Protocols & communication formats[XML/JSON] & APIs

How do we communicate?

Acting

Reacting

Asking

Answering

Sending

Recieving


skype
TM


N
NE
NW
E
W
SE
SW
S


Gmail
TM
by Google

How do we communicate?

XML

JSON

?

What are XML and JSON Protocols, and how do they help us in our daily communication?

XML stands for eXtensible Markup Language

XML is designed to transport and store data

XML was designed to carry data, not to display them

XML tags are not predefined. You must defined your own tags

XML is designed to be self-descriptive

How Can XML be Used?

It would take a lot of work to edit the HTML each time the data changes

XML Separates Data from HTML

XML data can be stored in separate XML files

→ you can concentrate on using HTML/CSS for display and layout, and be sure that changes in the underlying data will not require any changes to the HTML

In the real world, computer systems and databases contain data in incompatible formats.

XML data is stored in plain text format

→ provides a software- and hardware-independent way of storing data

XML Simplifies Data Transport

XML Simplifies Platform Changes

XML Makes Your Data More Available

XML is Used to Create New Internet Languages

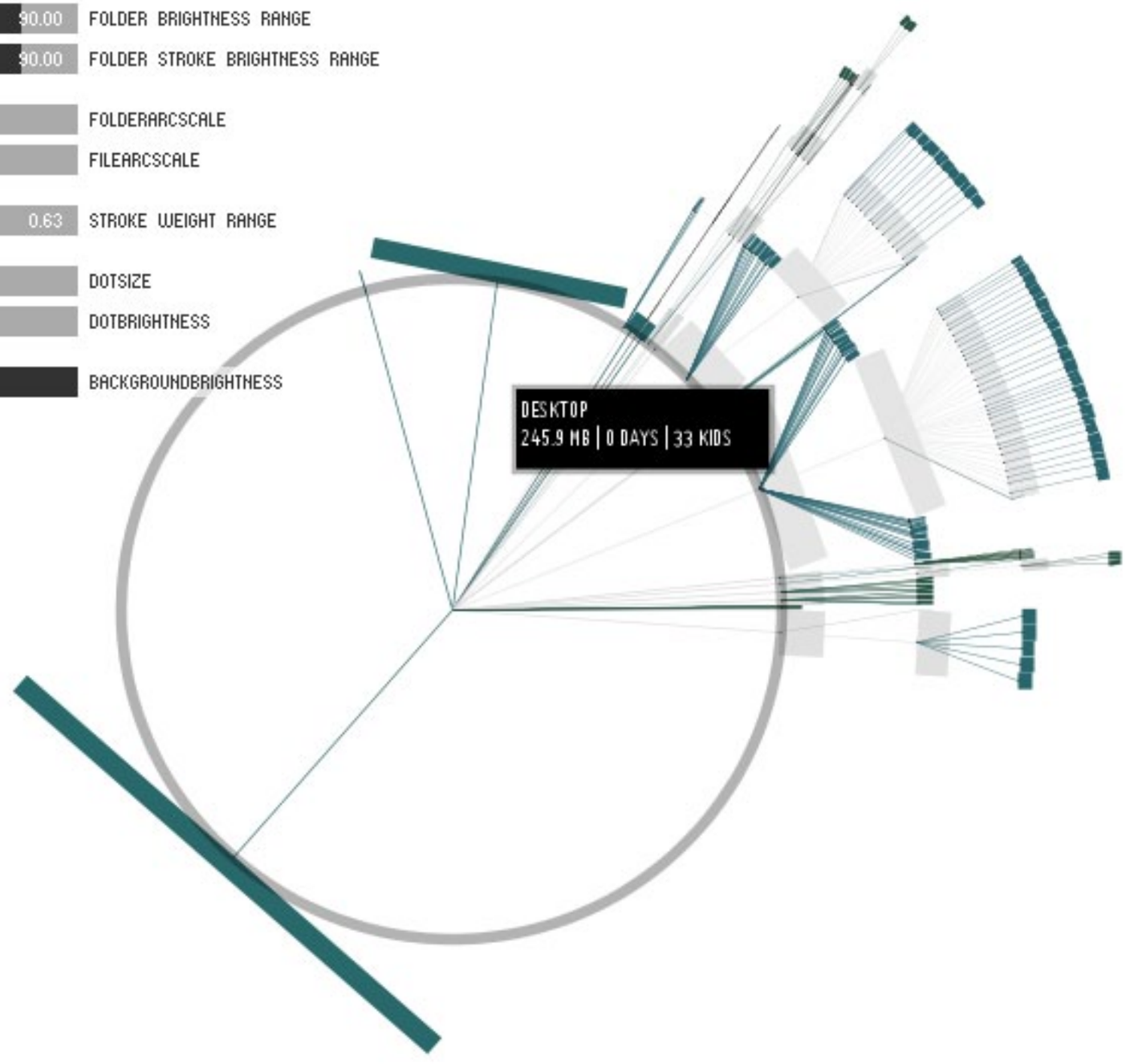
Here are some examples:

XHTML
WSDL for describing available web services
WAP and WML as markup languages for handheld devices
RSS languages for news feeds
RDF and OWL for describing resources and ontology
SMIL for describing multimedia for the web

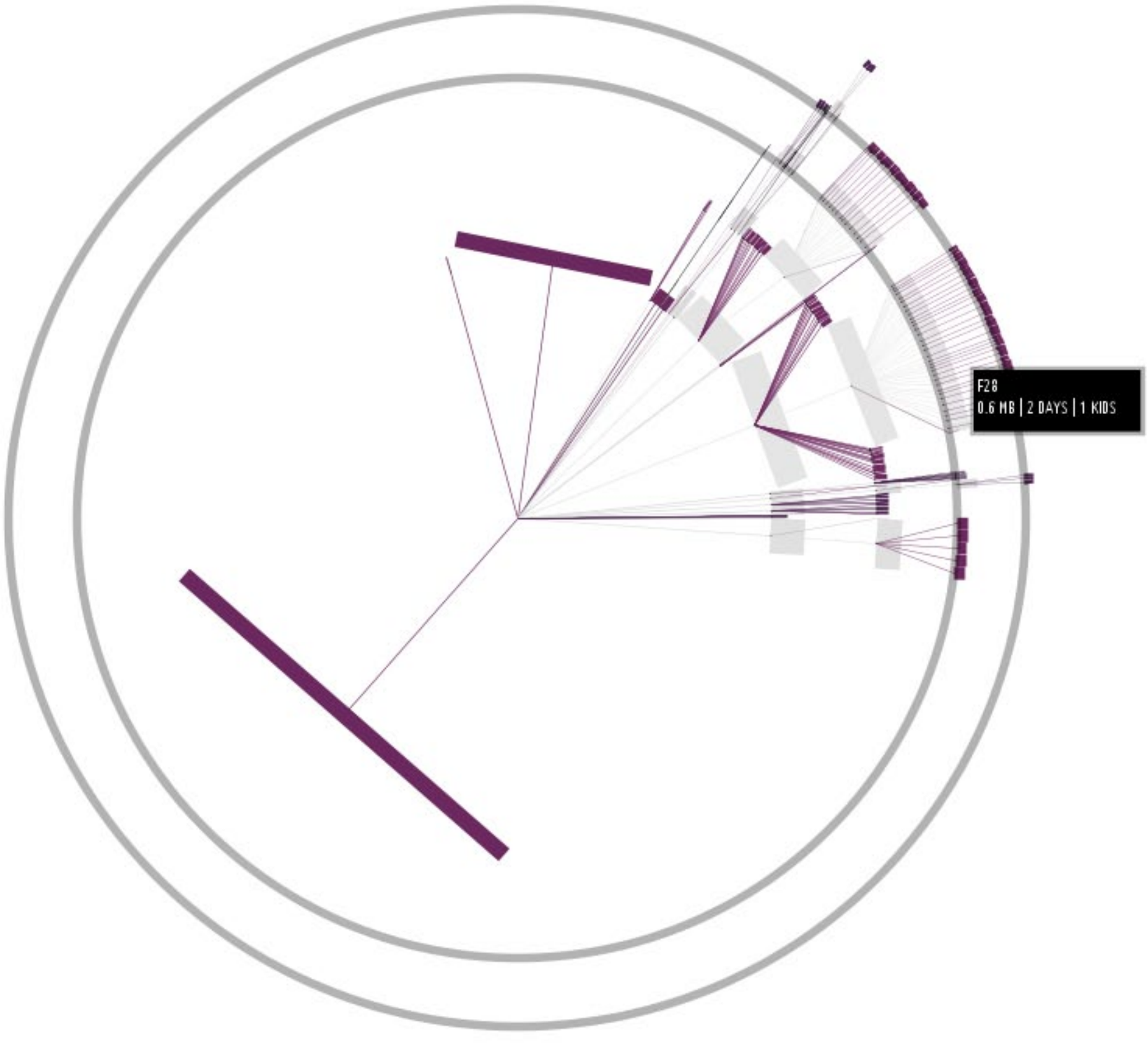
MENU

96.17	188.60	FILE HUE RANGE
35.33	62.33	FILE SATURATION RANGE
17.66	43.66	FILE BRIGHTNESS RANGE
20.00	90.00	FOLDER BRIGHTNESS RANGE
20.00	90.00	FOLDER STROKE BRIGHTNESS RANGE
0.31		FOLDERARCSCALE
0.15		FILEARCSCALE
0.13	0.63	STROKE WEIGHT RANGE
0.36		DOTSIZE
1.00		DOTBRIGHTNESS
100.00		BACKGROUNDBRIGHTNESS

- SHOW ARCS
- SHOW LINES
- BEZIER / LINE
- ARC / RECT



MENU



Storing XML Files on the Server

XML files can be stored on an Internet server exactly the same way as HTML files.

XML Tree:

```
<?xml version=”1.0” encoding=”ISO-8859-1”?>
<note>
  <from>Jani</from>
  <to>Tove</to>
  <message>Remember me this weekend</message>

</note>
```

To send a request to a server, we use the open() and send() methods of the XMLHttpRequest object:

open () - xmlhttp.open("GET","xmlhttp_info.txt",true);

send () - xmlhttp.send();

send (string) Sends the request off to the server

open (method,url,async)

method: the type of request: GET or POST

url: the location of the file on the server

async: true (asynchronous) or false (synchronous)

GET or POST?

GET is simpler and faster than POST

POST has no size limitations
POST is more robust and secure than GET - useful for cases, when user input contains unknown characters

The file type - any kind of file: .txt and .xml, or server scripting files: .asp and .php

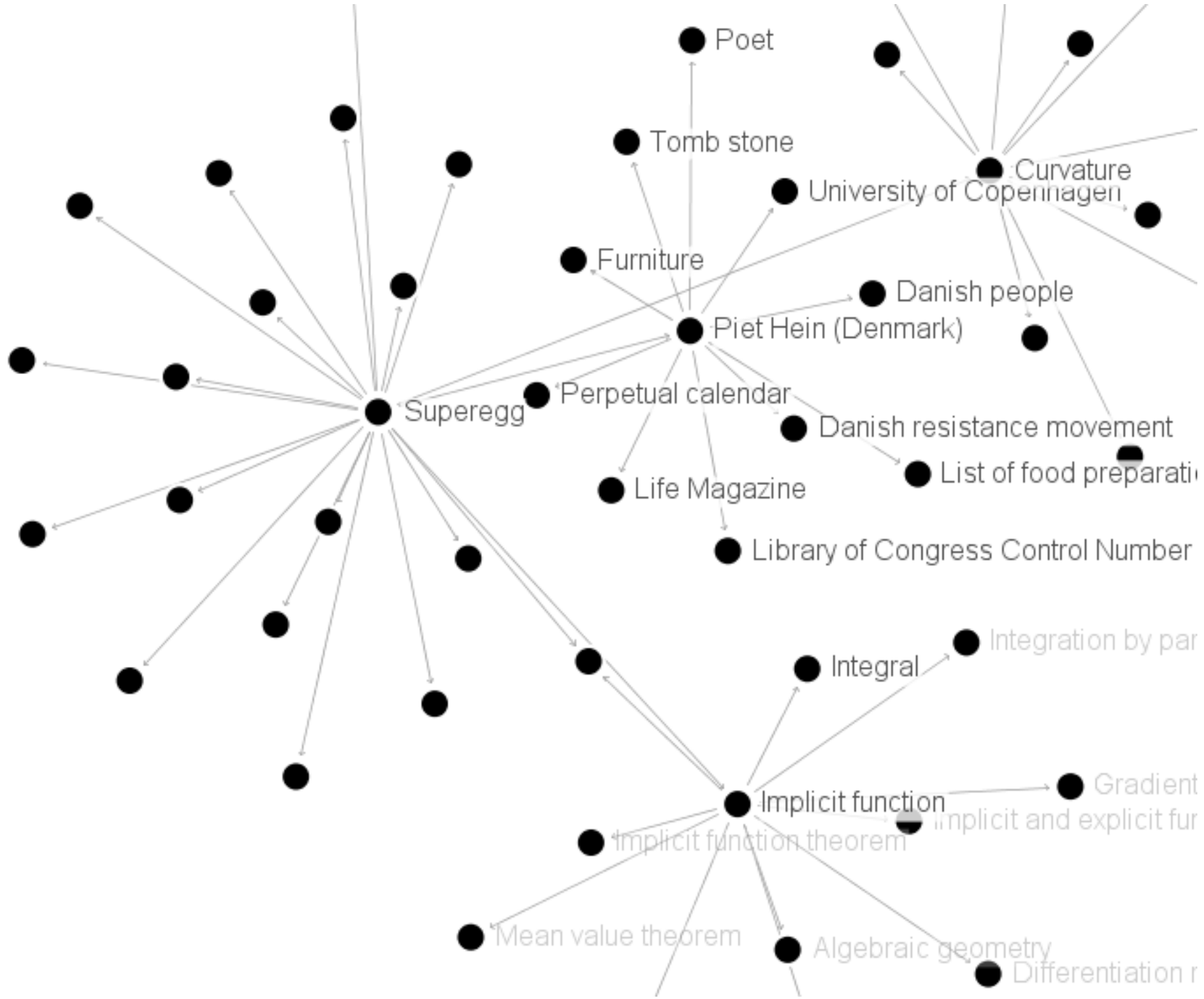
NODE Properties

In the XML DOM, each node is an object.

Objects have methods and properties, that can be accessed and manipulated by JavaScript.

Three important node properties are:

nodeName
nodeValue
nodeType


Poet
Tomb stone
Curvature
University of Copenhagen
Furniture
Danish people
Piet Hein (Denmark)
Perpetual calendar
Superegg
Danish resistance movement
List of food preparati
Life Magazine
Library of Congress Control Number
Integration by par
Integral
Gradient
Implicit function
Implicit and explicit fur
Implicit function theorem
Mean value theorem
Algebraic geometry
Differentiation r

JSON: JavaScript Object Notation

JSON is syntax for storing and exchanging text information.

Much Like XML

- JSON is plain text
- JSON is “self-describing” (human readable)
- JSON is hierarchical (values within values)
- JSON can be parsed by JavaScript
- JSON data can be transported using AJAX

Much Unlike XML

- No end tag
- Shorter
- Quicker to read and write
- Can be parsed using built-in JavaScript eval()
- Uses arrays
- No reserved words

Why JSON?

JSON is lightweight text-data interchange format -smaller than XML, and faster and easier to parse

JSON is language independent - it uses java script syntax for describing data objects, but indenpended of any language

Using XML

Fetch an XML document

Use the XML DOM
to loop through the document

Extract values and store in variables

Using JSON

Fetch a JSON string

eval() the JSON string

eval() function uses the JavaScript compiler = parse the JSON text and produce a JavaScript object

```
<!DOCTYPE html>
<html>
<body>
<h2>Create Object from JSON String</h2>
<p>
First Name: <span id=”fname”></span><br />
Last Name: <span id=”lname”></span><br />
</p>
<script type=”text/javascript”>
var txt = ‘{“employees”:[‘ +

‘{“firstName”:”John”,”lastName”:”Doe” },’ +
‘{“firstName”:”Anna”,”lastName”:”Smith” },’ +
‘{“firstName”:”Peter”,”lastName”:”Jones” }]}’;

obj = JSON.parse(txt);
document.getElementById(“fname”).innerHTML=obj.employees[1].firstName
document.getElementById(“lname”).innerHTML=obj.employees[1].lastName
</script>
</body></html>
```

API

API

An application programming interface (API) - a specification intended to be used as an interface by software components to communicate with each other.

An API:

may include specifications for routines, data structures, object classes and variables

can take many forms:

International Standard such as POSIX or vendor documentation such as the Microsoft Windows API, or the libraries of a programming language

can be:

language-dependent - only available by using the syntax and elements of a particular language, which makes the API more convenient to use

language-independent - written so that it can be called from several programming languages

What is the benefit of API for Devolopers & Designers?

The practice of publishing APIs has allowed web communities to create an open architecture for sharing content and data between communities and applications

Content that is created in one place can be dynamically posted and updated in multiple locations on the web.

Photos can be shared from sites like Flickr and Photobucket

Content can be embedded, e.g. embedding a presentation from SlideShare on a LinkedIn profile

Sharing live comments made on Twitter with a Facebook account

Video content can be embedded on sites which are served by another host

User information can be shared from web communities to outside applications, delivering new functionality to the web community, e.g. Facebook Application platform

API in object-oriented languages:

usually includes a description of a set of class definitions, with a set of behaviors associated with those classes

This abstract concept is associated with the real functionality exposed in the form of class methods

A class Stack can simply expose publicly two methods push() and pop() -
a class interface in an API has no methods, but only behaviours

API libraries and frameworks:

An API is usually related to a software library:

the API describes and prescribes the expected behavior

the library is an actual implementation of this set of rules

A single API can have multiple implementations in the form of different libraries that share the same programming interface.

An API can also be related to a software framework:

a framework can be based on several libraries implementing several APIs, but the access to the behavior built into the framework is mediated by extending its content with new classes plugged into the framework itself

API and protocols:

An API can also be an implementation of a protocol

In general the difference between an API and a protocol is that:

the protocol defines a standard way to exchange requests and responses based on a data/message exchange format, while

an API (not implementing a protocol) is usually implemented as a library to be used directly

API and WEB:

When used in the context of web development

→ API = set of Hypertext Transfer Protocol (HTTP) request messages, usually in an XML or JSON format

Source

Programming Interactivity - O'Reilly

w3schools - http://www.w3schools.com/xml/default.asp

Processing

Generative Gestaltung - Hartmut Bohnacker, Benedikt Gross, Julia Laub, Claudius Lazzeroni First Edition, Hermann Schmidt, Mainz, 2009

Wikipedia -http://en.wikipedia.org/wiki/Application_programming_interface#API_in_object-oriented_languages

Thank you for your attention !