

XOVis – Analytics and Visualization for Sugar and OLPC



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STATE UNIVERSITY**

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sverma@sfsu.edu



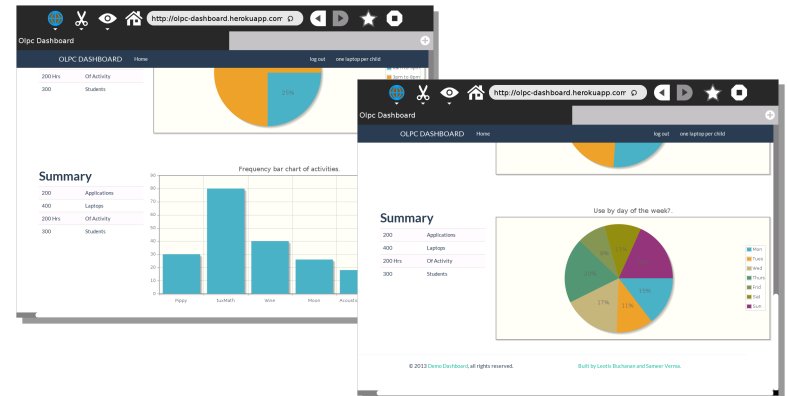
@sameerverma

Overview

- Peering into data about usage of laptops
- Learning Analytics
 - 1) measurement, 2) collection, 3) analysis and 4) reporting
- Visualization is part of the the reporting section
 - Tends to be most memorable, because of its visual component
 - Reporting should be more than just visualization
- XOVis as an add-on to existing and new projects
 - Existing projects can add a school server and “do analytics”
 - New projects can implement integrated analytics along with each school deployment.

History

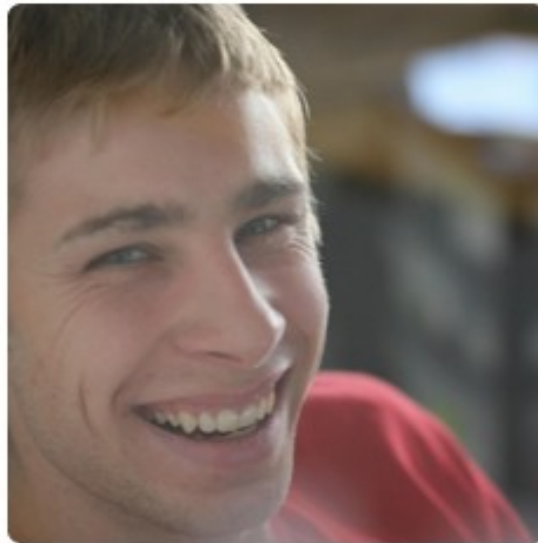
- Paraguay – Raúl Gutiérrez Segalés and Morgan Ames
- Jamaica – Leotis Buchanan and Sameer Verma
- Australia – Martin Abente Lahaye
- India – Anish Mangal and Sameer Verma
- Nepal – Martin Dluhos, Andi Gros, Sameer Verma
- Other:
 - Red Azúcar/Montar un cliente
 - Sugar Network
- See <http://www.olpcsf.org/node/204>



XOVis

Written by Martin Dluhos

<https://github.com/martasd/xovis>



Martin Dluhos

`martasd`

Methodologies

- Qualitative
 - In-class observation
 - Interviews
 - Children, parents, siblings, teachers, principals, local community
- Quantitative
 - Assessment tests as proxy
 - Metadata
- One corroborates the other.



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no-data	no-data	"#b20008,#f8e800"	""	"Photo by XO-PROV"	SHC03
"private"	"0"	"#B20008,#F8E800"	"org.ceibaljam.Tuxmath"	"Tuxmath Activity"	SHC03
"private"	"0"	"#B20008,#F8E800"	"org.ceibaljam.Tuxmath"	"Tuxmath Activity"	SHC03
"private"	"0"	"#B20008,#F8E800"	"org.ceibaljam.Tuxmath"	"Tuxmath Activity"	SHC03
"private"	"0"	"#5E008C,#00A0FF"	"org.ceibaljam.Tuxmath"	"Tuxmath Activity"	SHC03
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"private"	"0"	"#B20008,#F8E800"	"yu.lux.olpc.Speak"	"sdggasq12345677"	SHC03
"private"	"0"	"#B20008,#F8E800"	"org.ceibaljam.Tuxmath"	"Tuxmath Activity"	SHC03
no-data	no-data	"#b20008,#f8e800"	""	"Audio by XO-PROV"	SHC03
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"private"	"0"	"#B20008,#F8E800"	"org.laptop.WikipediaActivity"	"encyclopaedia"	SHC03
no-data	no-data	"#b20008,#f8e800"	""	"Photo by XO-PROV"	SHC03

Metadata

- Not a bad word.
- Metadata is data about data.
 - Data: Creative work by the child.
 - Metadata: time of creation, duration, collaboration, save-and-resume, etc.
- Metadata acts as a proxy for engagement.
- Engagement is a proxy for learning.
- Observing aggregates.

The Datastore

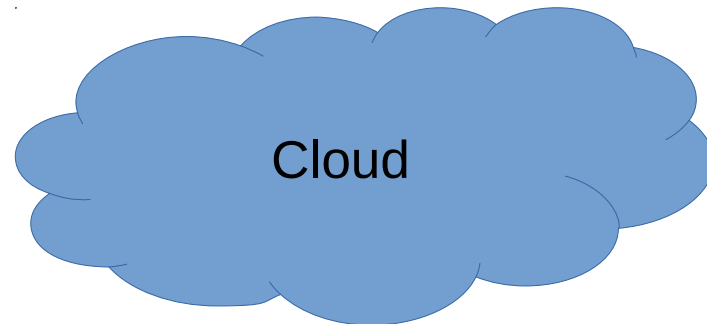
- User data is stored in Sugar using a datastore written in Python.
- The front-end (user interface) to the datastore is the Journal activity
- The Journal activity allows for storage, retrieval, searching, indexing, sorting etc. as contained in the datastore.
- In addition to the Journal as an expression of the datastore, we can extract relevant bits about the data stored as metadata.

Metadata: The data about data

```
#write header row
writer.writerow([
    "idx",
    "act",
    "icon_color",
    "activity_id",
    "keep",
    "mime_type",
    "mtime",
    "preview",
    "share_scope",
    "timestamp",
    "title",
    "title_set_by_user",
    "uid"]])
```

H	I	J	K	L	
share-scope	keep	icon-color	activity	title	machine
		"#b20008,#f8e800"	""	"Photo by XO-PROV"	SHC03
		"#B20008,#F8E800"	"org.ceibaljam.Tuxmath"	"Tuxmath Activity"	SHC03
		"#B20008,#F8E800"	"org.ceibaljam.Tuxmath"	"Tuxmath Activity"	SHC03
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		"#B20008,#F8E800"	"org.laptop.RecordActivity"	"q1eezZZZazzx x x"	SHC03
		"#B20008,#F8E800"	"vu.lux.olpc.Speak"	"sdggasq12345677"	SHC03
		"#B20008,#F8E800"	"org.ceibaljam.Tuxmath"	"Tuxmath Activity"	SHC03
		"#b20008,#f8e800"	""	"Audio by XO-PROV"	SHC03
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		"#B20008,#F8E800"	"org.ceibaljam.Tuxmath"	"Tuxmath Activity"	SHC03
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		"#b20008,#f8e800"	""	"Photo by XO-PROV"	SHC03

XOVis: Cloud-based analytics and visualization dashboard



What happens at school?

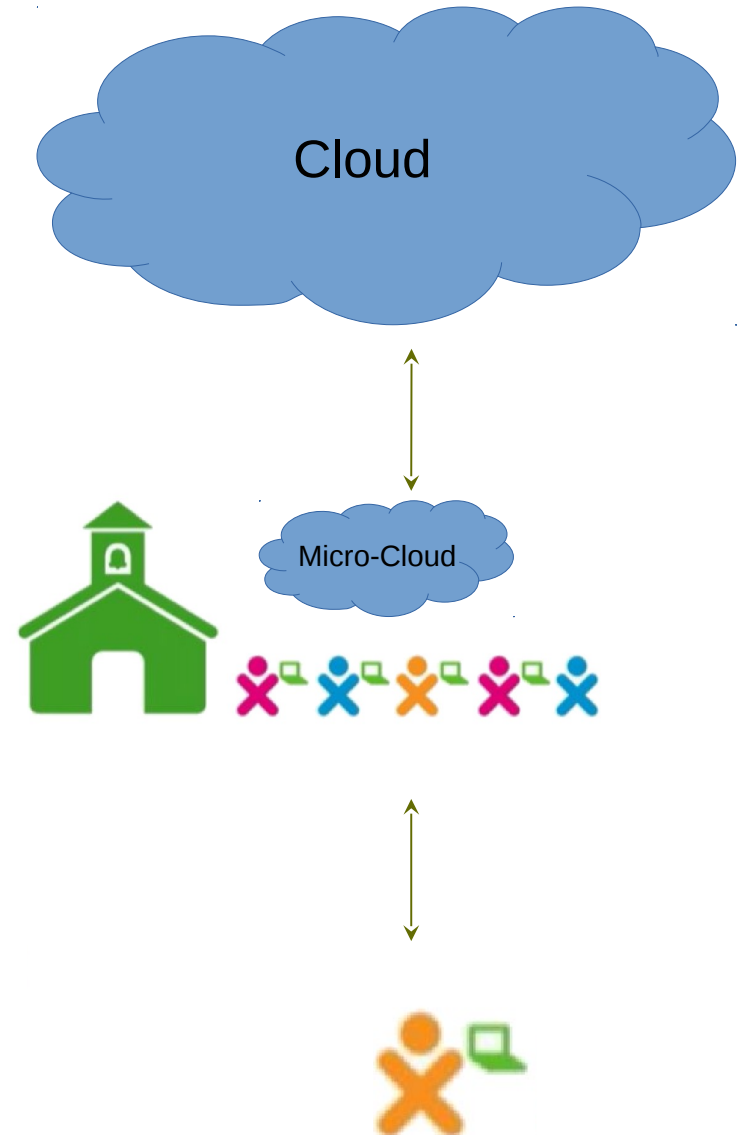


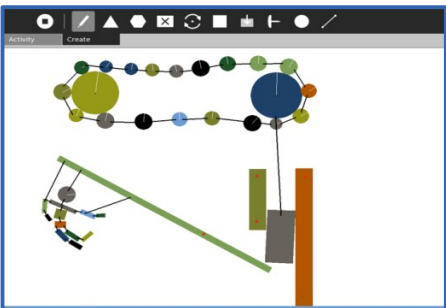
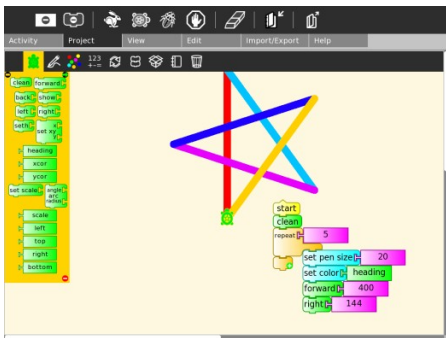
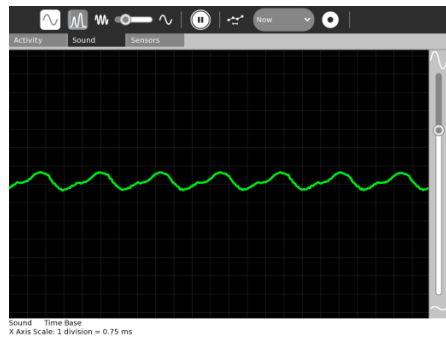
Architecture

Central management for orchestration, monitoring and analytics is done in the cloud.

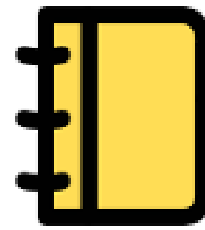
Micro-cloud appliance at school acts as a local mirror for content and management

Laptop with child has some offline content. It works in school and can go home.

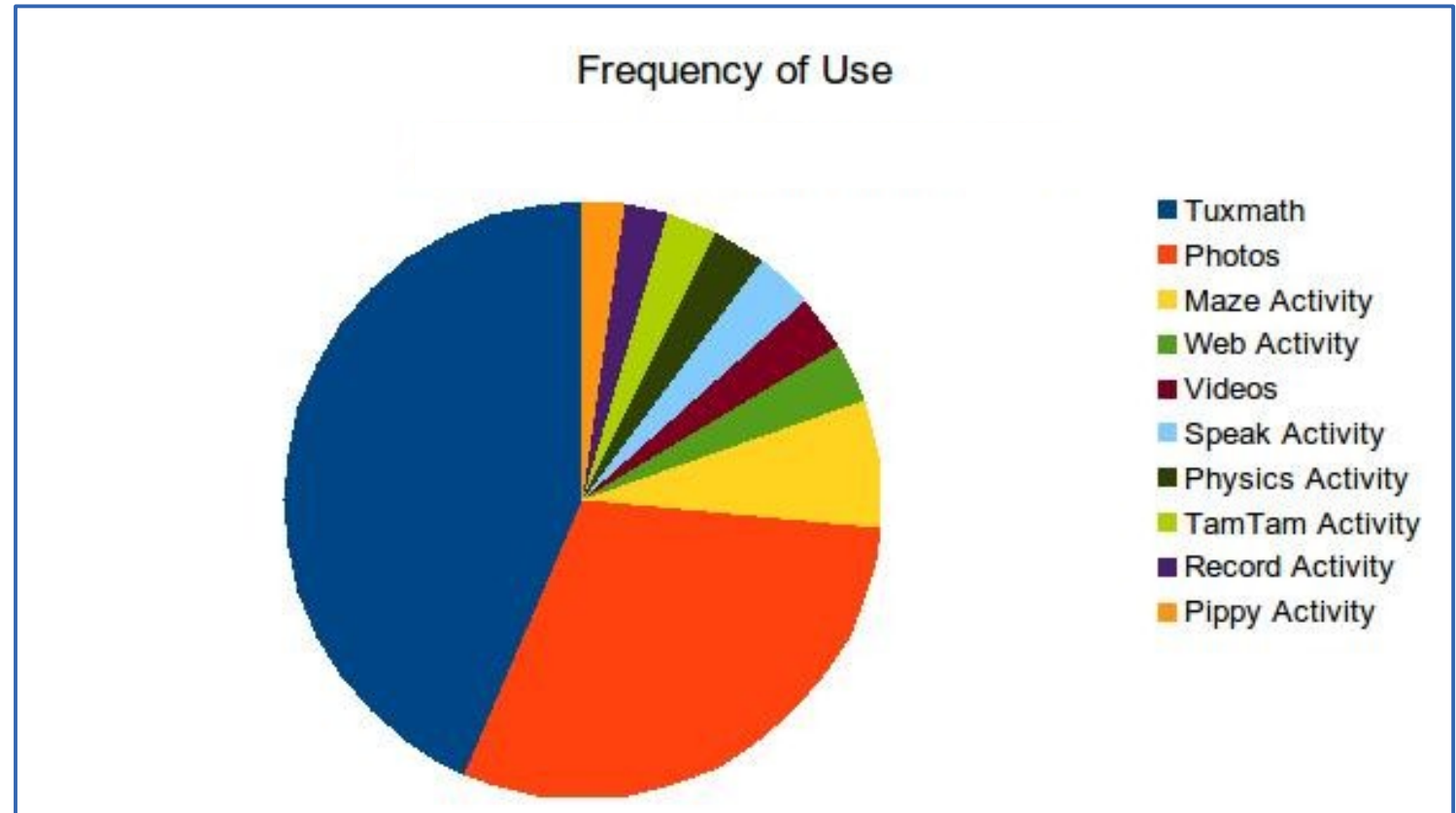
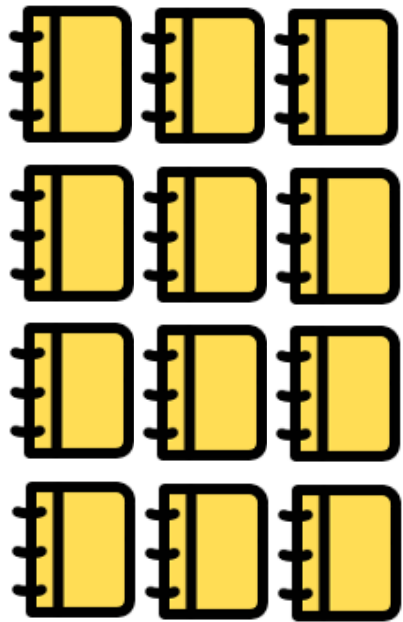




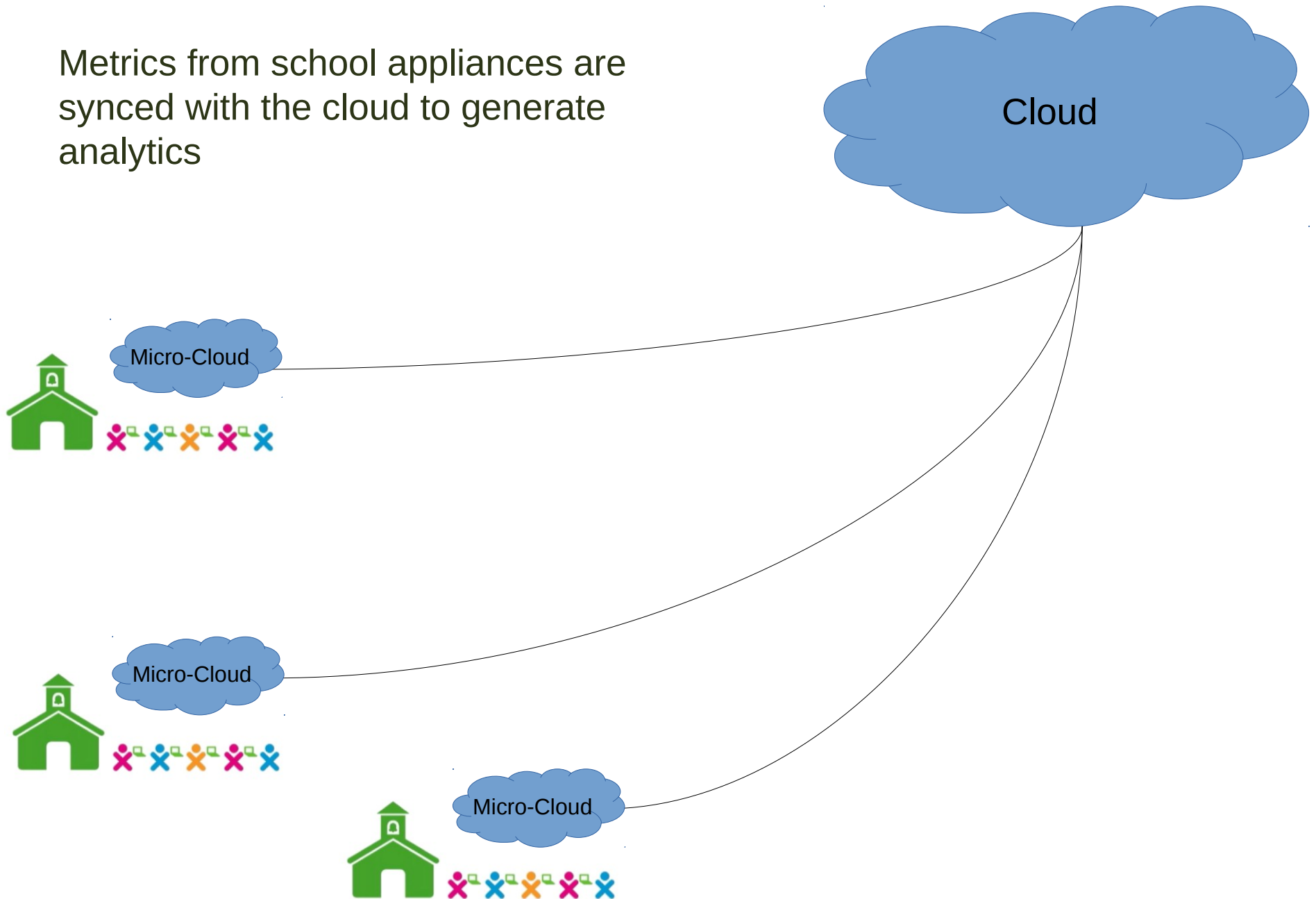
Each child's work is automatically stored in a Journal on her laptop



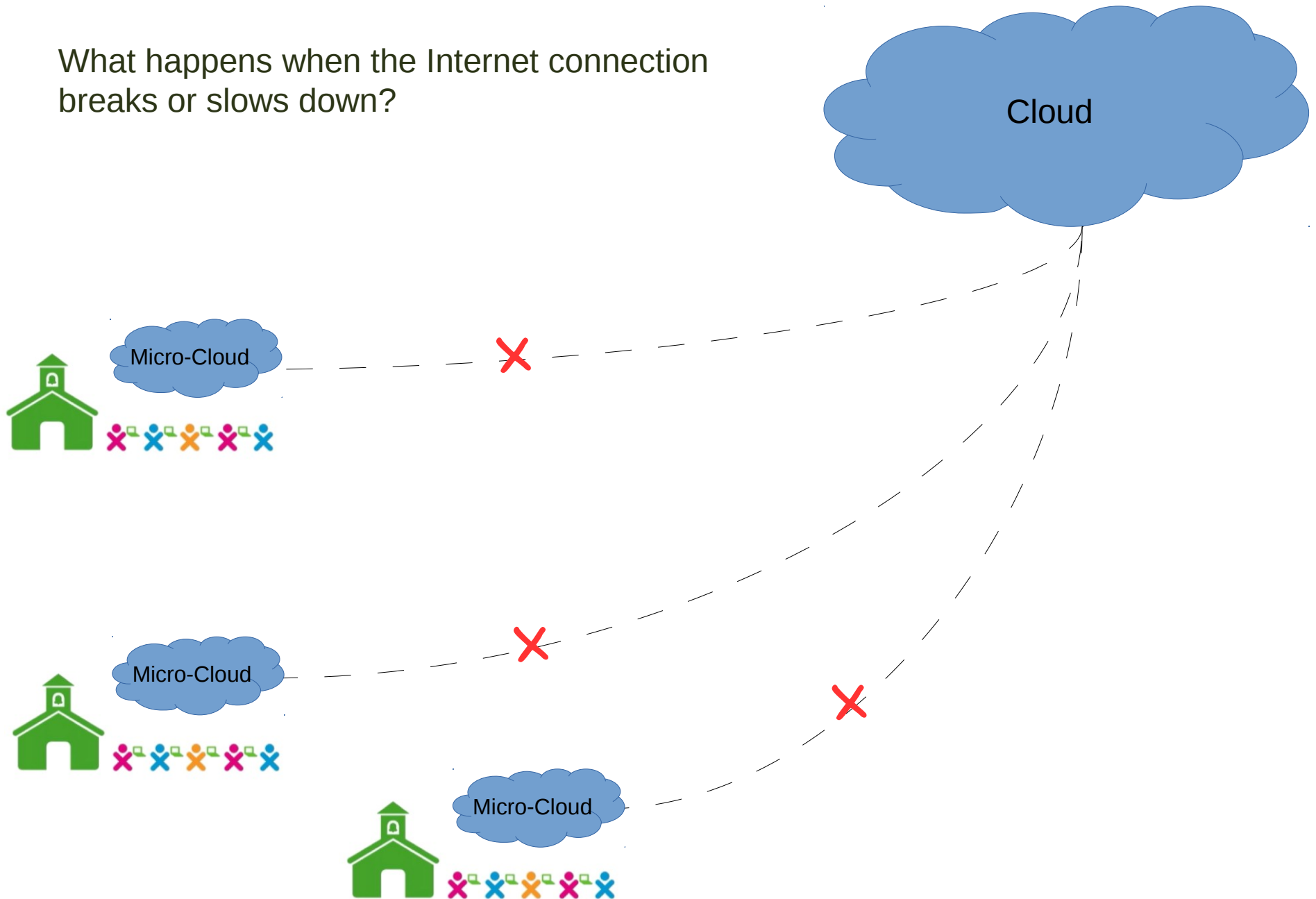
This work is distilled into metrics at the school micro-cloud appliance



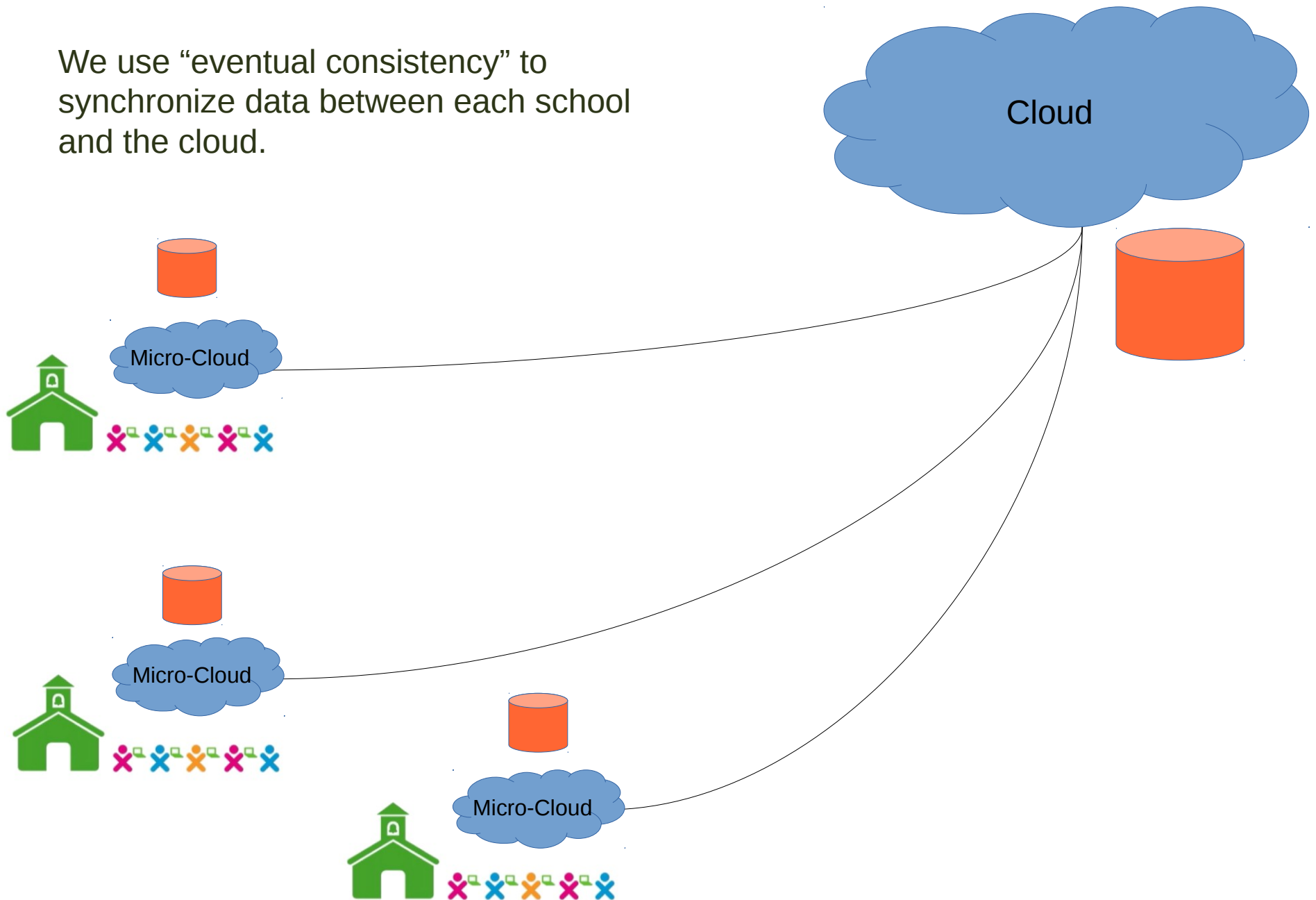
Metrics from school appliances are synced with the cloud to generate analytics



What happens when the Internet connection breaks or slows down?



We use “eventual consistency” to synchronize data between each school and the cloud.



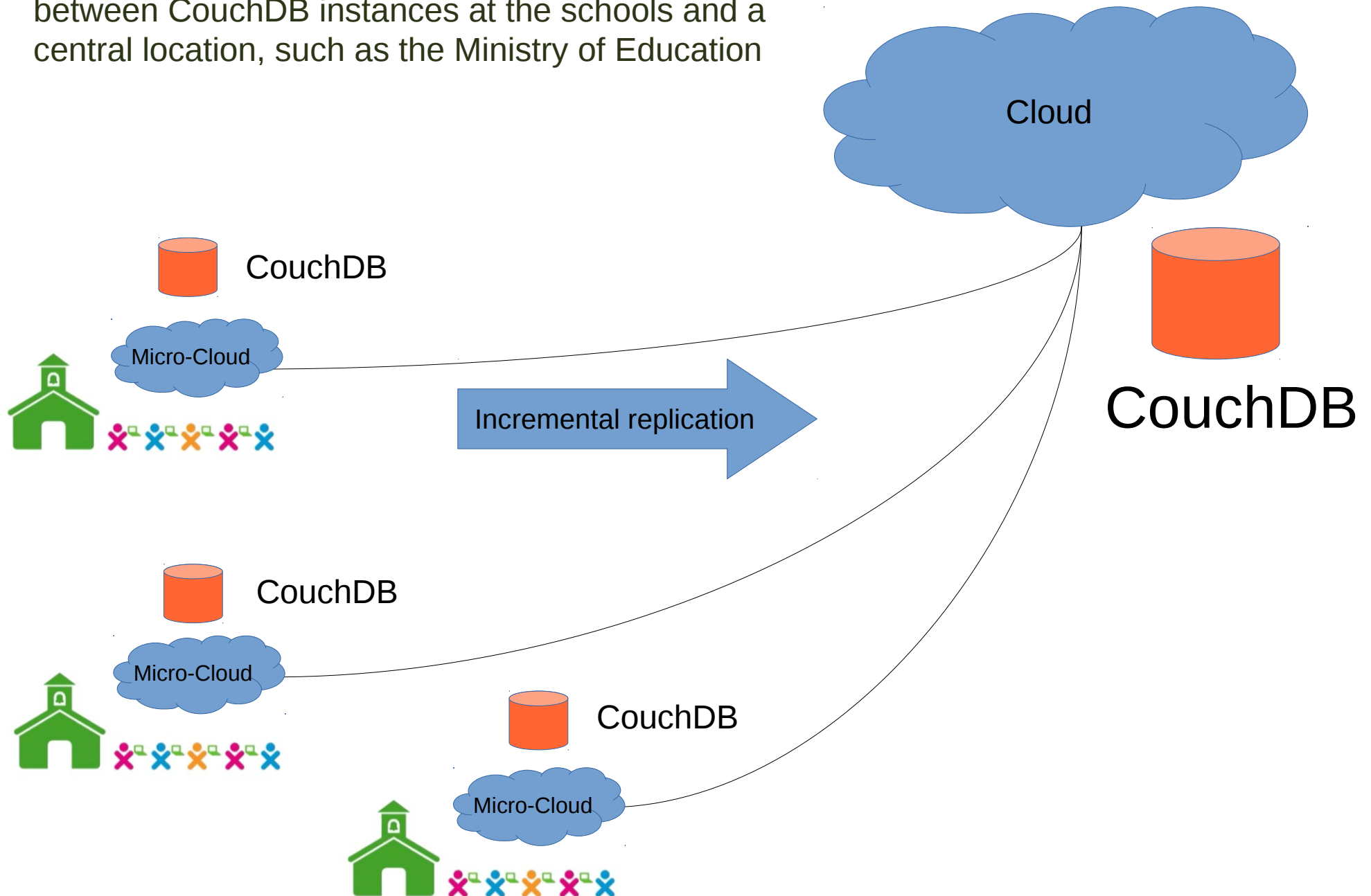
<https://couchdb.apache.org/>



Apache CouchDB™ is a database that uses **JSON** for documents, **JavaScript** for **MapReduce** indexes, and regular **HTTP** for its **API**

Database, Aggregation, Offline Sync, Document Storage, NoSQL, etc.

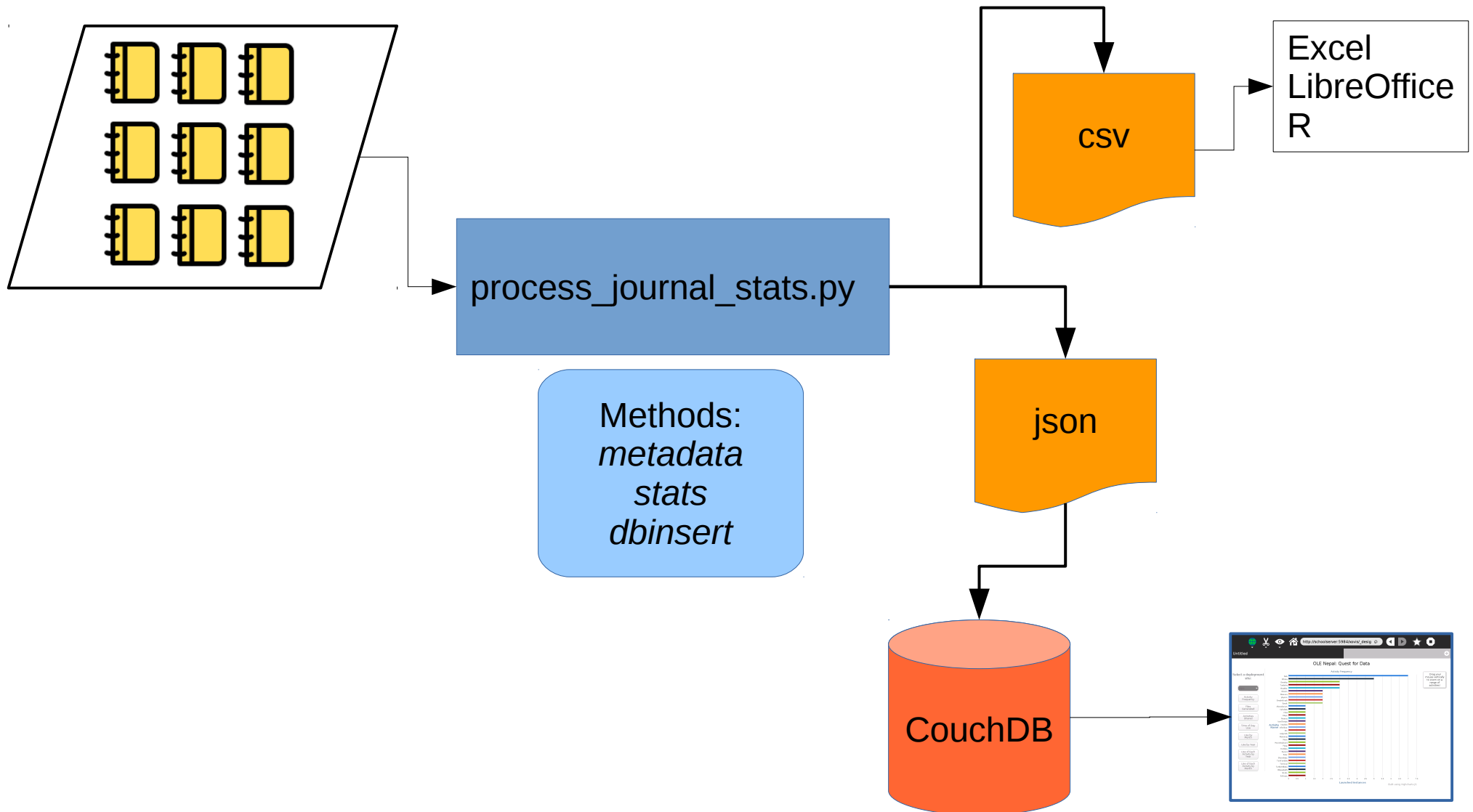
CouchDB supports “eventual consistency” through incremental replication and conflict management between CouchDB instances at the schools and a central location, such as the Ministry of Education



xovis

- Github: <https://github.com/martasd/xovis>
- Install
 - Online: *./scripts/install_xovis.sh*
 - On top of XSCE (Use ansible. See instructions)
- Process (go to */opt/xovis/xo-stats* folder)
 - Get all metadata to CSV (*./process_journal_stats.py all*)
 - Get activity stats (*./process_journal_stats.py activity*)
 - Push into DB (*./process_journal_stats.py dbinsert xovis --deployment olpc – server http://admin:admin@127.0.0.1:5984*)
- Use
 - *http://schoolserver:5984/<deployment-name>/_design/xovis-couchapp/index.html*

xovis





http://schoolserver:5984/xovis/_desig



Untitled



XOVis: Quest for Data

Select a deployment site:

olpc

Activity Frequency

Files Generated

Activities Shared

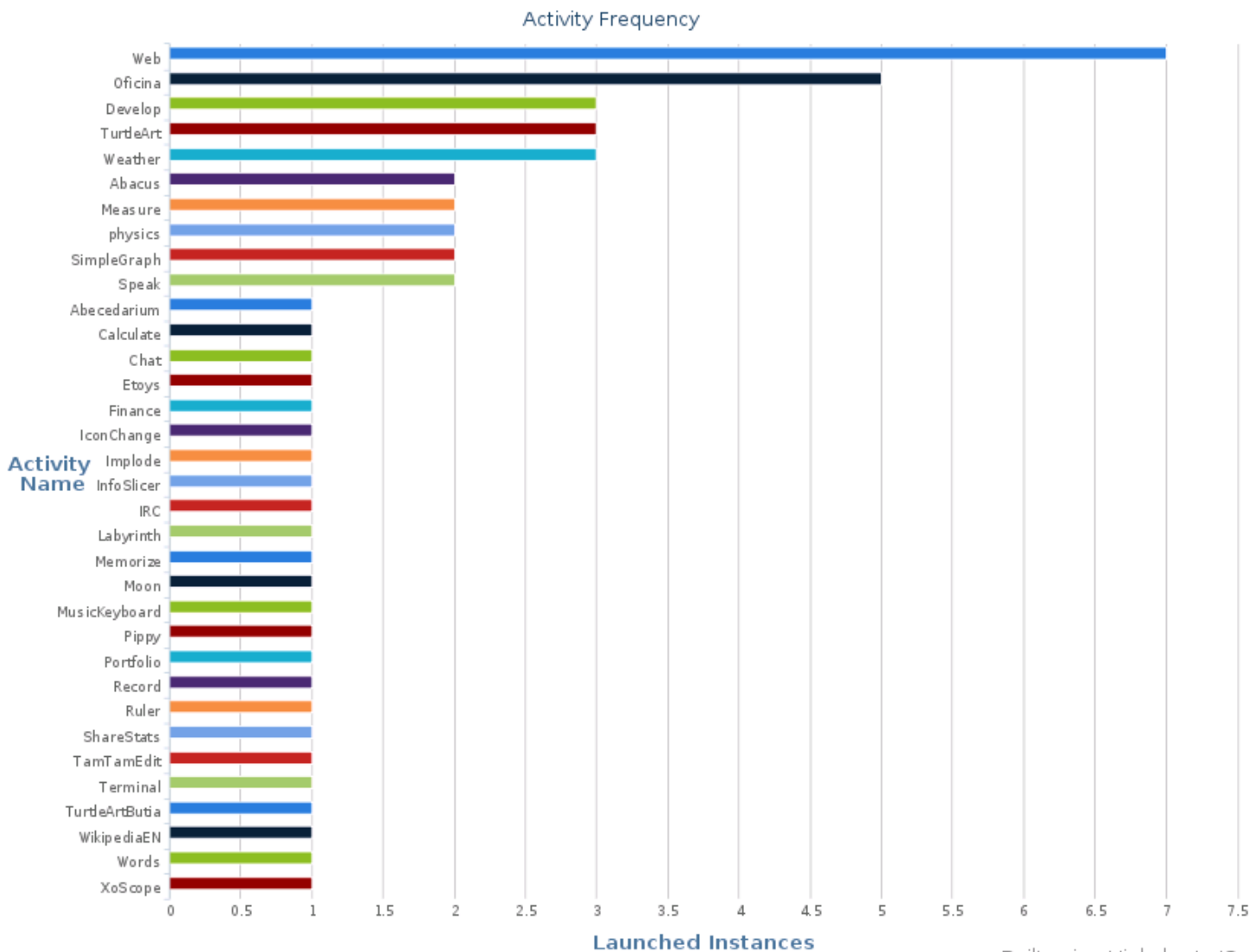
Time of Day Use

Use by Month

Use by Year

Use of Each Activity by Year

Use of Each Activity by Month



Drag your mouse vertically to zoom on a range of activities!

Built using Highcharts JS



http://schoolserver:5984/xovis/_desig



Untitled



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olpc

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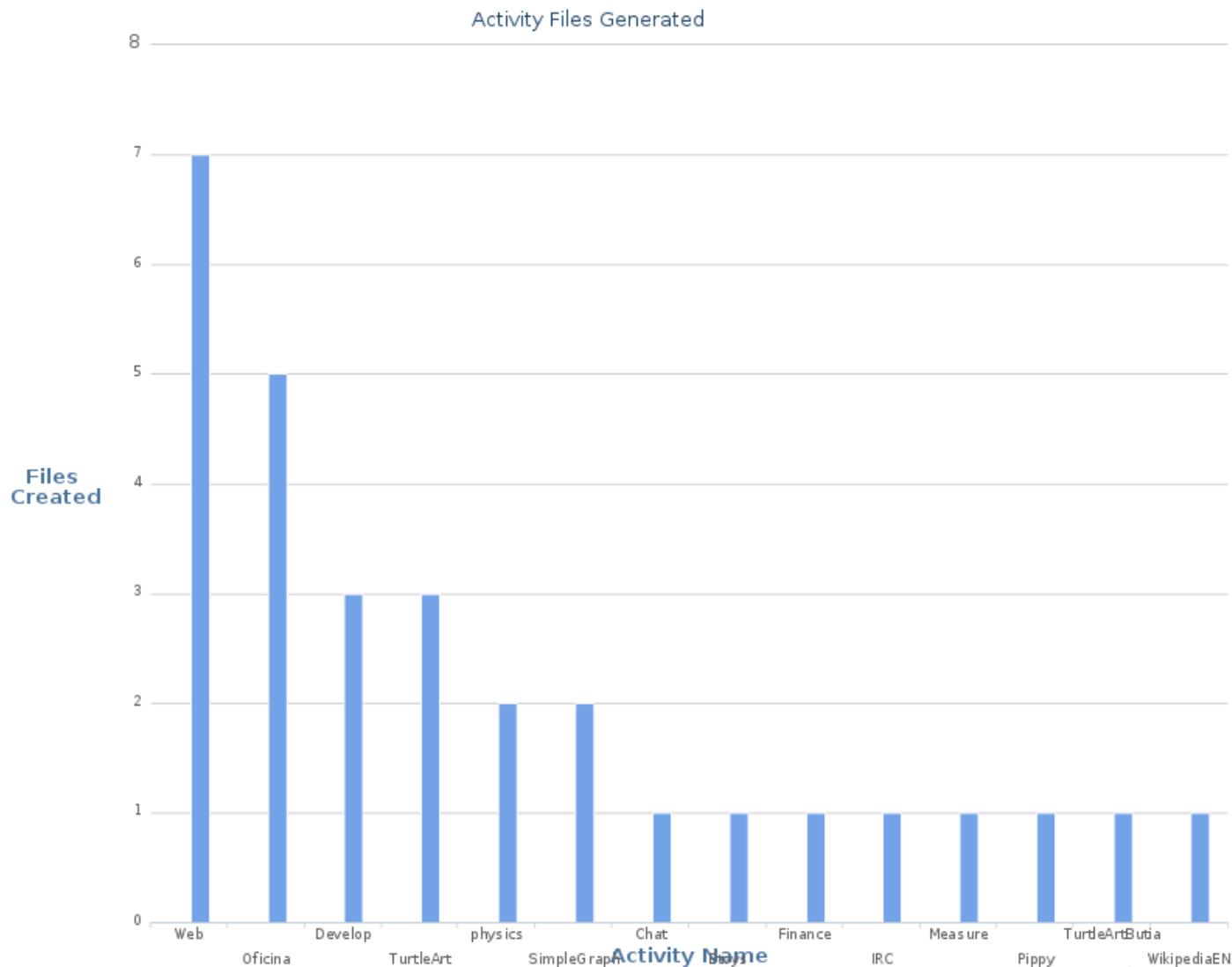
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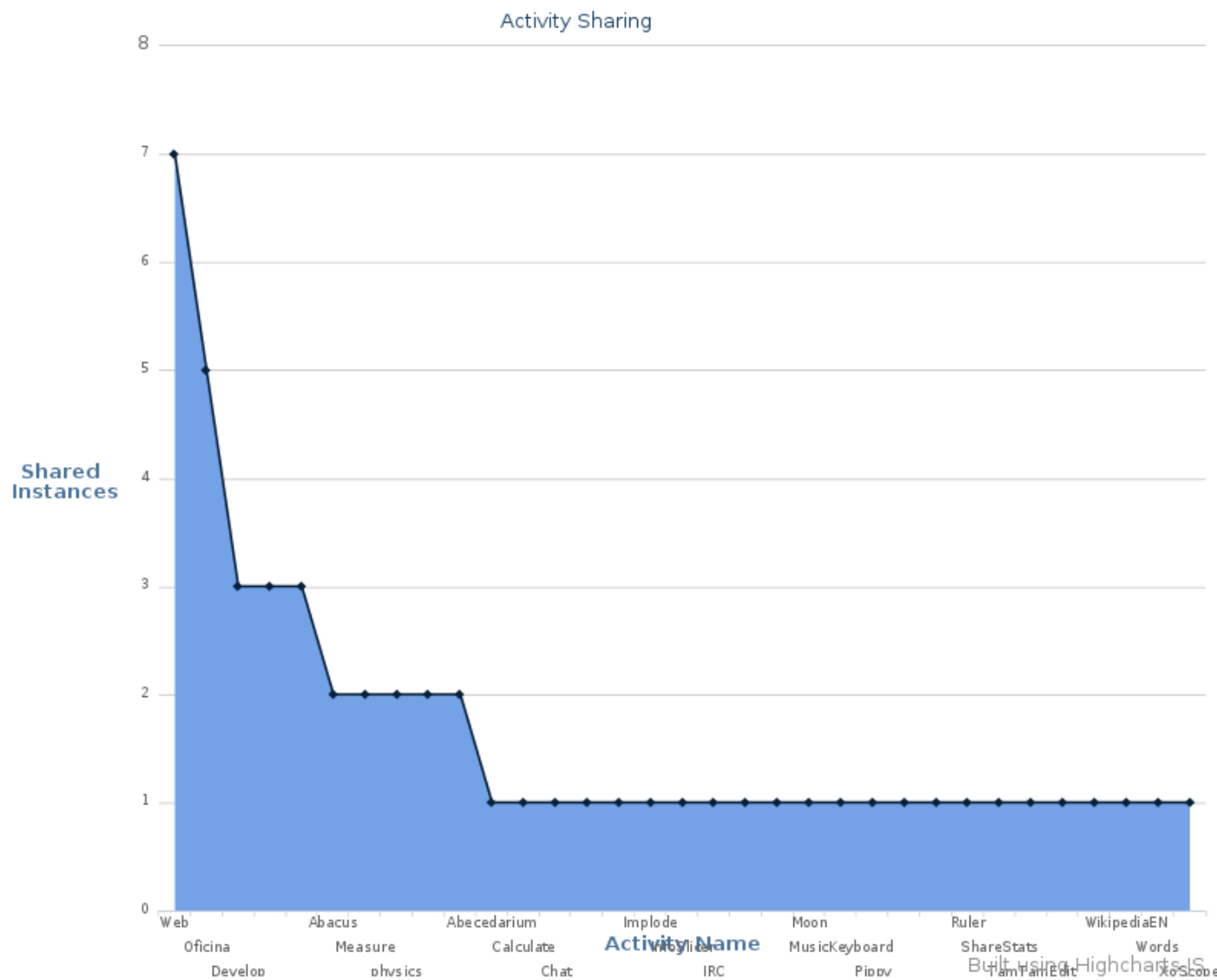
Time of Day Use

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http://schoolserver:5984/xovis/_desig



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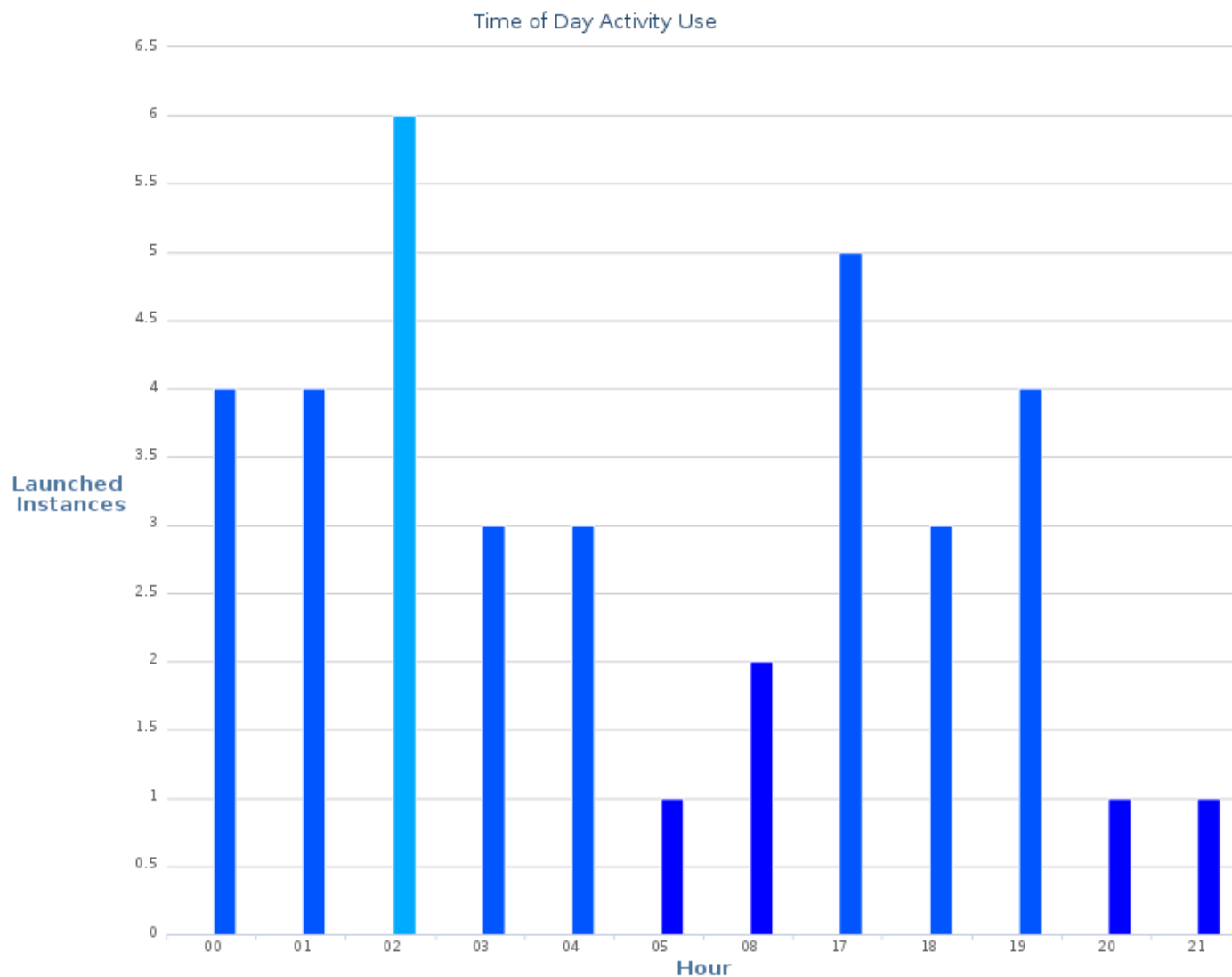
Time of Day Use

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Use of Each Activity by Year

Use of Each Activity by Month



Built using Highcharts JS



http://schoolserver:5984/xovis/_desig



Untitled



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Time of Day Use

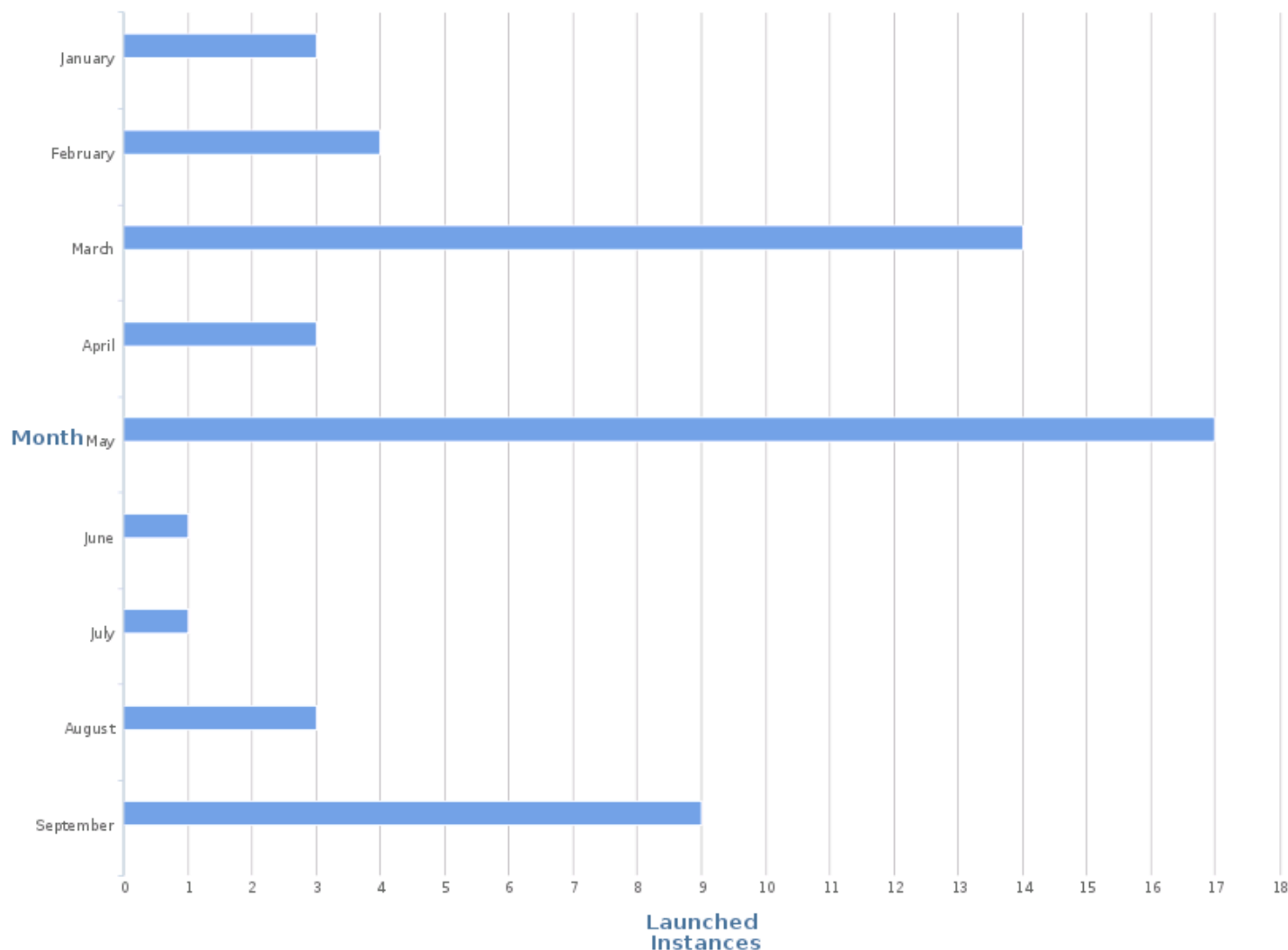
Use by Month

Use by Year

Use of Each Activity by Year

Use of Each Activity by Month

Activity Use By Months



Built using Highcharts JS



http://schoolserver:5984/xovis/_desig



Untitled



XOVis: Quest for Data

Select a deployment site:

olpc

Activity Frequency

Files Generated

Activities Shared

Time of Day Use

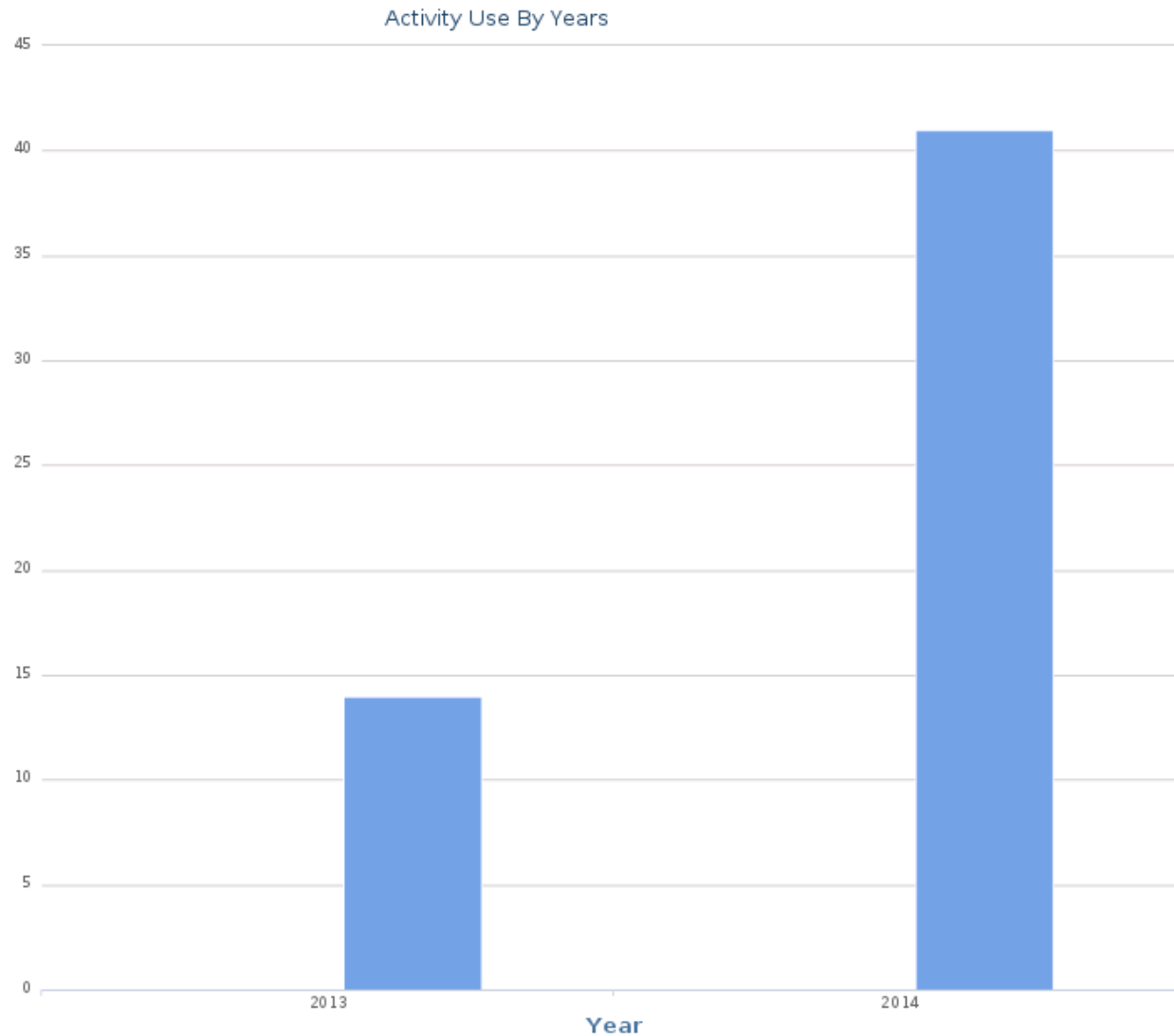
Use by Month

Use by Year

Use of Each Activity by Year

Use of Each Activity by Month

Launched Instances



Built using Highcharts JS



http://schoolserver:5984/xovis/_desig



Untitled



XOVis: Quest for Data

Select a deployment site:

olpc

Activity Frequency

Files Generated

Activities Shared

Time of Day Use

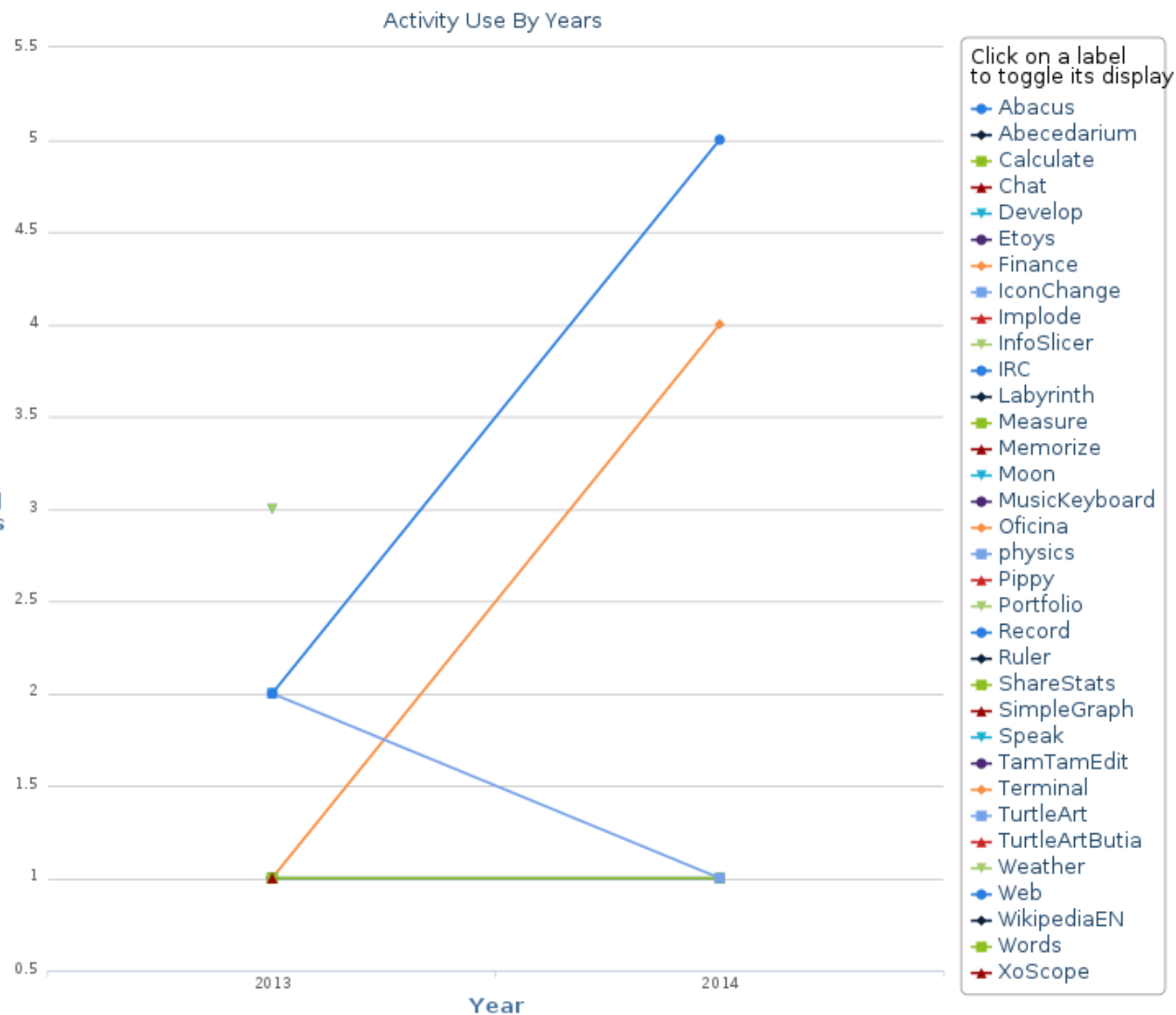
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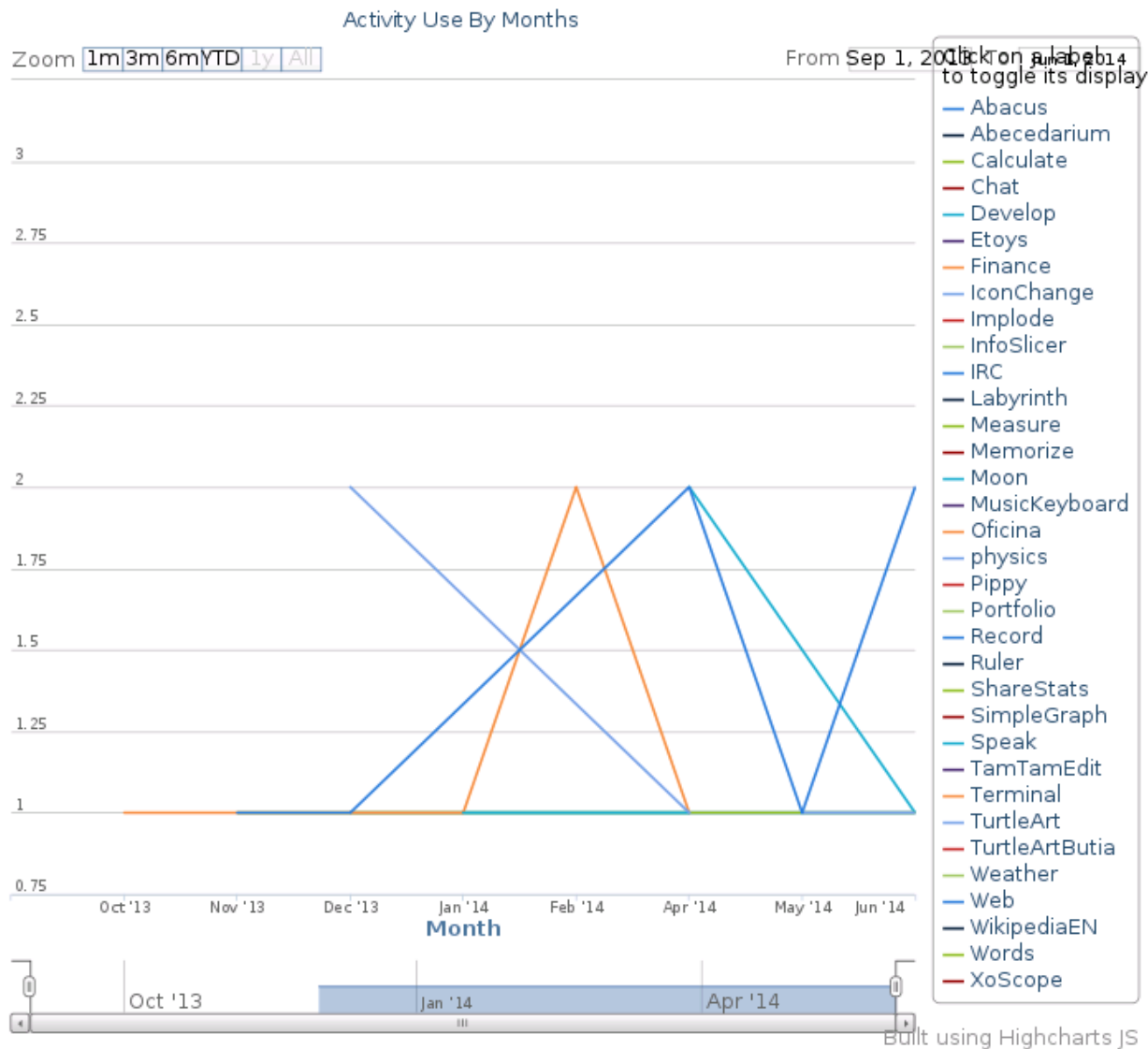
Use by Month

Use by Year

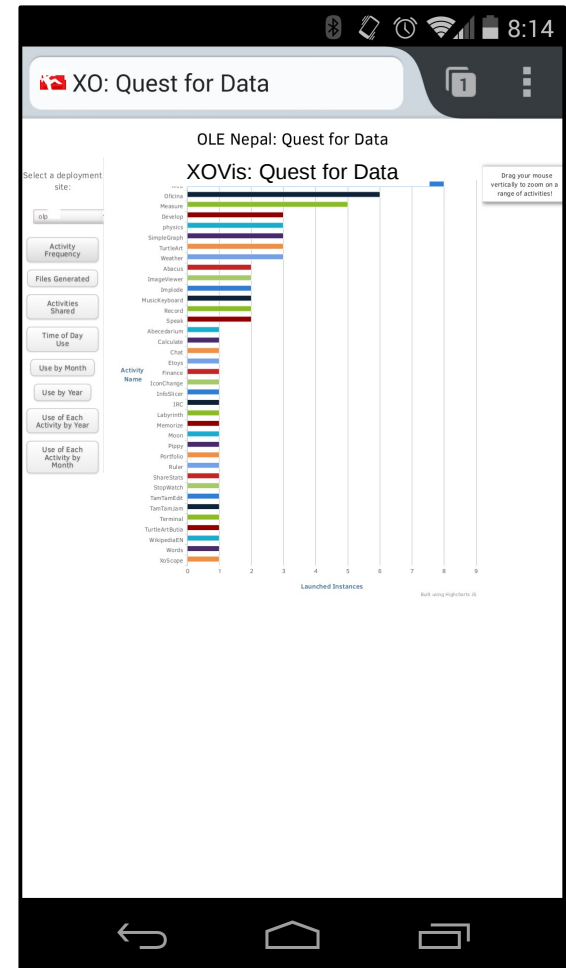
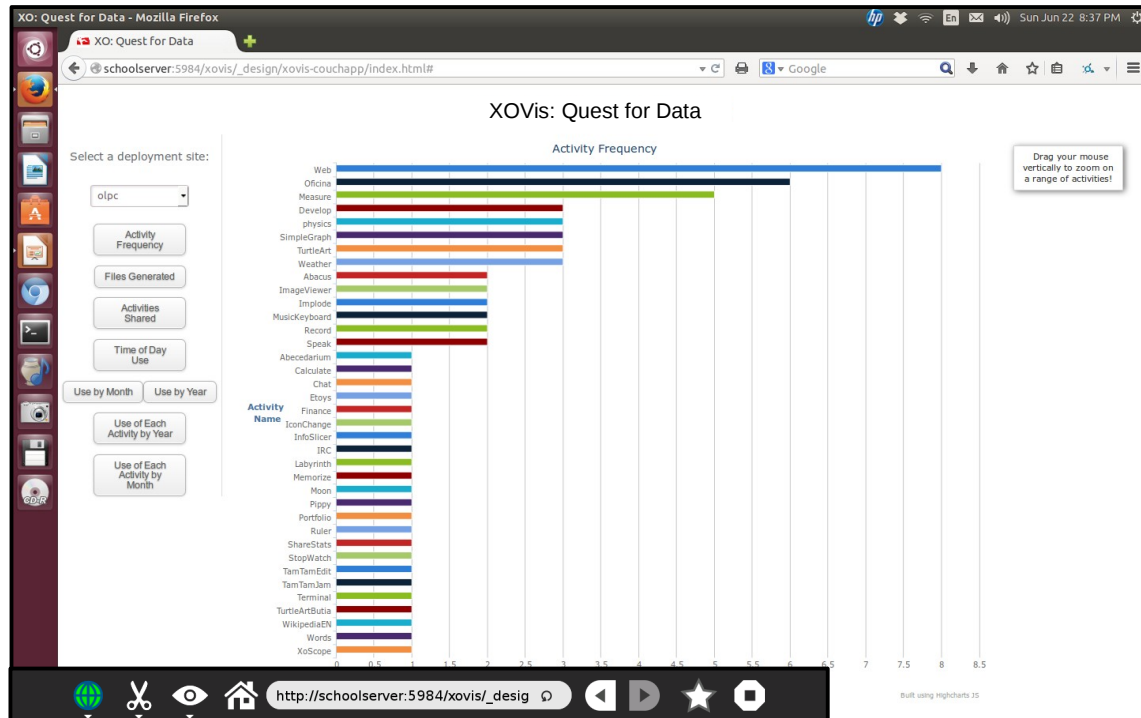
Use of Each Activity by Year

Use of Each Activity by Month

Launched Instances



Runs in a browser



Ubuntu

Android

Sugar

Scope

- Add multiple schools or deployments
 - Within a country
 - Across countries
- Compare certain stats across multiple deployments

Development continues



<https://github.com/martasd/xovis>