

go - aka golang

an uN4U7HOr123d PrOof OF ConC3p7
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Objectives of the brown bag

1. why another language
2. golang design characteristics
3. an experience report from a poc
 - 3.1. goals of the poc
 - 3.2. some code
 - 3.3. some demos
4. wrap



Language Design in the Service of Software Engineering

Language Design in the Service of Software Engineering

That's the title of the **keynote talk** given by **Rob Pike** at the **SPLASH 2012** conference in Tucson, Arizona, on October 25, 2012. These points are (ahem) excerpted from that talk:

“Conceived in **late 2007** as an answer to some of the problems we were seeing developing software infrastructure at Google.”

“The **computing landscape** today is almost **unrelated to** the environment in which **the languages being used**, mostly C++, **Java**, and Python, had been created.”

“The **problems** introduced by multicore processors, networked systems, massive computation clusters, and the web programming model were being **worked around** rather than addressed head-on.”

“Moreover, the scale has changed: today's server **programs** comprise **tens of millions of lines of code**, are worked on by hundreds or even thousands of programmers, and are **updated** literally **every day**.”

Language Design in the Service of Software Engineering

“To make matters worse, **build times**, even on large compilation clusters, have stretched to many minutes, even **hours**.”

“**Go was designed** and developed **to make** working in **this environment** more **productive**. Besides its better-known aspects such as **built-in concurrency and garbage collection**, Go's design considerations include rigorous **dependency management**, the adaptability of software architecture as systems grow, and **robustness across the boundaries between components**.”

golang design

- A syntax and environment adopting patterns more common in dynamic languages:
 - ◆ Concise variable declaration and initialization through type inference
(`x := 0` not `int x = 0`);
 - ◆ Fast compilation times
 - ◆ Remote package management (`go get`) and online package documentation (`godoc`)

golang design

- Distinctive approaches to particular problems:
 - ◆ Built-in concurrency primitives: light-weight processes (goroutines), channels, and the select statement.
 - ◆ An interface system in place of virtual inheritance, and type embedding instead of non-virtual inheritance.
 - ◆ A toolchain that, by default, produces statically linked native binaries w/o external dependencies.

golang design

- A desire to keep the language specification simple enough to hold in a programmer's head, in part by omitting features common to similar languages:
 - ◆ no type inheritance
 - ◆ no method or operator overloading
 - ◆ no circular dependencies among packages
 - ◆ no pointer arithmetic
 - ◆ no assertions
 - ◆ no generic programming



Experience report from poc

Goals of the poc

- Serve “standard” data sets with REST and json
 - ◆ Fed’s ACH data
 - ◆ ISO country, currency, language
- Not so standard sources:
 - ◆ Fed: fixed format text file served on the web
 - ◆ ISO country: gotta buy (or scrape from wikipedia)
 - ◆ ISO currency: XML served on the web
 - ◆ ISO language: pipe-delimited .csv file served on the web

<http://www.fededirectory.frb.org/FedACHdir.txt>

011001234001100001510826130000000000BANK OF NEW YORK MELLON	500 ROSS ST., 154-0960	PITTSBURGH	PA152620000412236333811
011001276001100001510306080000000000ONEUNITED BANK	3683 CRENSHAW BL	LOS ANGELES	CA900160000877663864811
011001331001100001510623140000000000RBS CITIZENS, NATIONAL ASSOCIATION	1 CITIZENS DRIVE	RIVERSIDE	RI029150000800883422411
0110017260011000015109121300000000000THE FIRST NATIONAL BANK OF IPSWICH	625 GEORGE WASHINGTON HWY	LINCOLN	RI028650000401574192011
011001742001100001510725050000000000BANK OF AMERICA, N.A.	PO BOX 27025	RICHMOND	VA232617025800446013511
011001881001100001510614110000000000FIDUCIARY TRUST CO	CASH MGMT	BOSTON	MA022055806617292674711
01100196201210003742080312122203950CATHAY BANK	RS-14	ROSEMEAD	CA917700000626582733811
011002343001100001510718060000000000BOSTON PRIVATE BK + TR CO	ATTN: ACH ORPERATIONS	BOSTON	MA021094603617912423111
0111008050011000015107280500000000000BANK OF AMERICA N.A.	P.O. BOX 27025	RICHMOND	VA232617025800446013511
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0111016130011000015102011000000000000WEBSTER BANK	436 SLATER RD	NEW BRITAIN	CT060530000860612652211
0111017520011000015107210500000000000BANK OF AMERICA N.A.	PO BOX 27025	RICHMOND	VA232617025800446013511
011102133001100001510610100000000000CITIZENS NATIONAL BANK	182 MAIN ST	PUTMAN	CT062601933860928792111
011102353001100001511010100000000000FIRST NAT BANK OF SUFFIELD	30 BRIDGE STREET	SUFFIELD	CT060780000860668395011
0111025020011000015111081000000000000UNION SAVINGS BANK	225 MAIN ST	DANBURY	CT068100000203830420011
0111026120011000015107241200000000000SALISBURY BANK & TRUST CO	100 MAIN STREET	CANAAN	CT060180000860435980111
0111026380011000015106080900000000000NATIONAL IRON BANK	PO BOX 565	SALISBURY	CT060680000860435258111
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011103129001100001510513020000000000JEWETT CITY SAVINGS BANK	135 DARLING DR	AVON	CT060014218860376444111

ISO-639-2: http://www.loc.gov/standards/iso639-2/ISO-639-2_utf-8.txt

```
afr||af|Afrikaans|afrikaans
ain|||Ainu|ainou
aka||ak|Akan|akan
akk|||Akkadian|akkadien
alb|sqi|sq|Albanian|albanais
ale|||Aleut|aléoute
alg|||Algonquian languages|algonquines, langues
alt|||Southern Altai|altai du Sud
amh||am|Amharic|amharique
ang|||English, Old (ca.450-1100)|anglo-saxon (ca.450-1100)
anp|||Angika|angika
apa|||Apache languages|apaches, langues
ara||ar|Arabic|arabe
arc|||Official Aramaic (700-300 BCE); Imperial Aramaic (700-300 BCE)|araméen d'empire (700-300 BCE)
arg||an|Aragonese|aragonais
arm|hye|hy|Armenian|arménien
```

ISO_3166-1: Price: 300 CHF

Afghanistan	AF	AFG	004
Åland Islands	AX	ALA	248
Albania	AL	ALB	008
Algeria	DZ	DZA	012
American Samoa	AS	ASM	016
Andorra	AD	AND	020
Angola	AO	AGO	024
Anguilla	AI	AIA	660
Antarctica	AQ	ATA	010
Antigua and Barbuda	AG	ATG	028
Argentina	AR	ARG	032
Armenia	AM	ARM	051
Aruba	AW	ABW	533
Australia	AU	AUS	036
Austria	AT	AUT	040
Azerbaijan	AZ	AZE	031
Bahamas	BS	BHS	044
Bahrain	BH	BHR	048
Bangladesh	BD	BGD	050

ISO_4217: http://www.currency-iso.org/dam/downloads/table_a1.xml

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ISO_4217 Pblshd="2014-03-28">
  <CcyTbl>
    <CcyNtry>
      <CtryNm>AFGHANISTAN</CtryNm>
      <CcyNm>Afghani</CcyNm>
      <Ccy>AFN</Ccy>
      <CcyNbr>971</CcyNbr>
      <CcyMnrUnts>2</CcyMnrUnts>
    </CcyNtry>
    <CcyNtry>
      <CtryNm>ÅLAND ISLANDS</CtryNm>
      <CcyNm>Euro</CcyNm>
      <Ccy>EUR</Ccy>
      <CcyNbr>978</CcyNbr>
      <CcyMnrUnts>2</CcyMnrUnts>
    </CcyNtry>
    <CcyNtry>
```

some code

<https://github.com/musicbeat/stddata/blob/master/stddata.go>

<https://github.com/musicbeat/stddata/blob/master/bank/bankprovider.go>

<https://github.com/musicbeat/stddata/blob/master/currency/currencyprovider.go>

<https://github.com/musicbeat/stddata/blob/master/language/languageprovider.go>

<https://github.com/musicbeat/stddata-cli/blob/master/stddata-cli.go>



demos

A problem has been detected and windows has been shut down to prevent damage to your computer.

If this is the first time you've seen this stop error screen, restart your computer. If this screen appears again, follow these steps:

Check for viruses on your computer. Remove any newly installed hard drives or hard drive controllers. Check your hard drive to make sure it is properly configured and terminated.
Run CHKDSK /F to check for hard drive corruption, and then restart your computer.

Technical information:

*** STOP: 0x0000007B (0xFFFFFA60005B99D0, 0xFFFFFFFFC0000034, 0x0000000000000000, 0x0000000000000000)

Microsoft®



Microsoft
Windows® 95

demos

```
go get github.com/musicbeat/stddata
go get github.com/musicbeat/stddata-cli
cd $GOPATH/src/github.com/musicbeat/stddata/currency
go test
cd $GOPATH/src/github.com/musicbeat/stddata-cli
go install
$GOPATH/bin/stddata-cli
browse http://localhost:6060
godoc -http=:6062
browse http://localhost:6062
```

<http://golang.org>

[http://en.wikipedia.org/wiki/Go_\(programming_language\)](http://en.wikipedia.org/wiki/Go_(programming_language))

<https://talks.golang.org/2012/splash.article>

<https://www.data.gov/developers/apis>

“I like a lot of the design decisions they made in the [Go] language. Basically, I like all of them.”



–Martin Odersky, creator of Scala