P2P Bug Tracking with SD

http://syncwith.us

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Hi!

I'm Jesse (obra)

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clkao and I own a small software company

(Best Practical)

I've been making issue trackers since 1995

Our software
has some bugs

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All software
has some bugs

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(All software
is made of bugs)

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I spend a lot of time on airplanes...

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This is my first conference at CMU

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I'm the boss

I need to keep track of our bugs and our work even when I don't have Internet access

I've tried everything

Text files

Text files in
version control

IMAP Servers

RSS Feeds

Running RT on my laptop

Keeping browsers open

Nothing was quite right

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So we built SD

SD is a Bug Tracker

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SD is a Distributed Bug Tracker

Principles of distributed computing

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The network is reliable

Latency is zero

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Bandwidth is infinite

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The network is secure

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Transport cost is zero

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The network is homogeneous

Topology doesn't change

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There is one administrator

Principles of distributed computing

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Principles of distributed computing

Fallacies

The network is **not** reliable

Latency **hurts**

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Bandwidth is **always a problem**

The network is
insecure

Topology is
unpredictable and fluid

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There is **no** administrator

(But there are many people who think they're administrators)

Transport
costs money

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The network is
heterogeneous

I didn't make those up

Bill Joy, Tom Lyon and James Gosling did

They missed one

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Data is clean

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SD is a distributed system

SD runs locally

Not Here

It syncs the way you do

Clone a project's bug database (over HTTP)

Work offline

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Pull *changesets* from anyone you work with

Publish your *database replica* with rsync

Topology doesn't matter...

Don't worry

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It won't break

SD learns how to resolve each conflict...

...based on how everyone else resolves it

Getting Started

SD Shell

$ sd

Getting help

$ sd help

```
Terminal — perl — 80×24

SD for SD (0.01; Prophet 0.01)
Type "help", "about", or "copying" for more information.
SD> help


sd 0.01 - Help Index
--------------------


help intro        -  Getting started with SD
help search       -  Searching for and displaying tickets
help tickets      -  Working with tickets
help comments     -  Working with ticket comments
help attachments -   Working with ticket attachments
help sync         -  Publishing and importing ticket databases
help history      -  Viewing repository history
help environment -   Environment variables which affect sd
help config       -  Local configuration variables
help summary_format_ticket  -  Details of this config variable
help aliases      -  Command aliases
help settings     -  Database configuration variables


Running 'help' on a specific command should also redirect you
to the proper help file.


SD>
```

Creating a new project

`$ sd init`

```
sd 0.01 - Getting started with SD
---------------------------------
SD is a peer to peer ticket tracking system built on the Prophet
distributed database. SD is designed to make it easy to work with tickets
and to share ticket databases with your collaborators.

To get started with SD, you need a ticket database. To get an ticket
database, you have two options: You can clone an existing database
or start a new one.

SD will store its local database replica in the ".sd" directory in your
home directory. You can override this behaviour by setting the SD_REPO
environment variable.

To clone a ticket database:

    clone http://example.com/path/to/sd

To start a new ticket database:

    init

:
```

Project settings

`$ sd settings`

```
Knlc3r8_1E
# uuid: 1AF5CF74-A6D4-417E-A738-CCE64A0A7F71
milestones: ["cavil","diana"]


# uuid: 0AEC922F-57B1-44BE-9588-816E5841BB18
default_component: ["core"]


# uuid: 6CBD84A1-4568-48E7-B90C-F1A5B7BD8ECD
components: ["core","cli","webui","sync","rt-sync","hm-sync","gcode-sync","trac-
sync","docs","tests"]


# uuid: 3f0a074f-af13-406f-bf7b-d69bbf360720
common_ticket_props: ["id","summary","status","milestone","component","owner","c
reated","due","creator","reporter","original_replica"]


# uuid: 2F9E6509-4468-438A-A733-246B3061003E
default_status: ["new"]


# uuid: C879A68F-8CFE-44B5-9EDD-14E53933669E
active_statuses: ["new","open"]


# uuid: BAB613BD-9E25-4612-8DE3-21E4572859EA
Knlc3r8_1E [conf] (confComment)                                    #1 1/30,1
"/var/folders/32/322-aCE4FAajlp...+++TI/-Tmp-/Knlc3r8_1E" 30L, 1209C
```

Config file

```
$ sd config
```

```
17h:~ jesse$ cat .sd-for-sd.sqlite/config
email_address = jesse@bestpractical.com
default_group_ticket_list = milestone
summary_format_ticket = %5.5s,$luid | %8.8s,status | %7.7s,component |%12.12s,ow
ner| %-44.44s,summary


source http://sartak.org/misc/sd = http://sartak.org/misc/sd | 98DAF902-D464-11D
D-8353-082EA2FCADC8
source http://fsck.com/~clkao/sd-bugs = http://fsck.com/~clkao/sd-bugs | 8E08197
6-2985-11DE-AC47-59B9DBC7CFEF


alias cavil = ticket update --id $1 --milestone cavil
alias take = ticket update $1 --owner=jesse@bestpractical.com
alias pull -a = pull --all
alias close = ticket close
alias upload = publish --replica --html --to jesse@fsck.com:public_html/sd-bugs
alias give = ticket update $1 -- owner=$2
alias mine = ticket list -- owner=~^(jesse@bestpractical.com|)$ milestone=cavil
status!~closed|rejected
17h:~ jesse$
```

Mirroring a project

`$ sd clone`

Publishing

$ sd publish

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```
17h:~ jesse$ sd publish --html --replica --to jesse@17h.local:public_html/sd
Exporting a static HTML version of this replia
Exporting a clone of this replia
 Exporting records...
 Exporting changesets...
Exporting resolution database
 Exporting records...
 Exporting changesets...
Publishing the exported clone of the replica to jesse@17h.local:public_html/sd w
ith rsync
The authenticity of host '17h.local (fe80::21f:f3ff:feba:9693%en0)' can't be est
ablished.
RSA key fingerprint is e5:e7:c0:3c:0f:ce:f1:b4:bd:f6:d0:69:c0:ce:9d:99.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '17h.local' (RSA) to the list of known hosts.
Warning: the RSA host key for '17h.local' differs from the key for the IP addres
s 'fe80::21f:f3ff:feba:9693%en0'
Offending key for IP in /Users/jesse/.ssh/known_hosts:101
Are you sure you want to continue connecting (yes/no)? yes
Publication complete.
17h:~ jesse$
```

Pulling

`$ sd pull`

```
17h:~ jesse$ sd pull --all
Pulling from http://fsck.com/~clkao/sd-bugs
Done.

Pulling from http://sartak.org/misc/sd
Done.

17h:~ jesse$
```

Terminal — bash — 80×24

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Create a bug

`$ sd ticket create`

Terminal — vim — 80×24

8nEKwqk91I

=== required ticket metadata (changes here will not be saved) ===

creator: jesse@bestpractical.com
original_replica: 09E374FA-EBD3-11DD-9A7A-BF638F31E82D

=== edit ticket details below ===

summary:
status: new
milestone: cavil
component: core
owner:
due:
reporter: jesse@bestpractical.com

=== add new ticket comment below ===

~
~
~
~

8nEKwqk91I ()   #1 1/17,1
"/var/folders/32/322-aCE4FAajlp...E+++TI/-Tmp-/8nEKwqk91I" 17L, 333C

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Listing bugs

```
$ sd ticket list
```

```
cavil
=====


   51     closed        - jesse@bestpr a failed pull still adds a replica to the so
   68     closed        - jesse@bestpr reported_by and creator are inconsistent. ('
  182     closed     webui jesse@bestpr No ticket update web ui
  192     closed     webui jesse@bestpr after updating a ticket without comments, co
  218     closed     webui jesse@bestpr  setting only the 'owner' field when updatin
  220   rejected     webui jesse@bestpr owner field should default to "me"
  221     closed     webui jesse@bestpr create/edit ticket forms need styling
  222     closed     webui jesse@bestpr summary field shouldn't try to autocomplete
  253     closed     webui jesse@bestpr "add a comment" and "initial comments" boxes
  257     closed      core jesse@bestpr due keeps getting set from blank to blank an
  259     closed      core jesse@bestpr "ticket search -- status!=closed status!=res
  284     closed       cli jesse@bestpr the prompt in the cli has the cwd rather tha
  289     closed      core jesse@bestpr Running SD without any arguments and without
  290     closed      core jesse@bestpr SD_REPO/PROPHET_REPO env variable doesn't ex
  291     closed      core jesse@bestpr publish --html doesn't work
  296     closed     webui jesse@bestpr Comments appear to be getting recorded twice
  300     closed      core jesse@bestpr webui updates with no changes record an empt
  302     closed     webui jesse@bestpr Button labels in the web ui don't appear to
  321     closed     webui jesse@bestpr history view is ugly
:
```

Show a bug

```
$ sd ticket show
```

```
= METADATA

id:                349 (76E449C0-298C-11DE-A698-3D3C27CF6674)
summary:           pulling from someone who cloned from you should do less work a
nd be faster
status:            new
milestone:         cavil
component:         core
created:           2009-04-15 07:10:13
creator:           jesse@bestpractical.com
reporter:          jesse@bestpractical.com
original_replica:  09E374FA-EBD3-11DD-9A7A-BF638F31E82D

= HISTORY

 jesse@bestpractical.com at 2009-04-15 07:10:13 (1032@09E374FA-EBD3-11DD-9A7A-BF
638F31E82D)
   + "created" set to "2009-04-15 07:10:13"
   + "original_replica" set to "09E374FA-EBD3-11DD-9A7A-BF638F31E82D"
   + "creator" set to "jesse@bestpractical.com"
   + "component" set to "core"
   + "summary" set to "pulling from someone who cloned from you should do less wo
:
```

Update a bug

$ sd ticket update

```
Terminal — bash — 80×24


SD for SD (0.01; Prophet 0.01)
Type "help", "about", or "copying" for more information.
SD> ticket update 34 -- status=closed owner=jesse@bestpractical.com
Ticket 34 (F2DEB79E-6859-11DD-A3A9-61873178437E) updated.
SD>
```

```
SD for SD (0.01; Prophet 0.01)
Type "help", "about", or "copying" for more information.
SD> ticket update 349
```

```
RQJWJ9PQpQ

=== required ticket metadata (changes here will not be saved) ===

id: 349 (76E449C0-298C-11DE-A698-3D3C27CF6674)
created: 2009-04-15 07:10:13
creator: jesse@bestpractical.com
original_replica: 09E374FA-EBD3-11DD-9A7A-BF638F31E82D

=== edit ticket details below ===

summary: pulling from someone who cloned from you should do less work and be fas
ter
status: new
milestone: cavil
component: core
owner:
due:
reporter: jesse@bestpractical.com

=== add new ticket comment below ===

~
RQJWJ9PQpQ  ()                                                     #1 1/19,1
"/var/folders/32/322-aCE4FAajlp...E+++TI/-Tmp-/RQJWJ9PQpQ" 19L, 483C
```

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Log

```
$ sd log
```

```
Terminal — perl — 80×24
```

```
SD for SD (0.01; Prophet 0.01)
Type "help", "about", or "copying" for more information.
SD> log
```

```
2009-04-15 08:26:59 - 1034 : clkao@bestpractical.com @ 8E081976-2985-11DE-AC47-5
9B9DBC7CFEF
 # Ticket 350 (PROPHET_REPLICA_TYPE=profit should give better error)
  + "creator" set to "clkao@bestpractical.com"
  + "original_replica" set to "8E081976-2985-11DE-AC47-59B9DBC7CFEF"
  + "status" set to "new"
  + "description" set to "unknown prophet replica type gives the following error
:

Use of uninitialized value in concatenation (.) or string at /Library/Perl/5.8.8
/Prophet/Replica.pm line 81.
Can't use string ("Prophet::Replica") as a HASH ref while "strict refs" in use a
t (eval 138) line 3.
"
  + "reporter" set to "clkao@bestpractical.com"
  + "created" set to "2009-04-15 08:26:59"
  + "component" set to "core"
  + "summary" set to "PROPHET_REPLICA_TYPE=profit should give better error"
  + "milestone" set to "cavil"


2009-04-15 07:30:56 - 1033 : clkao@bestpractical.com @ 8E081976-2985-11DE-AC47-5
9B9DBC7CFEF
:
```

Git Integration

`$ git sd`

Using SD (Web)

Web? Isn't SD an offline tool?

Local microserver

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$ sd browser

Home

SD for SD

Tickets   New ticket   Home

Project overview

Components

2 - **cli**

10 - **core**

0 - **hm-sync**

0 - **trac-sync**

0 - **sync**

3 - **webui**

0 - **rt-sync**

0 - **tests**

0 - **gcode-sync**

0 - **docs**

9 - **None**

Statuses

142 - **closed**

0 - **stalled**

Your active tickets for cavil

id	Status	Milestone	Component	Owner	Reporter	Due	Created
344	**Can't unset a ticket due date from the web ui**						
	new	cavil	webui		jesse@bestpractical.com	3 days ago	3 months ago
351	**some database settings records of sd bug are in lower case uuid**						
	new	cavil	core		clkao@bestpractical.com		3 months ago
308	**sd server readonly mode appears to have vanished**						
	new	cavil	core		jesse@bestpractical.com		5 months ago
366	**aliases can't be created unless you have one already**						
	new	cavil	core		jesse@bestpractical.com		6 weeks ago
325	**stop users from 'pushing' to a foreign replica they haven't pulled from**						
	new	cavil	core		jesse@bestpractical.com		5 months ago

Create a ticket

SD for SD

Create a new ticket

summary

status	component	milestone
new	core	cavil

owner

reporter   jesse@bestpractical.com

due

tags

description

Save

Initial comments on this ticket

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Search

SD for SD

Tickets ▾   New ticket   Home

My open tickets for the current milestone

Show ticket #

id	Status	Milestone	Component	Owner	Reporter		
						Milestones ▸	cavil
						Due Created	
344	**Can't unset a ticket due date from the web ui**					Components ▸	diana
	new	cavil	webui		jesse@bestpractical.com	All	None
							3 days ago
351	**some database settings records of sd bug are in lower case uuid**						
	new	cavil	core		clkao@bestpractical.com		21 hours ago
350	**PROPHET_REPLICA_TYPE=profit should give better error**						
	new	cavil	core		clkao@bestpractical.com		Yesterday
348	**publish/export should be incremental**						
	new	cavil	core		jesse@bestpractical.com		2 days ago
334	**sd aliases -add takes one argument, but SD preparses it**						
	new	cavil	core		jesse@bestpractical.com		7 days ago
349	**pulling from someone who cloned from you should do less work and be faster**						
	new	cavil	core		jesse@bestpractical.com		2 days ago
308	**sd server readonly mode appears to have vanished**						
	new	cavil	core		jesse@bestpractical.com		3 months ago
325	**stop users from 'pushing' to a foreign replica they haven't pulled from without --force**						
	new	cavil	core		jesse@bestpractical.com		3 months ago

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Show a bug

SD for SD

Tickets ▾   New ticket   Home

344: Can't unset a ticket due date from the web ui

Show | Update | History

UUID   96339B24-28A0-11DE-81D0-F841DEF9AFC5

status	component	milestone
new	webui	cavil

reporter   jesse@bestpractical.com

created   3 days ago

creator   jesse@bestpractical.com

original_replica   09E374FA-EBD3-11DD-9A7A-BF638F31E82D

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Update a bug

SD for SD

Tickets ▾   New ticket   Home

344: Can't unset a ticket due date from the web ui

Show   Update   History

summary   Can't unset a ticket due date from the web ui

status
new

component
webui

| webui |
| core |
| cli |
| sync |
| rt-sync |
| hm-sync |
| gcode-sync |

milestone
cavil

owner

reporter   jesse@bestpractica

due

tags

description

Save

Add a comment

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Comments

SD for SD

Tickets ▾   New ticket   Home

317: push should have a 'dry run' option

Show   Update   History

UUID	4B230438-F729-11DD-B769-08D095F21BD5

status	**component**	**milestone**
closed	sync	diana

owner	jesse@bestpractical.com
reporter	jesse@bestpractical.com
created	5 months ago
creator	jesse
original_replica	09E374FA-EBD3-11DD-9A7A-BF638F31E82D

Comments

10 days ago jesse@bestpractical.com wrote:

now it does, because I was too scared to push to gcode without it.

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History

http://localhost:8080/ticket/4B230438-F729-11DD-B769-08D095F21BD5/history

Q▼ Google

SD for SD

Tickets ▼   New ticket   Home

317: push should have a 'dry run' option

Show   Update   History

5 months ago   jesse   967 @ 09E374FA-EBD3-11DD-9A7A-BF638F31E82D

created set to 2009-02-10 04:14:21

original_replica set to 09E374FA-EBD3-11DD-9A7A-BF638F31E82D

creator set to jesse

component set to sync

summary set to push should have a 'dry run' option

status set to new

milestone set to diana

reporter set to jesse@bestpractical.com

10 days ago   jesse@bestpractical.com   1077 @ 09E374FA-EBD3-11DD-9A7A-BF638F31E82D

owner set to jesse@bestpractical.com

status changed from new to closed

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Working with others

Working with others (Using SD)

Any topology

It doesn't matter who you sync with

You get all the updates eventually

Cloning

$ sd clone

clone makes a replica of someone else's database

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Pulling

`$ sd pull`

Publishing

$ sd publish

publish writes out a copy of your database replica for sharing

(As SD changesets and static HTML)

Hackathon mode
(using Bonjour)

Publish your replica

`$ sd server`

Pull updates

$ sd pull --local

Working with others (Using other systems)

But you already have a bug tracker?

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No Problem!

I use at least two others.

I wrote at least two others.

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We designed SD talk to *foreign* bug trackers

RT

(RT::Client::REST)

Hiveminder

(Net::Jifty)

Trac

(Net::Trac)

Google Code

(Net::Google::Code)

GitHub

Redmine
(Read-only for now)

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(Net::Redmine)

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Want to help with Bugzilla, Jira, FogBugz or something else?

Star topology

One SD node acts as a gateway

Clone

$ sd clone

Clone from Google Code

```
$ sd clone --from gcode:k9mail
```

Clone from RT

```
$ sd clone --from "rt:https://rt.cpan.org|DBI|"
```

Clone from Trac

```
$ sd clone --from trac:https://trac.parrot.org/parrot
```

Clone from GitHub

```
$ git sd clone --from github:miyagawa/remedie
```

SD reverse engineers a database history

Pull

`$ sd pull`

SD reverse engineers a partial database history

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Push

$ sd push

(Then it does a bunch of book-keeping)

Installing SD

It's time to get SD
up and running

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SD is in Perl

Are you afraid?

Don't be

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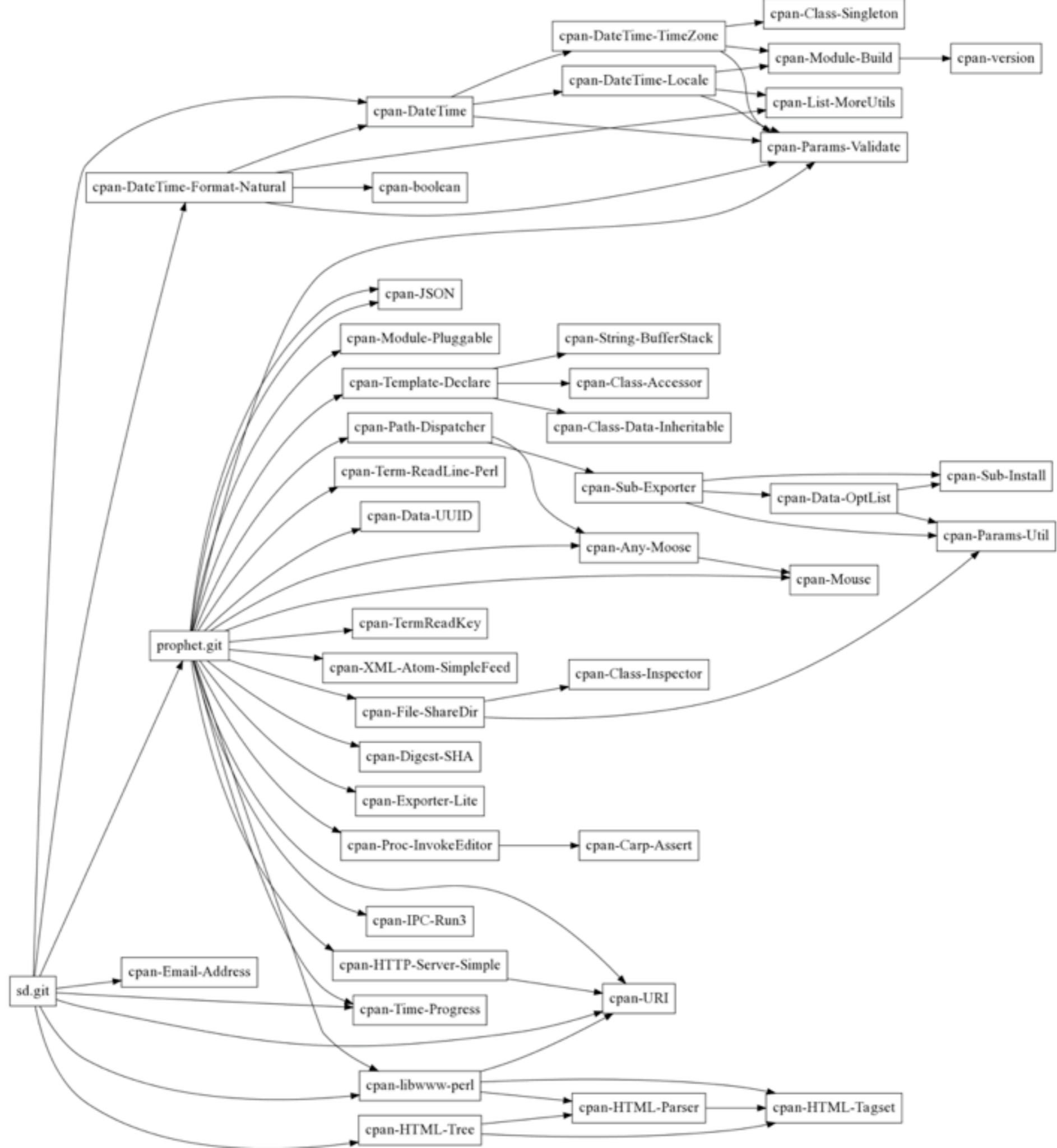
I have a novel idea for a Perl application

One-tweet install.

I'm installing #SD (http://syncwith.us)
after seeing @obra's talk at #YAPC!

80 bytes! I still have 60 to work with!

I'm installing #SD (http://syncwith.us)
after seeing @obra's talk at #YAPC!
curl fsck.com/sd|perl;
export $PATH=~/sd/bin:$PATH; sd

You won't need:

CPAN

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SD is in Perl

SD uses CPAN modules.

This is a blessing.

This is a curse.

CPAN

=

Dependency Hell

When we first built SD, we used anything we thought was useful.

(The first version of SD used a SVN backend)

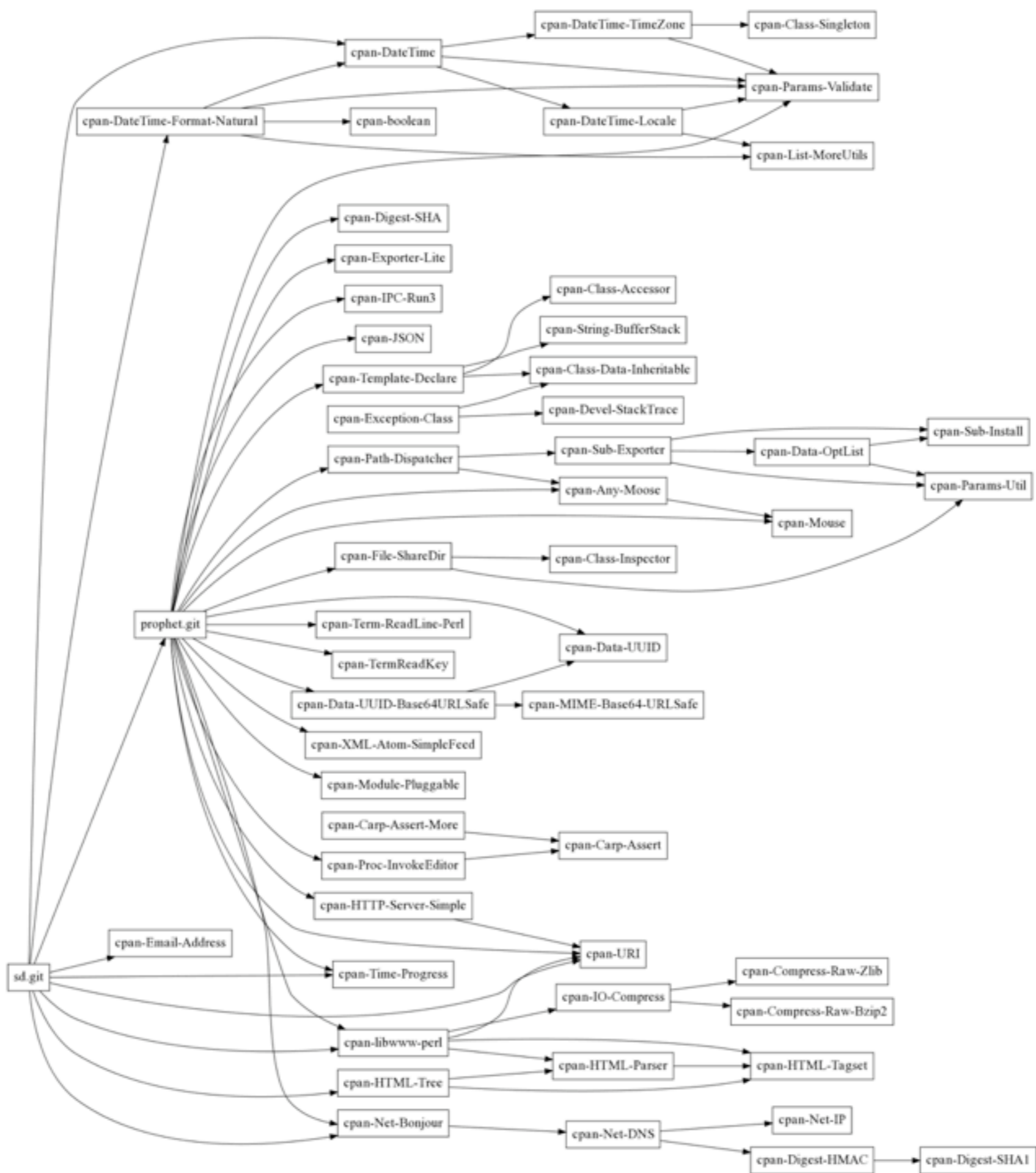The first ~useful version of SD:

123 Dependencies

...one hour later

95 Dependencies
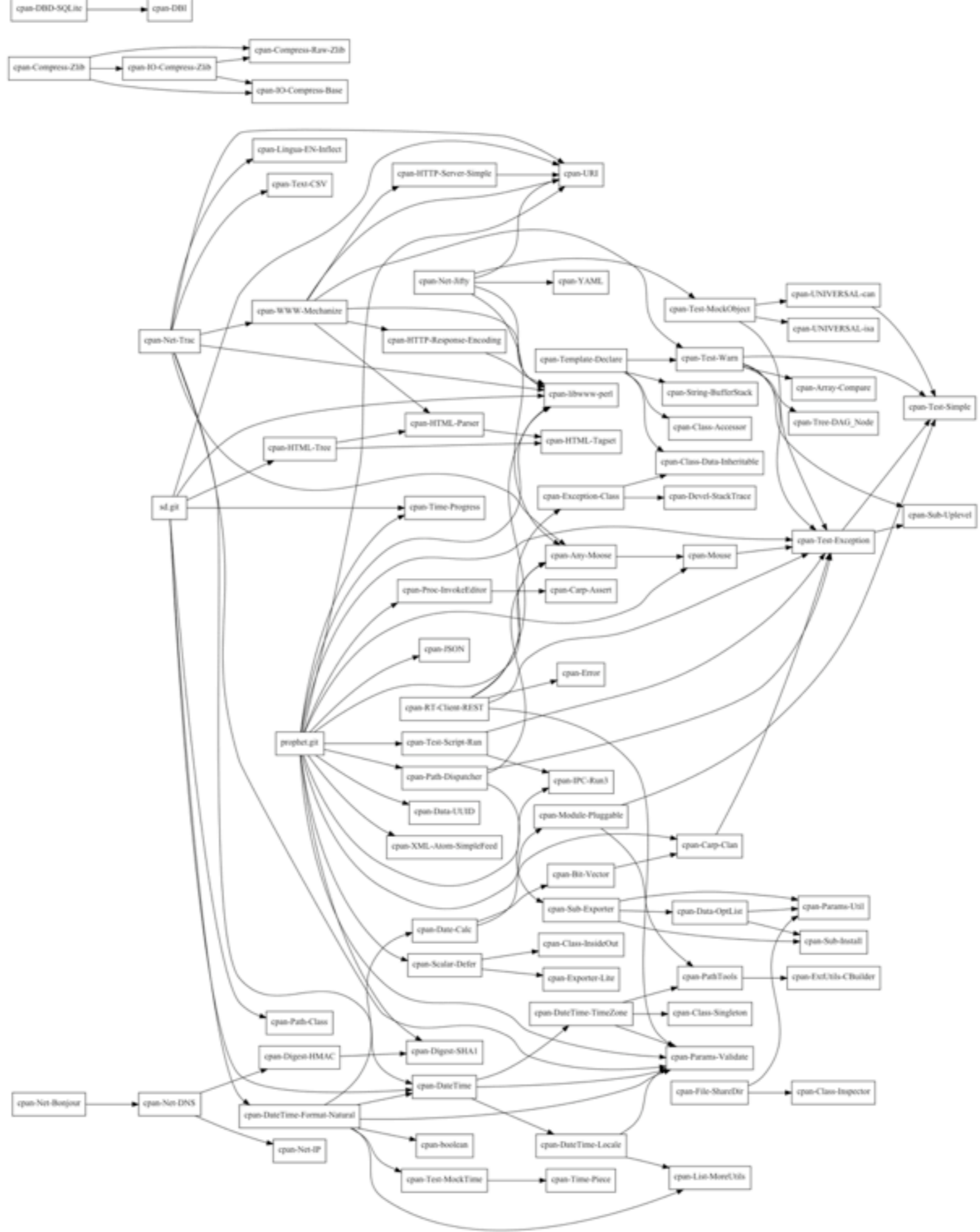
82 Dependencies

SD today

54 Dependencies

Only one *needs* a compiler.

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(rjbs: I'm sorry!
I promise I'll switch
to Data::GUID soon)

Shipwright gives us one-command install

curl fsck.com/sd|perl
export PATH=$PATH:~/sd/bin

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curl

perl

```
$ head /Library/WebServer/Documents/sd

open (my $tar,'|tar xz 2>/dev/null');
while (<DATA>) {
    print $tar $_;
}
close $tar;
exec("cd sd-build; bin/shipwright-builder \
      --install-base=$ENV{HOME}/sd");
__DATA__
?I?Isd-build.tar?<is?F???_1?盡yH?"#⌨${U???H?eH
...
```

Shipwright installs a few
Perl modules...

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...in order

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Scalar-List-Utils
String-BufferStack
Class-Accessor
Class-Data-Inheritable
Tree-DAG_Node
Test-Simple
Sub-Uplevel
Test-Exception
Array-Compare
Test-Warn
Template-Declare
URI
HTTP-Server-Simple
Params-Util
Class-Inspector
File-ShareDir
DBI
DBD-SQLite
HTML-Tagset
HTML-Parser
HTML-Tree
Crypt-SSLeay
JSON
YAML-Syck
JSON-XS
JSON-DWIW
JSON-Any
Mouse
Any-Moose
Compress-Raw-Zlib
Compress-Raw-Bzip2
IO-Compress
libwww-perl
HTTP-Response-Encoding
WWW-Mechanize

WWW-Mechanize-GZip
File-Slurp
Test-MockModule
Net-GitHub
MIME-Types
Class-Singleton
Params-Validate
version
ExtUtils-CBuilder
ExtUtils-ParseXS
Test-Harness
File-Temp
Module-Build
DateTime-TimeZone
List-MoreUtils
DateTime-Locale
DateTime
File-MMagic
Net-Google-Code
Term-ReadLine-Perl
Digest-SHA1
Digest-HMAC
Net-IP
Net-DNS
Net-Bonjour
TermReadKey
Data-UUID
XML-Atom-SimpleFeed
Digest-SHA
Exporter-Lite
IPC-Run3
MIME-Base64-URLSafe
Data-UUID-Base64URLSafe
Sub-Install
Data-OptList

Sub-Exporter
Path-Dispatcher
Module-Pluggable
Time-Progress
Carp-Assert
Proc-InvokeEditor
Test-HTTP-Server-Simple
Module-Refresh
Carp-Assert-More
Test-LongString
Test-WWW-Mechanize
Test-Script-Run
prophet.git
Devel-StackTrace
Exception-Class
Error
RT-Client-REST
Email-Address
YAML
Path-Class
Clone
Hash-Merge
UNIVERSAL-isa
UNIVERSAL-can
Test-MockObject
Net-Jifty
Lingua-EN-Inflect
Text-CSV
Net-Trac
boolean
Time-Piece
Test-MockTime
DateTime-Format-Natural
sd.git

(104 dists with our sync plugins)

$ sd clone --from http://fsck.com/~jesse/sd-bugs

Don't want to install SD?

Point your browser at
http://fsck.com/~jesse/sd-bugs

BEST
PRACTICAL TM

What's next?

BEST PRACTICAL ™

Indexing

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GPG-signed changesets

Actually releasing 1.0

Bonus Material

How to implement an SD replica type

3 Classes

App::SD::Replica::
Bugz
Bugz::PullEncoder
Bugz::PushEncoder