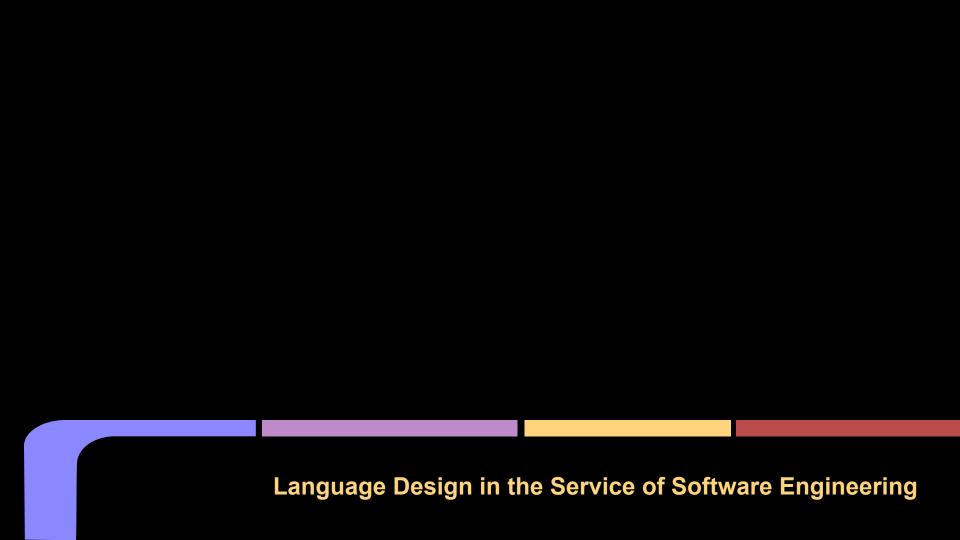
go - aka golang

an uN4U7HOr123d PrOof OF ConC3p7
Craig Thomas (craig.thomas@bhnetwork.com)

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

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

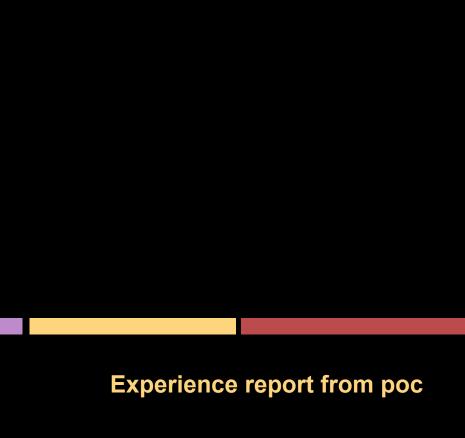
- → A syntax and environment adopting patterns more common in dynamic languages:
 - Concise variable declaration and initialization through type inference (x := 0 not int x = 0;).
 - Fast compilation times
 - Remote package management (go get) and online package documentation (godoc)

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



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

0110012340011000015108261300000000BANK OF NEW YORK MELLON 0110012760011000015103060800000000000NEUNITED BANK 0110013310011000015106231400000000RBS CITIZENS, NATIONAL ASSOCIATION 0110017260011000015109121300000000THE FIRST NATIONAL BANK OF IPSWICH 01100174200110000151072505000000000BANK OF AMERICA, N.A. 01100188100110000151061411000000000FIDUCIARY TRUST CO 01100196201210003742080312122203950CATHAY BANK 0110023430011000015107180600000000BOSTON PRIVATE BK + TR CO 0111008050011000015107280500000000BANK OF AMERICA N.A 0111008920011000015107130600000000BANK OF AMERICA N.A. 0111009150011000015107280500000000BANK OF AMERICA N.A. 01110152900110000151072805000000000BANK OF AMERICA N.A. 01110161300110000151020110000000000WEBSTER BANK 01110175200110000151072105000000000BANK OF AMERICA N.A. 01110213300110000151061010000000000CITIZENS NATIONAL BANK 01110235300110000151110101000000000FIRST NAT BANK OF SUFFIELD 01110250200110000151110810000000000UNION SAVINGS BANK 01110261200110000151072412000000000SALISBURY BANK & TRUST CO 01110263800110000151060809000000000NATIONAL IRON BANK 01110266700110000152072412011102612SALISBURY BANK & TRUST CO. 01110308000110000151072105000000000BANK OF AMERICA N.A. 0111030930011000015106271100000000TD BANK NA 01110312900110000151051302000000000JEWETT CITY SAVINGS BANK

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LINCOLN
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RICHMOND
RICHMOND
NEW BRITAIN
RICHMOND
PUTMAN
SUFFIELD
DANBURY
CANAAN
SALISBURY
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LEWISTON
AVON

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

```
afr||af|Afrikaans|afrikaans
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	800	
Algeria	DZ	DZA	012	
American S	Samoa	AS	ASM	016
Andorra	AD	AND	020	
Angola	AO	AGO	024	
Anguilla	AI	AIA	660	
Antarctic	1	AQ	ATA	010
Antigua a	nd 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	ВН	BHR	048	
Banglades		BD	BGD	050

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

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                             <CtryNm>AFGHANISTAN</CtryNm>
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                             <CcyNm>Euro</CcyNm>
                             <CcyNbr>978</CcyNbr>
                             <CcyMnrUnts>2</CcyMnrUnts>
                   </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



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,

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.

restart your computer. If this screen appears again, follow

Technical information:

×0000000000000000000

Microsoft^{*}



demos

```
go get github.com/musicbeat/stddata-cli
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:6062

godoc -http=:6062

browse http://localhost:6060

http://golang.org

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."