

CloudTalk: Programming with Search and Wikis

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Problem

- World of code keeps getting bigger
 - More libraries and frameworks
 - More code snippets and samples
 - More complexity
- Niche (long tail) reuse difficult

Cloud-specific Problems

- Multitude of services
 - E.g., REST social/location services like Facebook, Yelp, Foursquare, Flickr, Gowalla, Eventful, ...
 - Which service provides what we want?
 - (Possibly multiple services)
- Services have custom schemas
 - `user_name, user_first_name, user`

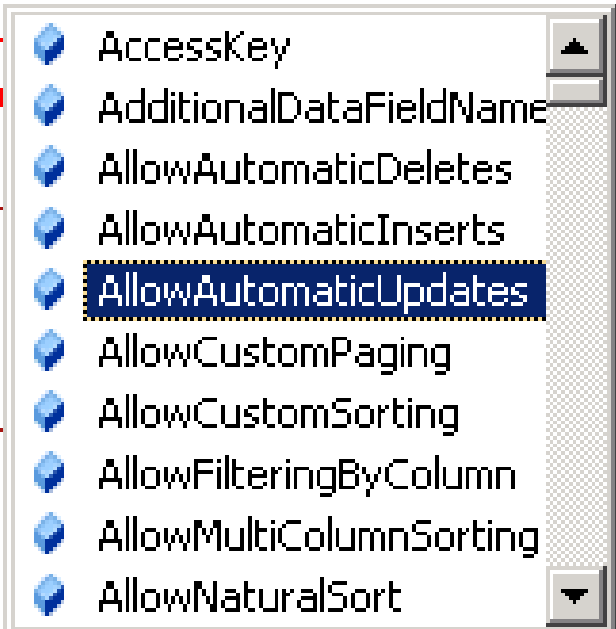
So what?

- Claim: *managing huge namespaces is one of the upcoming big challenges in PL*
 - The namespace for whatever is available
- What can we do about it?

Intellisense/Autocomplete

```
<telerik:RadGrid
  ID="RadGrid1"
  runat="server"
  DataSourceID="AccessDataSource1" S1
  <MasterTableView al
    autogenera
    datakeynam
    datasource
  </MasterTableV
</telerik:RadGrid>

<asp:AccessDataSou
  DataFile="~/Ap
  SelectCommand=
</asp:AccessDataSo
```



- AccessKey
- AdditionalDataFieldName
- AllowAutomaticDeletes
- AllowAutomaticInserts
- AllowAutomaticUpdates
- AllowCustomPaging
- AllowCustomSorting
- AllowFilteringByColumn
- AllowMultiColumnSorting
- AllowNaturalSort

Intellisense/Autocomplete

- Useful for browsing
 - Recalling what's in a local scope
- Very local
 - Doesn't apply to everything...like some library you don't have yet.

Search

Search background

- Find long-tail information
 - Obscure, niche, but pervasive
- Search-assisted “Google” Memory
 - Not knowing something is less of a problem
 - Viable on-the-fly discovery and learning
- Applied to PL?

Search and Code

[Advanced Search](#)

Web [+ Show options...](#)

Results 1 - 10

[JSON](#) ☆

JSON (JavaScript Object Notation) is a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to **parse** and ...

www.json.org/ - [Cached](#)

[parsing JSon using JSon.net - Stack Overflow](#) ☆

Browse other questions tagged **json.net** **c#** **parse** serialization or ask your own question. ...

Parsing JSON DateTime from Newtonsoft's **JSON** Serializer ...

stackoverflow.com/questions/.../parsing-json-using-json-net - [Cached](#) - [Similar](#)

[Is there a library to read JSON in C# on Windows Mobile? - Stack ...](#) ☆

I am trying to find a library to **parse JSON** on C# on Windows Mobile (working with Visual Studio 2005). The libraries that I have found that allow me to ...

stackoverflow.com/.../is-there-a-library-to-read-json-in-c-on-windows-mobile - [Cached](#) - [Similar](#)

[+ Show more results from stackoverflow.com](#)

[JSON and C#? - Ales Rosina's Another .NET Blog](#) ☆

6 Feb 2009 ... This is great for AJAX websites, but what about C#? I did some research and found very light-weight library for **parsing JSON**, ...

blogs.windowsclient.net/alesrosina/archive/.../json-and-c.aspx - [Cached](#) - [Similar](#)

[JavaScript Object Notation Support for .NET 2.0 - CodeProject](#) ☆

24 Jan 2007 ... Below is a simple example of how to **parse** and extract the **JSON** types. ...

Json namespace make use of C#'s cool ability to overload operators ...

www.codeproject.com > ... > [Parsers and Interpreters](#) - [Cached](#) - [Similar](#)

Search and Code



stackoverflow

Questions

Tags

Users

Badges

Unanswered

Search Results

relevance

- 8** votes
2 answers
4k views

parsing JSon using JSon.net

... I'm trying to parse some JSon using the JSon.Net library. The documentation seems a little sp ...
compish what I need. Here is the format for the JSon I need to parse through. ... nd every example I find
discusses serializing the JSon first, but I'm not sure how I would build an obje ... ts. I have no idea how I
would code my object so JSon.Net would know how to serialize that. ...

json.net c# parse serialization

asked Dec 30 '08 at 22:48

Carter
292 ●3 ●17
- 3** votes
5 answers
185 views

Parsing JSON objects to c#

... ttp://sharpdevpt.blogspot.com/2009/10/deserialize-json-on-c.html?
showComment=1265045828773#c249731251800 ... ttp://sharpdevpt.blogspot.com/2009/10/deserialize-json-
on-c.html?showComment=1265045828773#c249731251800 ... I know the example below uses
Newtonsoft.Json....

json .net-3.5 c#

asked Feb 1 at 17:50

nav
93 ●6
- 1** vote
7 answers
235 views

How can i parse this json with .net ?

... how can i turn this JSON to a list of objects that have two properties fir ...

asp.net c# json

asked Oct 7 at 23:03

Yassir
2,511 ●1 ●5 ●19
- 0** votes

C# - parsing json formatted data into nested hashtables

... I'm trying to work with some json formatted data in C#, but, I'm having some proble ... ay to approach the
problem. My issue is that the json formatted data will be in an unknown format (I kn ... hat sounds odd ...
please read on). Basically, the json formatted data will be some collection of name/va

Semantic Search

S⁶

Look for: In Archives Using

Description:
(keywords)

Method

Declaration:

Tests:

<input type="text" value="17"/>	<input type="text" value="=="/>	<input type="text" value="XVII"/>	<input type="text" value="CALL"/>
<input type="text"/>	<input type="text" value="=="/>	<input type="text"/>	<input type="text" value="CALL"/>

User Context

Security

Contracts

Threading

Find it!

Results:

Order By: Format Using:

Source: [programs/roman-numerals/bio98q1.java @ http://www.olympiad.org.uk](http://www.olympiad.org.uk/programs/roman-numerals/bio98q1.java)

License

```
static String [] hundreds = {"", "c", "cc", "ccc", "cd", "d", "dc", "dcc", "decc", "cm" };
static String [] tens = {"", "x", "xx", "xxx", "xl", "l", "lx", "lxx", "lxxx", "xc" };
static String [] thousands = {"", "m", "mm", "mmm" };
static String [] units = {"", "i", "ii", "iii", "iv", "v", "vi", "vii", "viii", "ix"};

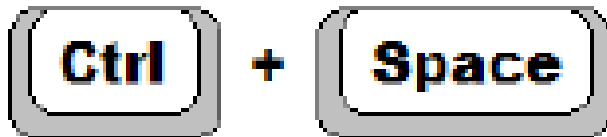
public static String convert(int n)
{
    return (thousands[(n/1000)] + hundreds[(n/100)% 10] + tens[(n/10)% 10] +units[(n)% 10]).toUpperCase();
}
```

Source: [XQuisitor/saxonb8-4+Folder/net/sf/saxon/number/Numberer_en.java @ http://www.cafeconleche.org/xquisitor/xquisitor-1.0a5.zip](http://www.cafeconleche.org/xquisitor/xquisitor-1.0a5.zip)

License

Autocomplete + Search

```
public List<String> getLines(BufferedReader in) throws Exception {  
    List<String> lines = new Vector<String>();  
    while (in.ready()) {  
        add line|  
    }  
    return lines;  
}
```



```
public List<String> getLines(BufferedReader in) throws Exception {  
    List<String> lines = new Vector<String>();  
    while (in.ready()) {  
        lines.add(in.readLine());|  
    }  
    return lines;  
}
```

Limitations

- External search disrupts flow
- Context is valuable
- Search as just a tool concern
 - PL design not applied
- How about search being more like a PL?
 - WolframAlpha



box side 42

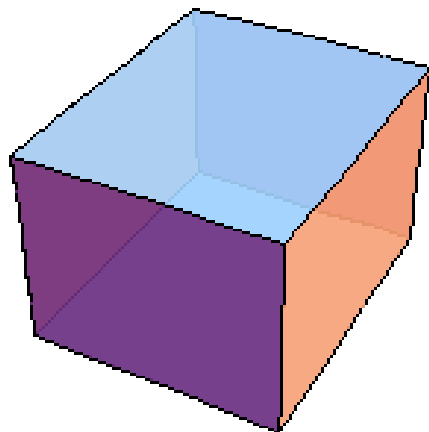


Input interpretation:

cuboid

edge length 42

Visual representation:



citizens on earth minus people in PRC minus population of india



Input interpretation:

Mathematica form

world population - China population - India population

Result:

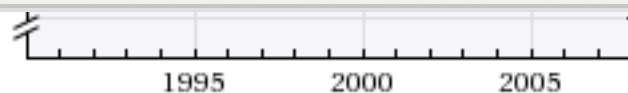
[Show details](#)

4.29 billion people (2008 and 2009 estimates)

History:

Mathematica plaintext:

```
CountryData["World", "Population"] - CountryData["China", "Population"] -  
CountryData["India", "Population"]
```





WIKIPEDIA
The Free Encyclopedia

[article](#)[discussion](#)[edit this page](#)[history](#)

Split

From Wikipedia, the free encyclopedia

For the splitting of Wikipedia articles see, [WP:SPLIT](#)

Split may refer to:

In **geography**:

- [Split \(city\)](#), the largest coastal city in Croatia
- [Split Island](#), an island in Hudson Bay, Canada
- [Split Island, Falkland Islands](#)
- [Haflia](#) or [Split Island](#), an island in the Rotuma Group

In **music**:

- [Split album](#), an album by two or more artists
- ["Split" \(song\)](#), a song by KMFDM
- [Split \(Huntingtons and Darlington album\)](#)
- [Split \(Lush album\)](#)
- [Split \(Zeke/Peter Pan Speedrock album\)](#)
- [The Split CD](#), an EP by Queens of the Stone Age and Beaver
- [Split \(Patricia Barber album\)](#), an album by [Patricia Barber](#)
- [Split \(The Groundhogs album\)](#), an album by [The Groundhogs](#)

In **games**:

- [Split \(poker\)](#), the division of winnings in the card game
- [Split \(bowling\)](#)
- [Split](#), a possible player decision in blackjack

In **sports**:

- [Split \(gymnastics\)](#), a body position
- [Split leap](#) or [jumping](#), a class of dance leaps
- [Split jump](#), a type of jump in figure skating
- [Split decision](#), combat sports term when a fight is scored non-unanimously for one fighter by all judges

In **science**:

- [Split \(mathematics\)](#), a property of an exact sequence
- [Split \(phylogenetics\)](#), a bipartition of a set of taxa in phylogenetics

tation or

navigation

- [Main page](#)
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search

interaction

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- [Italiano](#)



100 split



Input interpretation:

100 splits

Unit conversions:

[More](#)

0.01774 m³ (cubic meters)

17744 cm³ (cubic centimeters)

17.74 L (liters)

4.688 gallons

37.5 pints

Comparison:

≈ 0.79 × molar volume (1 mol molar volume constants)

Interpretation:

volume

Basic unit dimensions:

[length]³

Corresponding quantities:

split 5



Assuming "split" is referring to a combinatorial computation | Use as a unit instead

Input interpretation:

partition 5 into nonzero parts

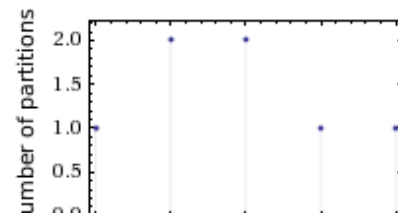
Total number of partitions:

7

Partitions by size:

size of partition	count	example
1	1	$5 = 5$
2	2	$4 + 1 = 5$
3	2	$3 + 1 + 1 = 5$
4	1	$2 + 1 + 1 + 1 = 5$
5	1	$1 + 1 + 1 + 1 + 1 = 5$

Plot:



WolframAlpha Limitations

- Not much composition
 - *The time derivative of PRC population*
- Not much abstraction
 - Lacks functions and variables
- Very incomplete interface to Mathematica
 - Not a PL, but still...

Names vs. Identifiers

- Identifiers
 - Just strings, meaning only by convention
 - “f” vs. “integerToString”
- Names
 - Has meaning
 - Has synonyms that can be resolved
 - Keyword searchable
- First-class naming in PL design?

Search Word:

Searches for population:

5 senses of population

Sense 1

- population** -- (the people who inhabit a territory or state; "the population seemed to be well fed and clothed")
 - => people -- ((plural) any group of human beings (men or women or children) collectively; "old people"; "there were at least 200 people in the audience")
 - => group, grouping -- (any number of entities (members) considered as a unit)
 - => abstraction -- (a general concept formed by extracting common features from specific examples)
 - => abstract entity -- (an entity that exists only abstractly)

Search Word:

Searches for citizenry:

1 sense of citizenry

Sense 1

- citizenry**, people -- (the body of citizens of a state or country; "the Spanish people")
 - => group, grouping -- (any number of entities (members) considered as a unit)
 - => abstraction -- (a general concept formed by extracting common features from specific examples)
 - => abstract entity -- (an entity that exists only abstractly)
 - => entity -- (that which is perceived or known or inferred to have its own distinct existence (living or nonliving))

on")

More PL-ish

Route to this conventions' stalls
that interest my pals

Word Sense Resolution

```
route (  
  this-convention.stalls.if  
    (b =>  
      interest(my.pals, b)  
    )  
  )  
)
```


More PL-ish

```
route (  
  this-convention.stalls.if  
    (b =>  
      interest (my.friends, b)  
    )  
  )  
)
```

More PL-ish

```
route (  
  this-convention.booths.if  
  (b =>  
    interest(my.friends, b)  
  ) )
```

More PL-ish

```
map-route (  
  this-convention.booths.if  
  (b =>  
    show-interest (my.friends , b)  
  ) )
```

Types and Search

- Beyond simple procedure calls
 - Query results can have non-local consequences
- Use types to track consequences
 - Query then involves type info

More PL-ish

```
p : ui-panel
```

```
s : p.slider
```

```
p.layout = canvas
```

```
...
```

```
s.position = (50, 0)
```

```
ui-panel.slider <:  
  ui-panel.element
```

```
p : ui-panel
```

```
s : p.slider
```

```
p.layout = canvas
```

```
...
```

```
s.position = (50, 0)
```

```
point position in ui-panel  
(layout = canvas).element
```

```
s <: ui-panel  
  (layout = canvas).element
```

```
p : ui-panel
```

```
s : p.slider
```

```
p.layout = canvas
```

```
...
```

```
s.position = (50, 0)
```

```
point position in ui-panel  
  (layout = canvas).element
```

More PL-ish

```
p : ui-panel
```

```
s : p.slider
```

```
p.layout = canvas
```

```
...
```

```
s.position = top
```



```
placement in ui-panel  
(layout = dock).element
```

```
p : ui-panel  
s : p.slider  
p.layout = canvas  
...  
s.position = top
```

```
top, bottom, left, right  
placement
```

More PL-ish

```
p : ui-panel
```

```
s : p.slider
```

```
p.layout = canvas
```

```
...
```

```
s.position = top
```

```
ui-panel, slider,  
layout, canvas, position,  
top
```

More PL-ish

```
p : ui-panel
```

```
s : p.slider
```

```
p.layout = canvas
```

```
...
```

```
s.position = top
```

```
ui-panel, slider, element,  
layout, canvas, position,  
top, placement
```

```
position in ui-panel  
  (layout = canvas).element
```

```
p : ui-panel
```

```
s : p.slider
```

```
p.layout = canvas
```

```
...
```

```
s.position = top
```

```
ui-panel, slider, element,  
layout, canvas, position,  
top, placement
```

```
position in ui-panel  
  (layout = canvas).element
```

```
p : ui-panel
```

```
s : p.slider
```

```
p.layout = canvas
```

```
...
```

```
s.position = top
```

```
ui-panel, slider, element,  
layout, canvas, position,  
top, placement
```

More PL-ish

```
p : ui-panel
```

```
s : p.slider
```

```
p.layout = canvas
```

```
...
```

```
s.position = top
```

More PL-ish

```
p : ui-panel
```

```
s : p.slider
```

```
p.layout = dock
```

```
...
```

```
s.placement = top
```

More PL-ish

```
p : ui-panel
```

```
s : p.slider
```

```
p.layout = canvas
```

```
...
```

```
s.position = north
```


More PL-ish

```
p : ui-panel
```

```
s : p.slider
```

```
p.layout = dock
```

```
...
```

```
s.placement = top
```

More PL-ish

```
p : ui-panel
```

```
s : p.slider
```

```
p.layout = canvas
```

```
...
```

```
s.position.y = 0
```

Searching with Types

- Dependent typing
 - Dependent classes (Gasiunas, Mezini, Ostermann)

Next Step

- Where to find things?
 - General Internet is too volatile
 - Review and transparency
- Community convergence required
 - Diversity in naming and architecture makes reuse more difficult

The Code Wiki

Code wiki

- Flat namespace
 - All definitions at the top-level
 - Disambiguate through richer naming
- Everyone shares the same namespace
 - No separate libraries/modules/frameworks
 - No explicit import

Code wiki

- Namespace is editable by all
 - Community reviewed, enhanced, refactored
 - Convergence of community vocabulary
- *Linking* through pervasive search
 - Linking as key to wiki's success

Eliminating Diversity

- Consistent naming
 - Name new stuff like existing stuff
- High-level declarative abstractions
 - Not expressive or powerful
 - Binding, non-recursive
 - Just easy to use

Conclusion

- Programming Language Implementation (PLI)
 - Compiler or interpreter
 - Libraries (lots of them) and services*
 - IDE
 - Community
- Consider in PL design

北京欢迎你!

WELCOME TO BEIJING!