VWRAP Type System Experience & Issues

Linden Lab

March 2010

Mark Lentczner / “Zero Linden”

Experience Report

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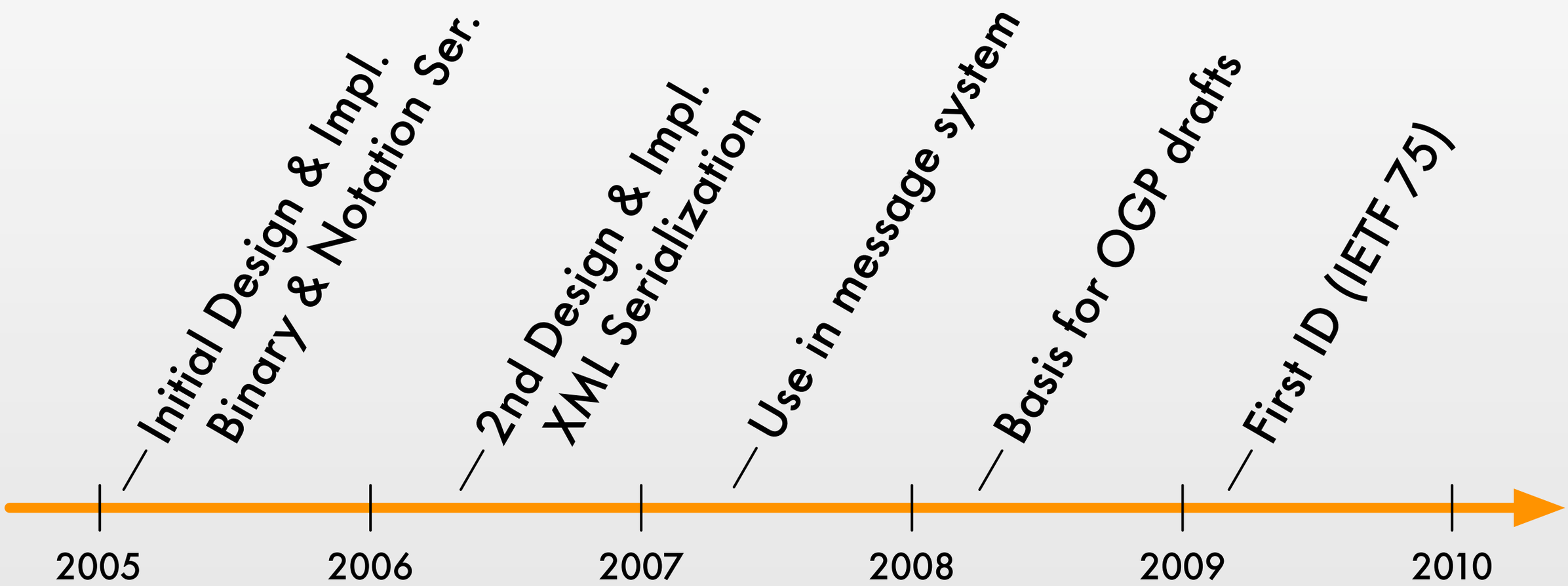
Time Line



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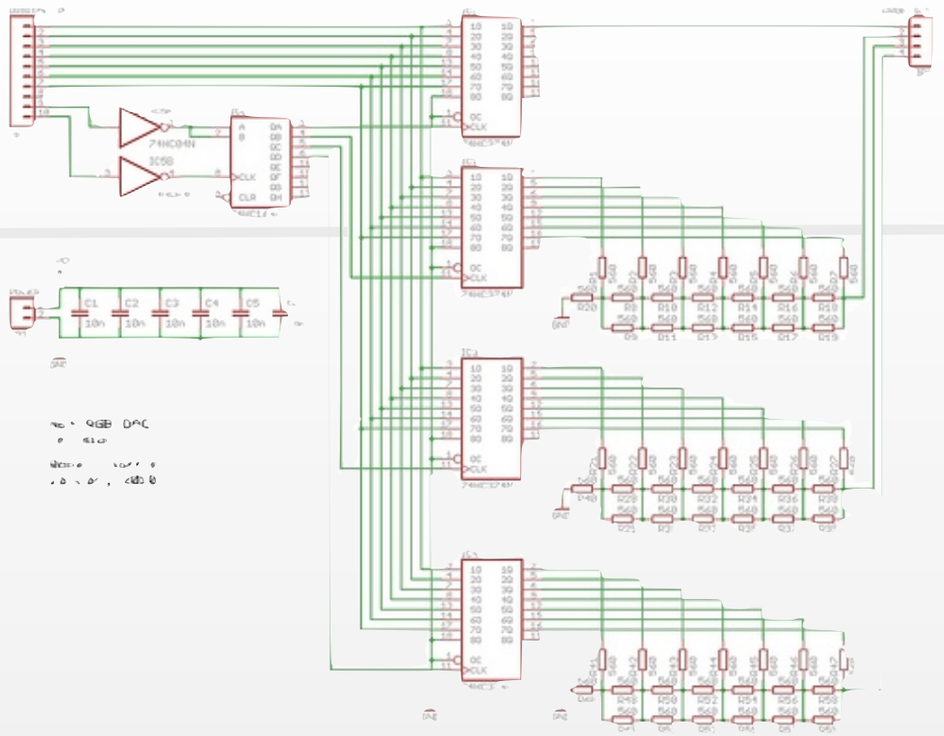
Implementations



C++: *Linden Lab*

C#: *OpenMetaverse*

Haskell: *Linden Lab*

Java: *Linden Lab, University of St. Andrews*

JavaScript: *Linden Lab*

Perl: *Linden Lab*

PHP: *Linden Lab, SignpostMarv*

Python: *Linden Lab*

Ruby: *Linden Lab*

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Usage

Code:

9% of modules in LL main codebase use LLSD

(~8k modules, ~3M lines of code)

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Usage

Counts:

253k log messages / **minute**

daily peak (notation)

9.7M objects created / day

(XML)

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Usage

Data Volume:

6.4 TiB / day for 2M teleports

average of 3.3MiB each (binary)

big LLSD!

55.7 TiB / day for 749k simulation checkpoints

gzip'd to 42% of original (XML)

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Pain Points

Content Negotiation

Unicode Strings vs. XML

Mixing LLSD and non-LLSD

Documentation

Validation

Big data sets

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Issues

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Types: Date Range

The range of dates is currently bounded:

> "Data of type Date may have the value of any time in the from January 1, 1970 though at least January 1, 2038, to at least second accuracy."

Is this a worry?

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Encoding: JSON Subtlety

1) RFC 4627 vs. ECMA-262

2) RFC 4627's `JSON-text` vs.
ECMA-262's `JSONvalue`

3) String literals are escaped UTF-16, not Unicode!

U+1D11E (𝄞) is encoded in JSON as:

```
"\ud834\udd1e"
```

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Encoding: XML Base64

1) The `encoding` attribute is defaulted to `base64`,
   it is not `#REQUIRED`

2) Which alphabet?
   RFC 4648 § 4. Base 64 Encoding

3) Linebreaking, Padding and Non-Alphabet
   RFC 4648 § 3. Implementation Discrepancies

LLIDL: REST vs. HTTP

1) Clear community dislike of binding to HTTP

2) Agreement on focus on REST semantics

3) Which REST like operations do we support?

Operational	POST	<- ->
Readable	GET	<<
Read/Write	GET/PUT	<>
Read/Write/Deletable	GET/PUT/DELETE	<x>

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LLIDL: Events

An event, as cast into REST, would be like a request with no response.

This does seem to map onto the communication needs of VWRAP.

Do we add this? Perhaps:

Event	POST?	>>

LLIDL: Semantics of Matching

LLIDL describes shapes
LLSD describes defaulting and conversion

What constitutes conformance of an LLSD value to an LLIDL description?

One approach:

```
match(actual) -- matches structurally and all conversions are
     valid (non-defaulted)
valid(actual) -- matches structurally though defaulted or
     additional data is acceptable

has_additional(actual) -- has additional data
has_defaulted(actual) -- has defaulted data
incompatible(actual) -- the value is incompatible
```

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LLIDL: Stand Alone Values

There a need to be able to reference (and check conformance) for individual values.

The named type facility serves this purpose for now.

LLIDL: Path Arguments

Astute readers will have noticed the addition of query argument specifications to LLIDL (the `??` syntax).

While not strictly part of the current VWRAP usage, internally the need for specifying the query arguments to a resource was pressing.

The need for path arguments is similar, though at present, LLIDL doesn't consider the URL to access a resource.

VWRAP Foundation Issues

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Additions:

Minor nit: "Capability Host"

Minor nit: Resource Base URI

Medium issue: Required Serialization Formats

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Issues

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Seed Capability Format

In draft:

```
%% seed
-> { capabilities: [ string, ... ] }
<- { capabilities: { $: uri } }
```

But should it be?

```
%% seed
-> { capabilities: [ string, ... ] }
<- { capabilities: [ &cap, ...]
&cap = { name: string, loc: uri }
```

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Event Queues

1) Are events to be handled differently than other resource types?

2) How should server invoked resources be implemented?

3) Is the current long-poll queue mechanism good enough for now?

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Capability Host

The “capability host” is responsible for both granting and proxying

Should split out into two:

“granting host”

“proxying host”

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Resource Name Base URI

Currently:

`http://xmlns.secondlife.com/capability/name`

Propose something like:

`urn:vwrap:res:`

Serialization

Currently "XML and JSON ... **MUST** be supported"

Is there a point to forcing everyone to do both?

We could put the burden on:

just providers?

just consumers?

How does that work in our more symmetric world?

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