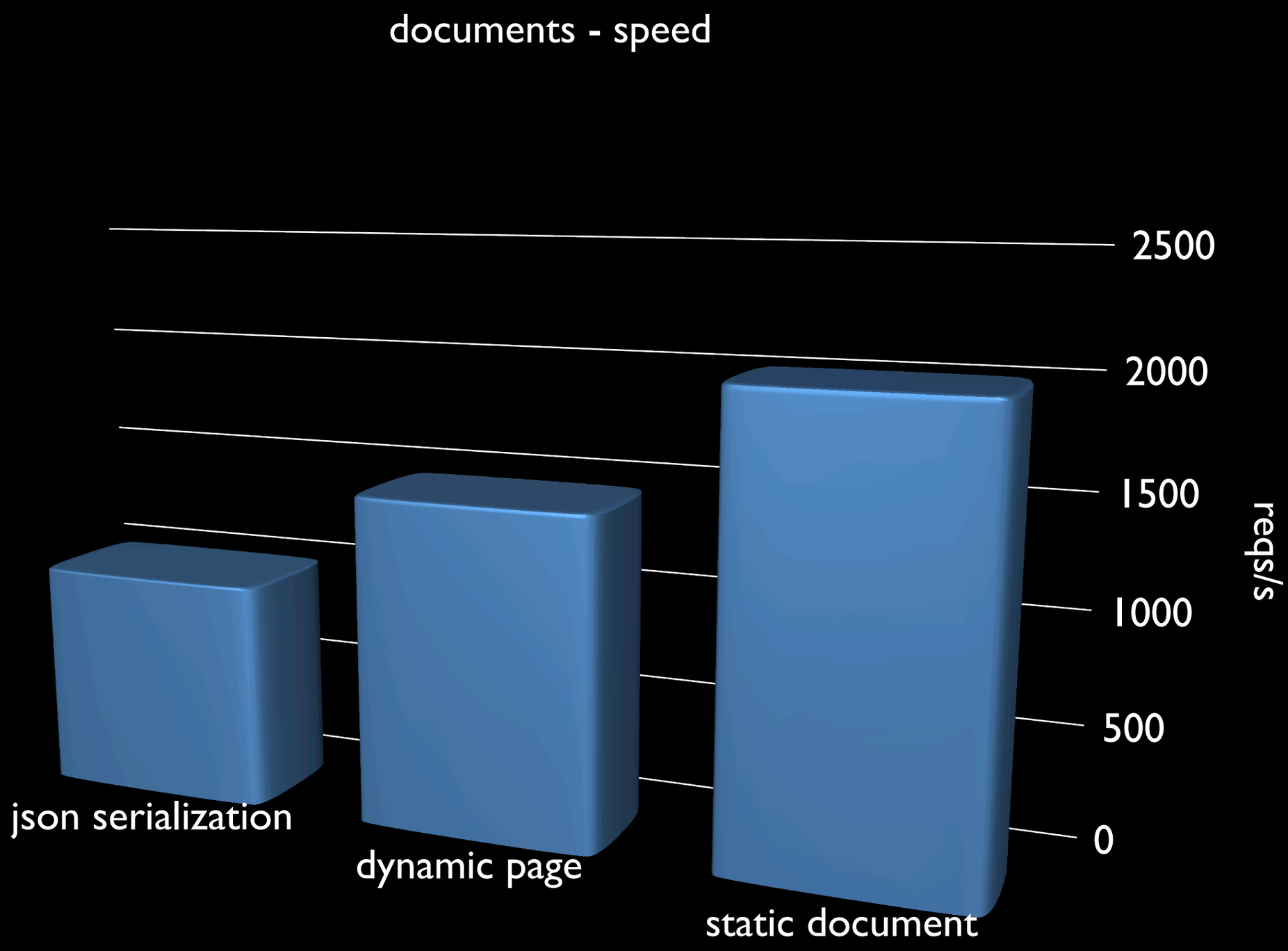
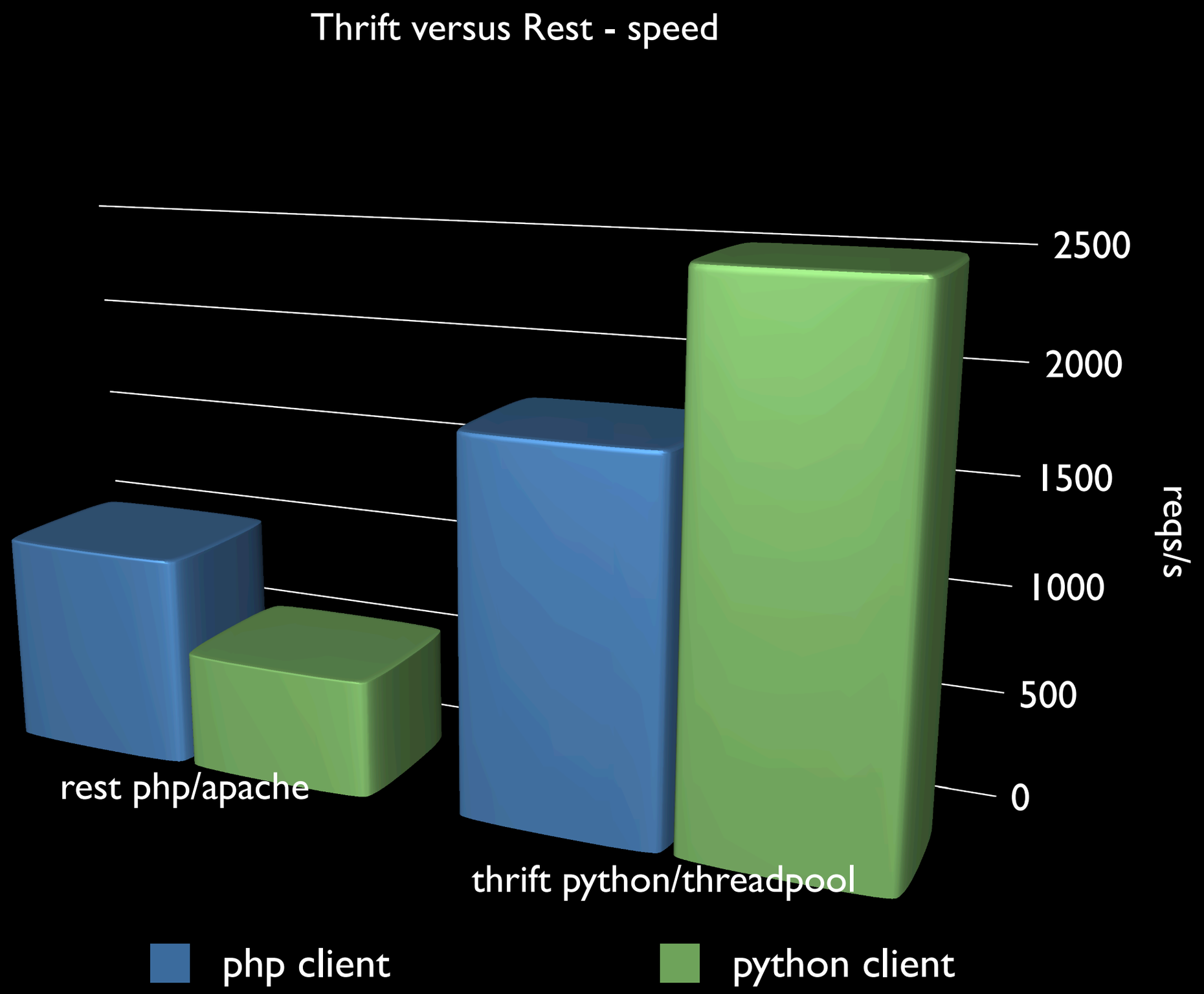
Benchmarks



http://github.com/bzanchet/presentation-thrift-fisl10/



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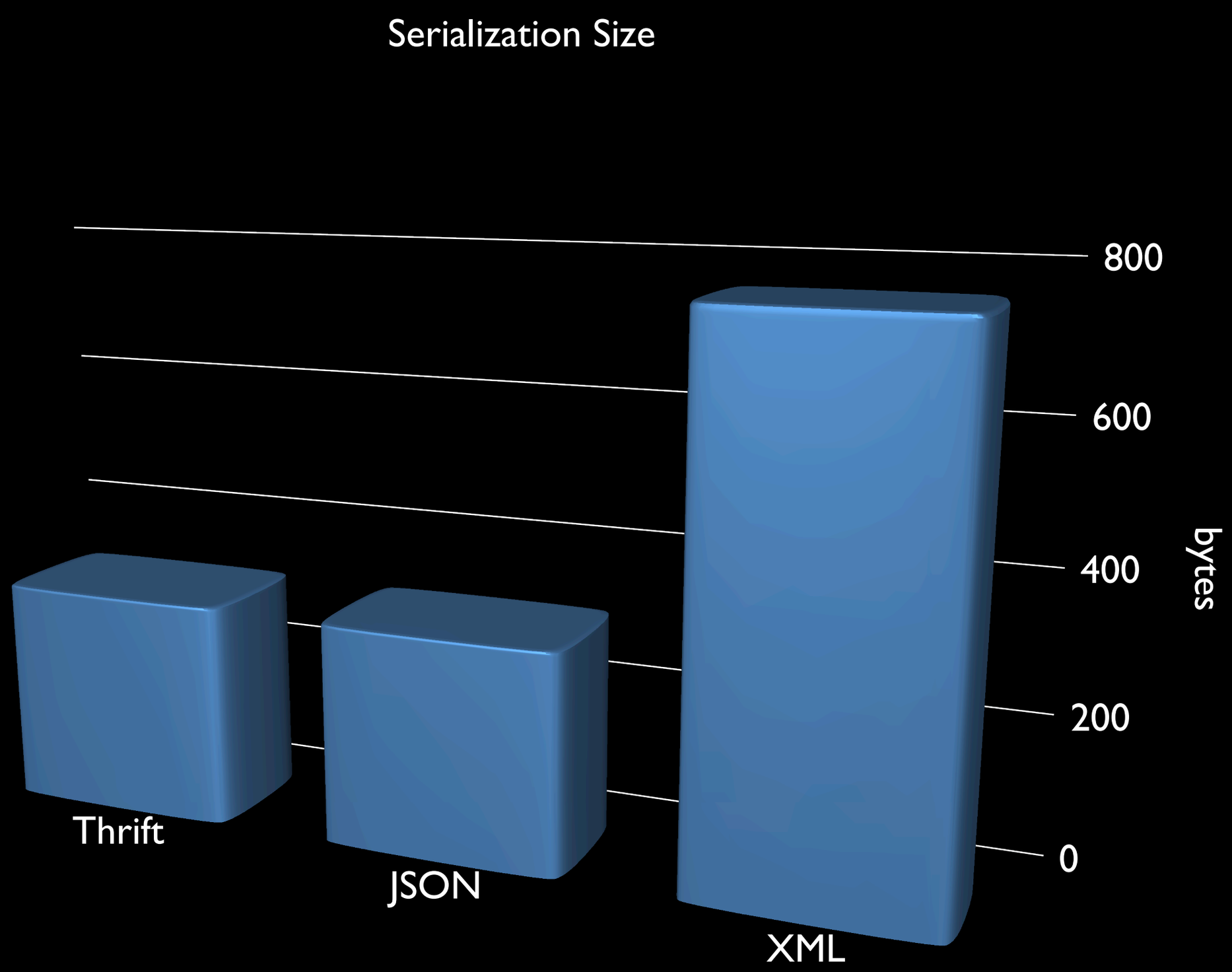

http://code.google.com/p/thrift-protobuf-compare/wiki/Benchmarking

Desvantagens

Não tão ubíquo (quanto HTTP)

Não tão maduro (quanto HTTP)

Não tão óbvio (quanto HTTP) ?!

Pontos fortes

Compatibilidade entre linguagens

Serialização built-in

Performance!

meme

DO YAHOO!

http://meme.yahoo.com

Mais

Versionamento da interface

Thrift + Protocol buffers

Referências

http://incubator.apache.org/thrift/

https://github.com/bzanchet/presentation-thrift-fisl10/

Thrift

serviços para comunicação inter-linguagens