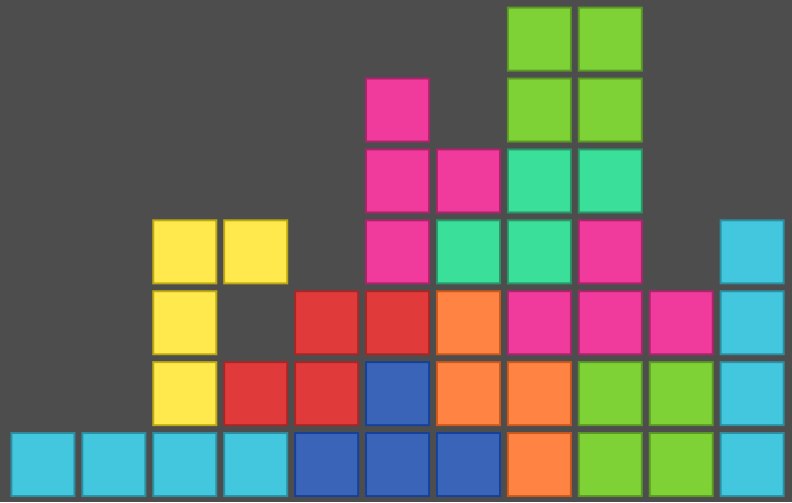
Samba command line user experience

SambaXP 2021

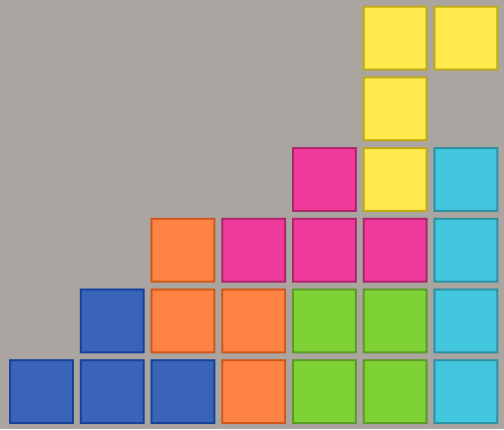
Andreas Schneider

Principal Software Engineer | Red Hat | Samba Team



About me

- I'm the Samba maintainer at Red Hat
- Samba Core Team member since 2010



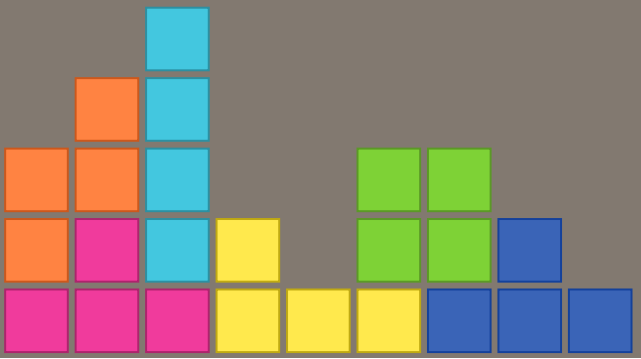
About me

FOSS Hacker working on:

- Samba - The domain controller and file server
- libssh - The SSH Library
- cmocka - A unit testing framework for C
- cwrap - Client/Server testing made easy
- darktable - Image raw developer
- LineageOS - Android with Privacy Features

Abstract

Samba's command line user interface [...] and design principles [...] fade in and out of use according to some esoteric pattern.



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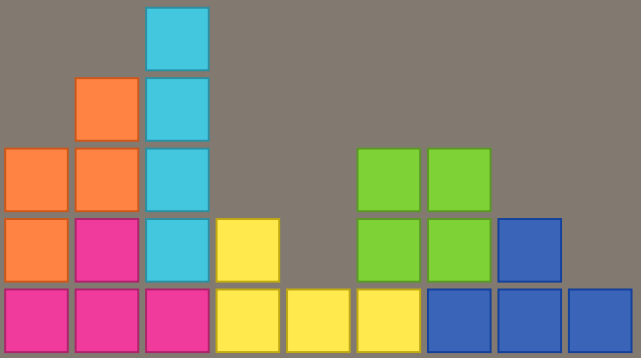
Abstract (stolen)

The abstract was shamelessly stolen from Douglas his SambaXP talk in 2019:

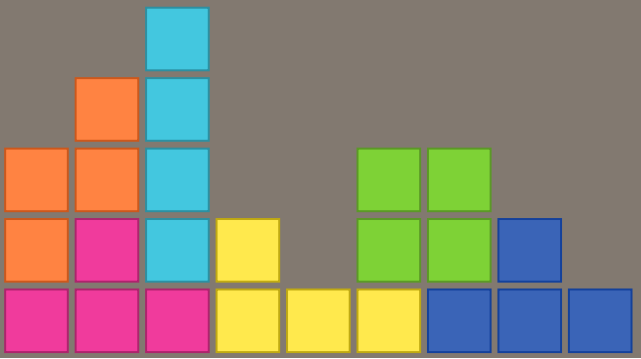
What should we do with our user interface?



Flashback (2019)

Samba's command line UI

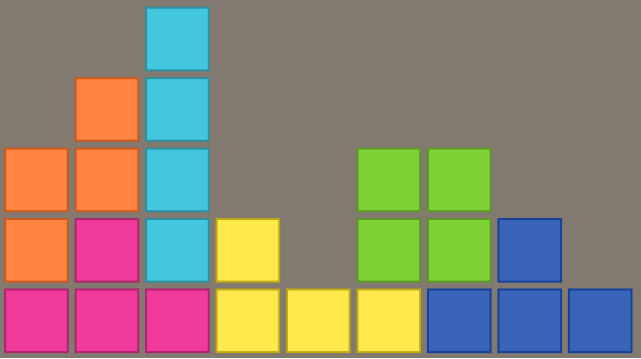
- kind of haphazard
- patchy abstractions
- untested as a user interface



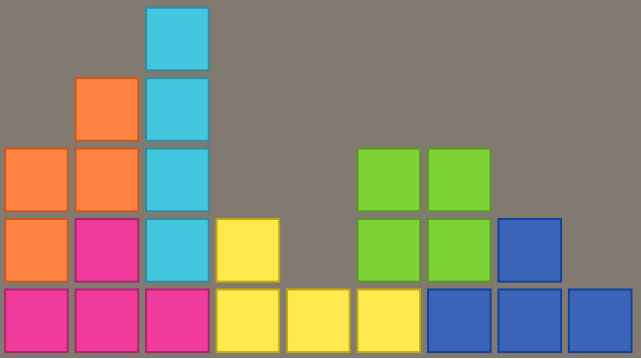
Flashback (2019)

Nobody can fix it

- experts are locked-in
- newbies are baffled
- old options can’t be dropped

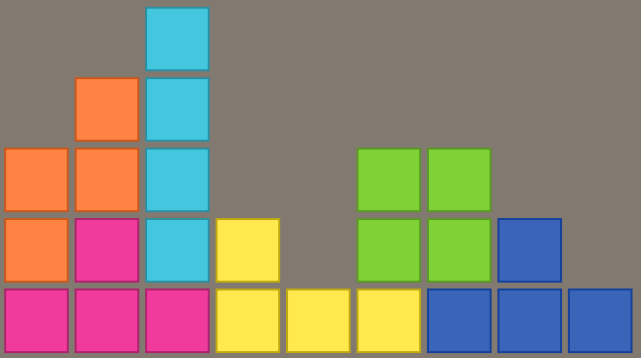


I tried to fix it (as good as possible)



Agenda

- What are the current problems?
- How did we solve the issues?
- How do we prevent issues in future?
- What can still be improved?
- Has the documentation been updated?



1

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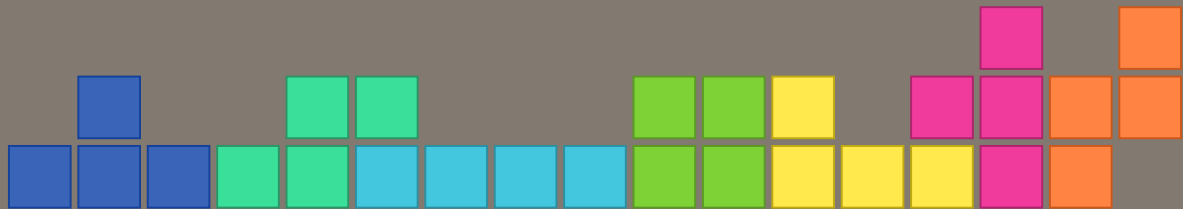
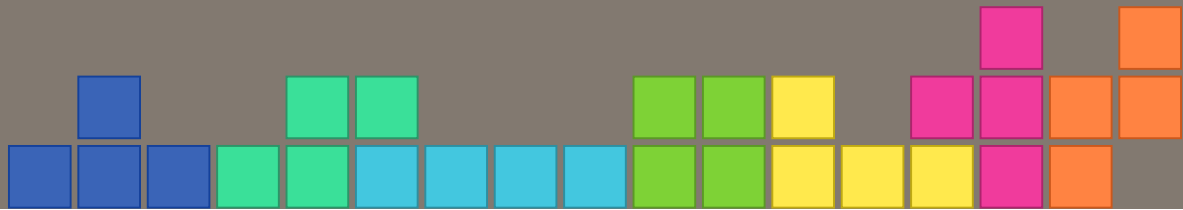


A few examples ...

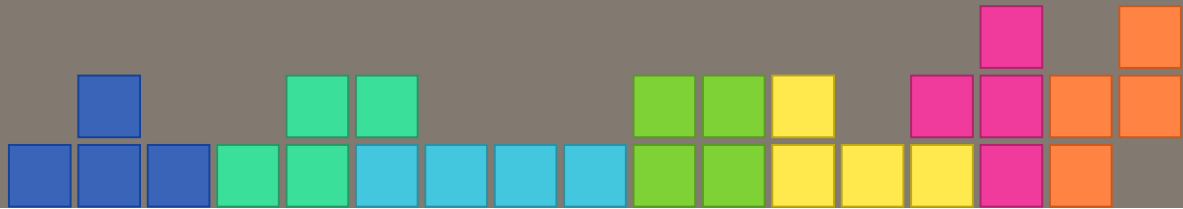


Kerberos

```
$ smbclient --help | grep '\-k'
  -k, --kerberos                  Use kerberos

$ ldbsearch --help | grep '\-k'
  -k, --kerberos=STRING           Use Kerberos, -k [yes|no]
```

We have `-k` and `-k yes`. Same option with and without an argument.



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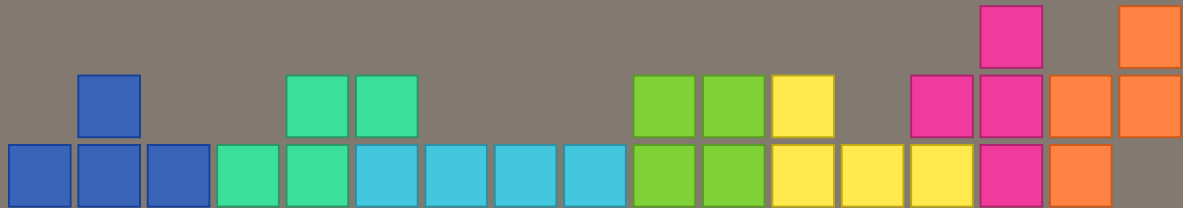

Editor or encryption?

```
$ ldbedit --help | grep '\-e'
  -e, --editor=PROGRAM            external editor
  -e, --encrypt                   Encrypt connection for privacy
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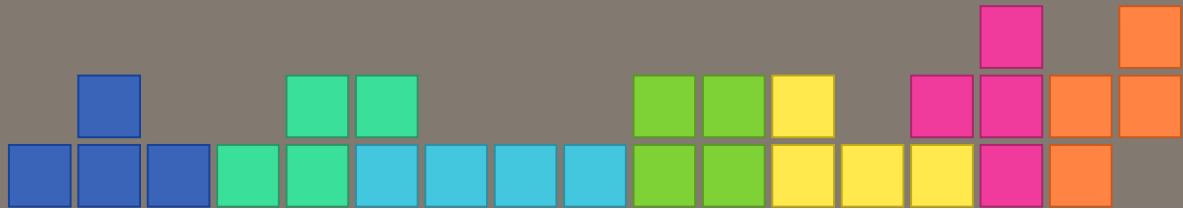
Will I enable encryption or will it open an editor, or both?



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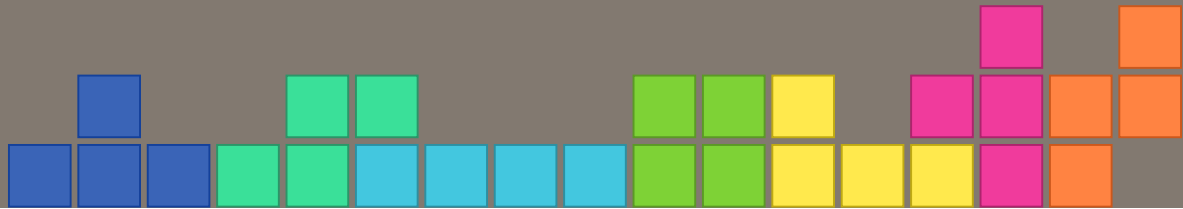

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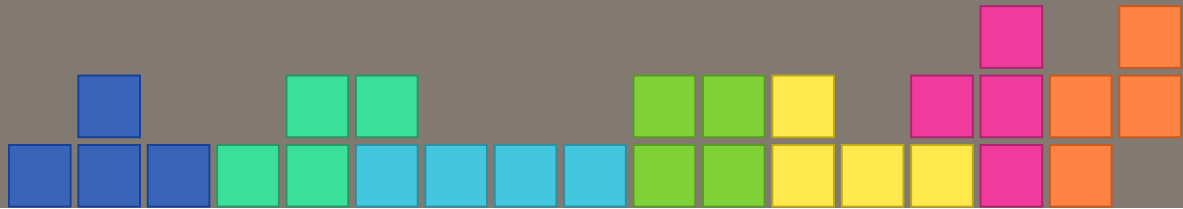

Sorted or sign?

```
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  -S, --sign                      Sign connection to prevent
  -S, --signing=on|off|required   Set the client signing state
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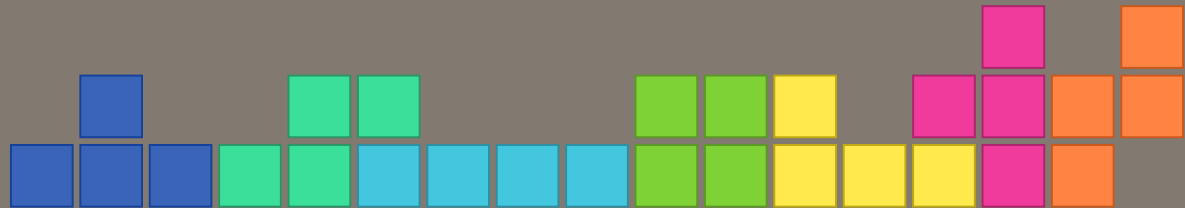

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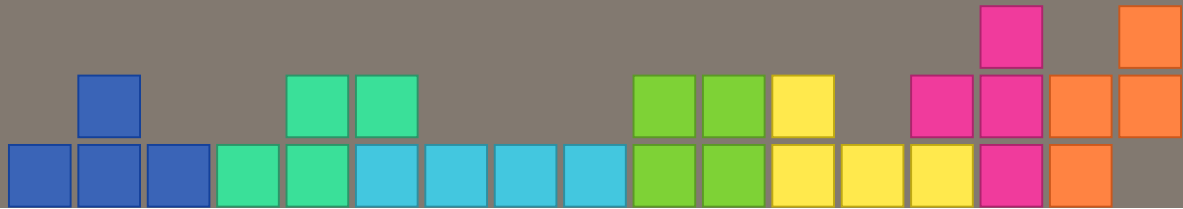

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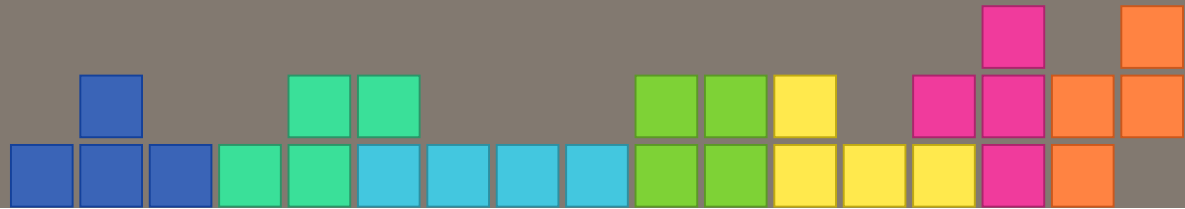

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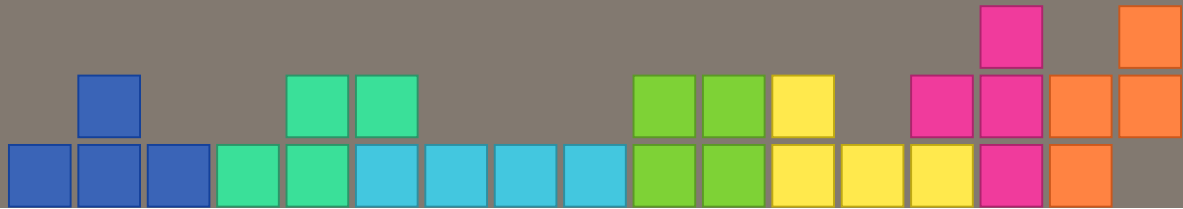

Scope or config file?

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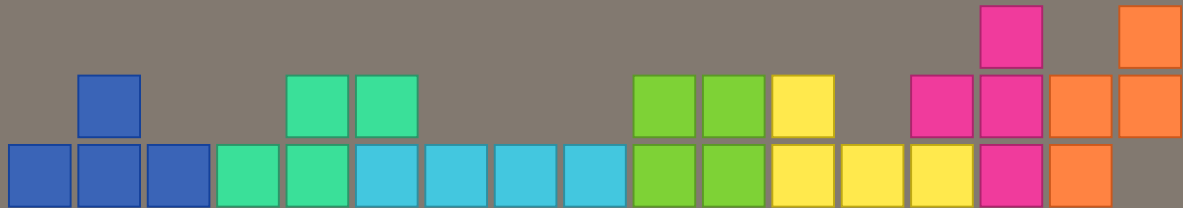

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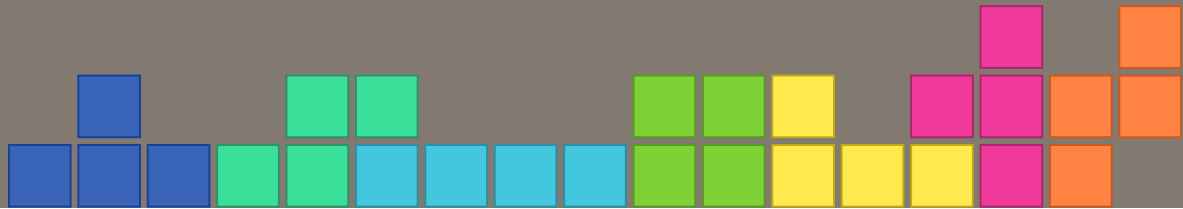

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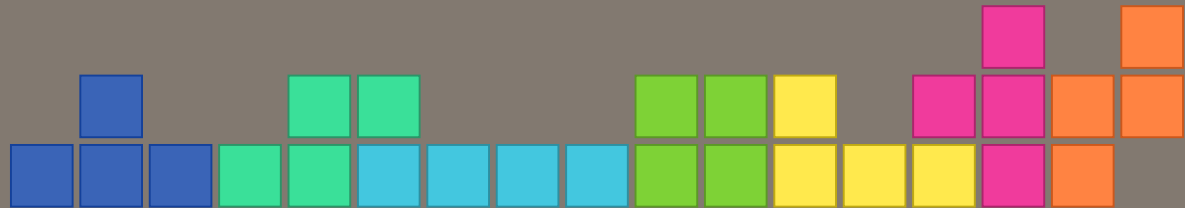

I want scope

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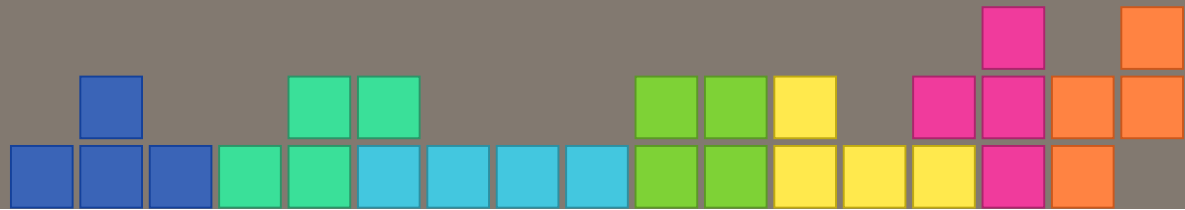
- I want to set the scope, lets use the long option.



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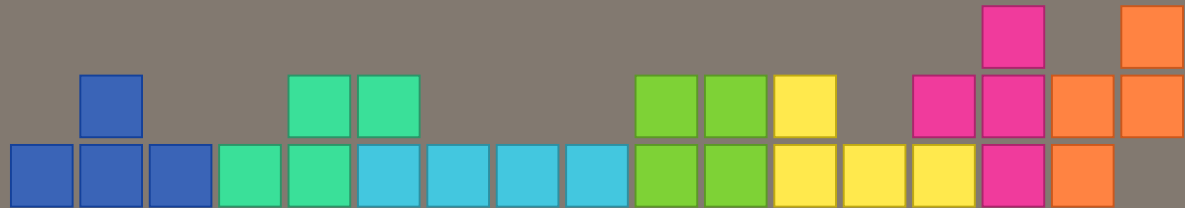

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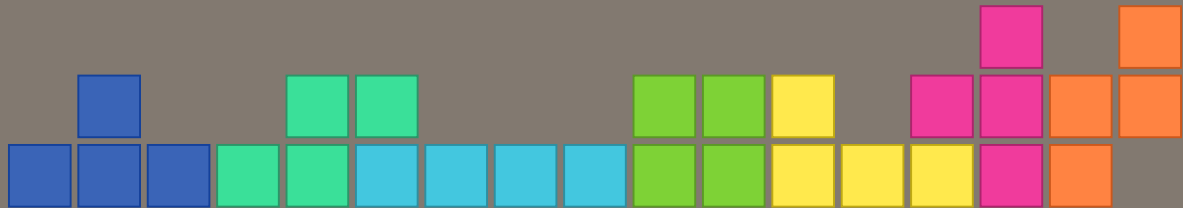

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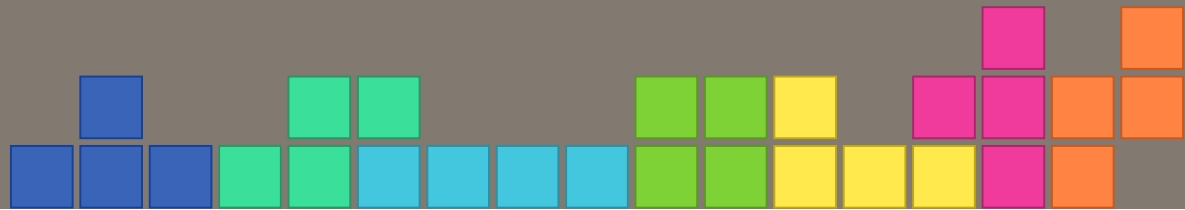
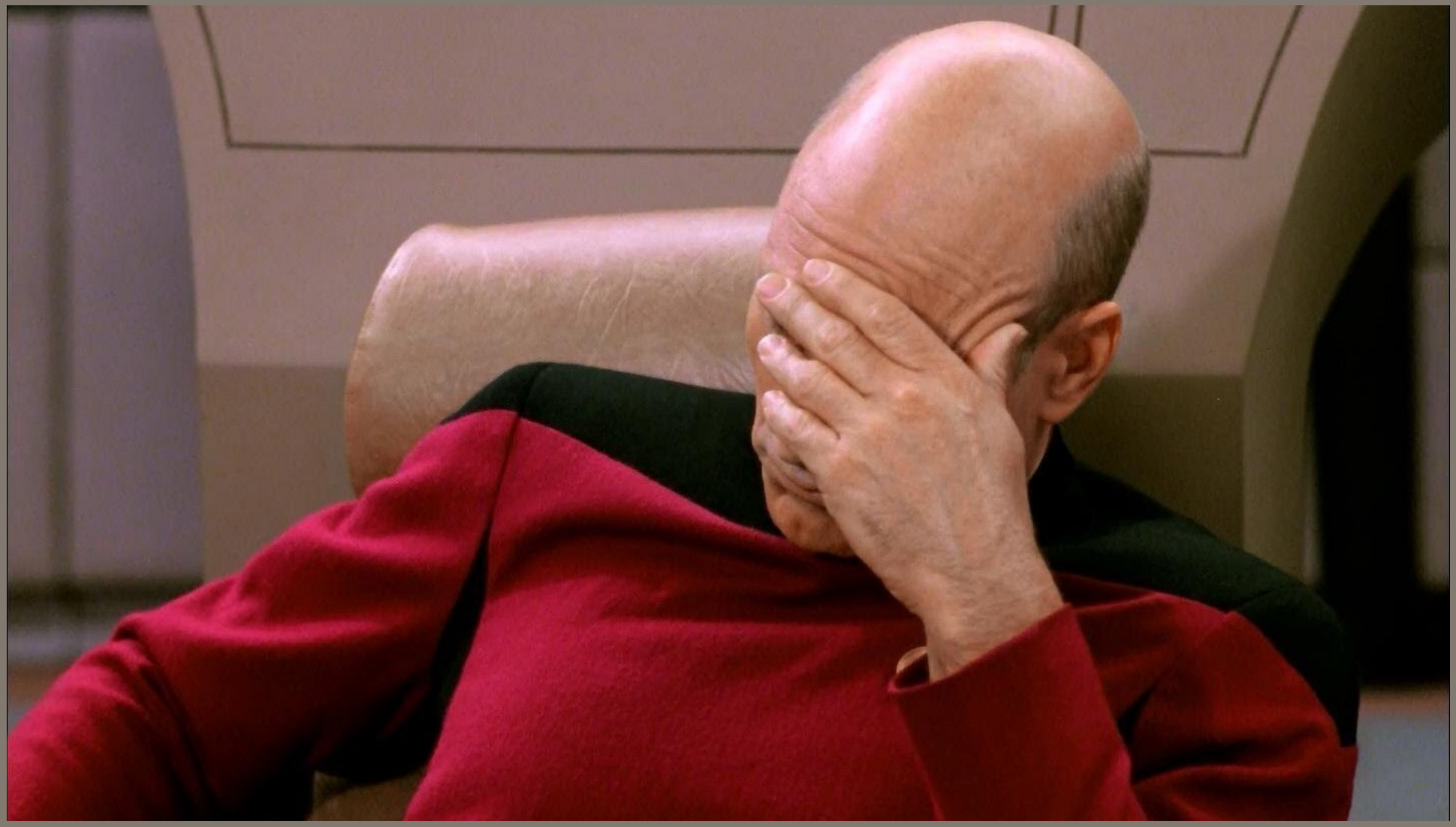
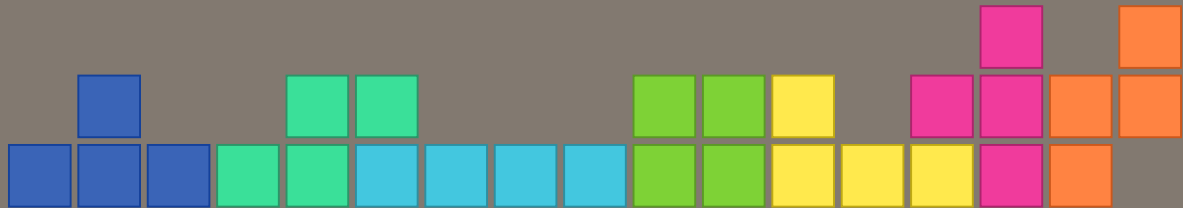




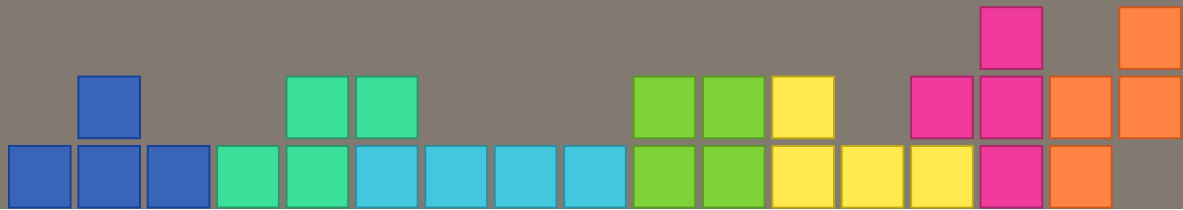
Can we fix this?



Backwards compatibility dilemma

Fixing consistency across tools will create new problems!

- We need to introduce new options
- Complexity might increase
- User scripts will break

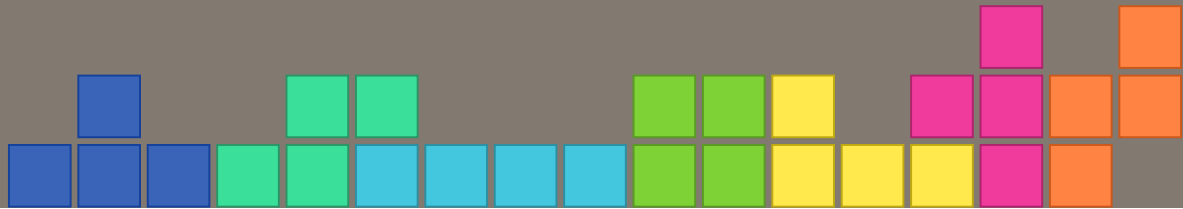


Another problem: Logging

Do Samba tools log to

- *Standard Output (stdout)* or
- *Standard Error (stderr)*

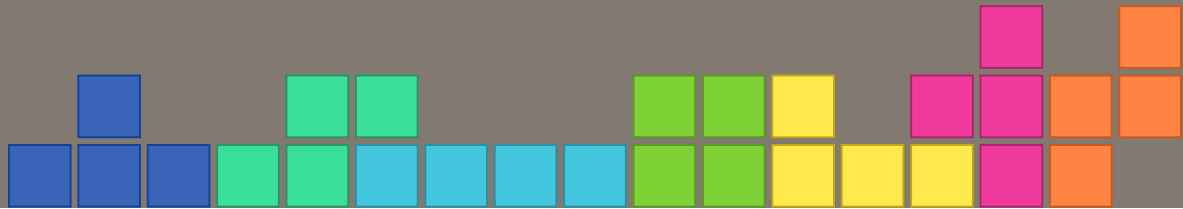
by default?



Logging

```
$ smbclient --help | grep 'std'
  -E, --stderr                    Write messages to stderr instead
                                  of stdout

$ smbd --help | grep 'std'
  -S, --log-stdout                Log to stdout
```



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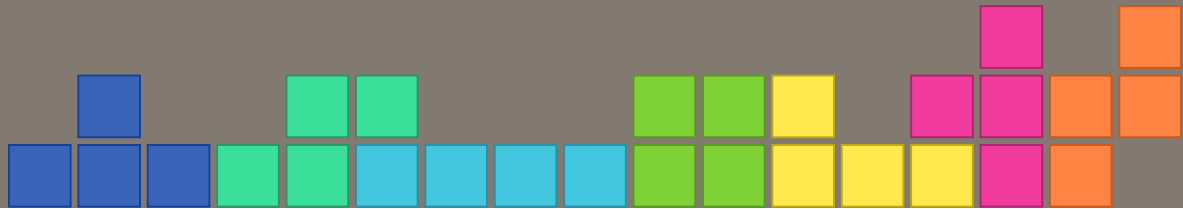
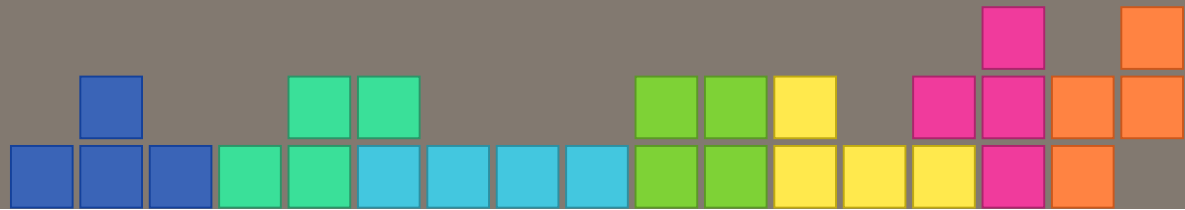


Problems discovered so far

- There is no consitency in logging to *stdout* or *stderr*
- We have several command line parsing implementations
- We have a lot of duplicate options



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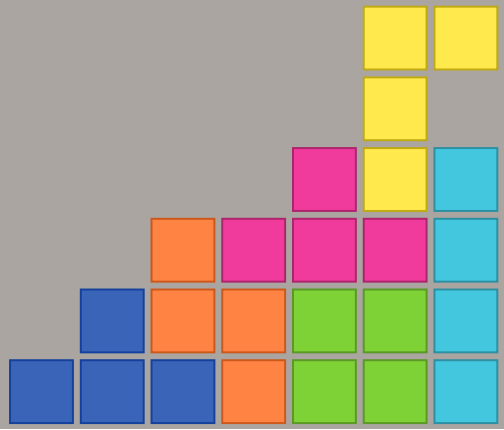
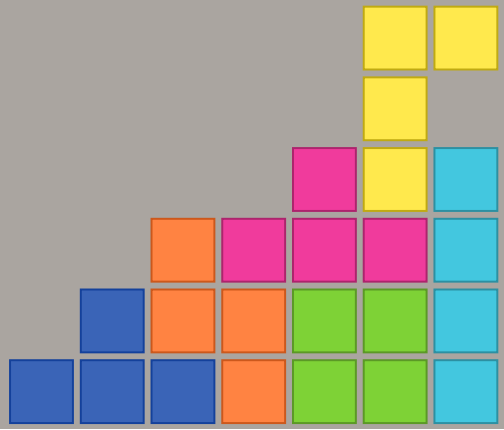
How did we solve the issues?



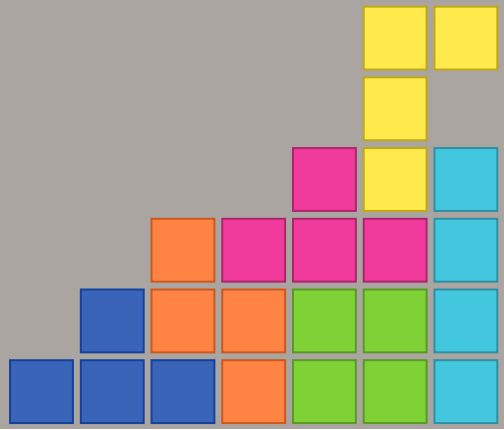
For tools written in C

- Rewrite of command line parser
- Only ***one*** cmdline parser implementation in C
- Uses the client credentials API for all tools



New important common options (1)

```
1  --use-kerberos=desired|required|off  Use Kerberos authentication
2  --use-krb5-ccache=CCACHE             Credentials cache location for Ke
```



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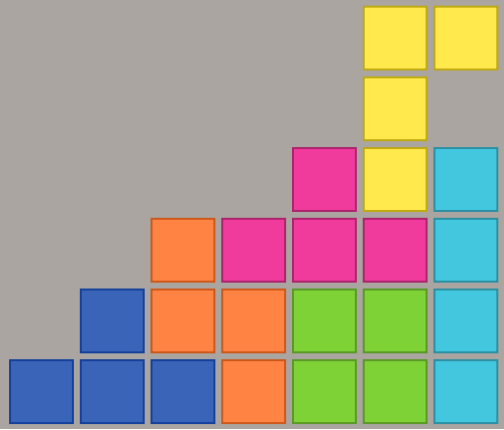
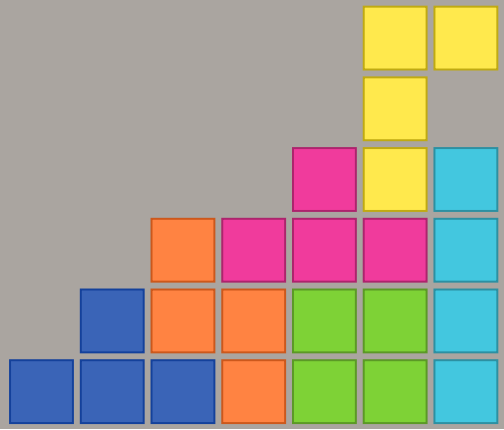


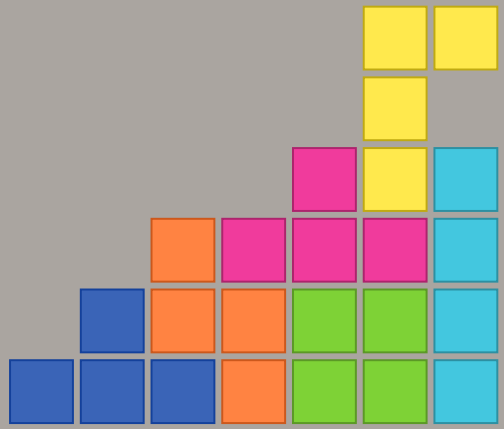
Corresponding smb.conf option

```
client use kerberos = desired|required|off
```



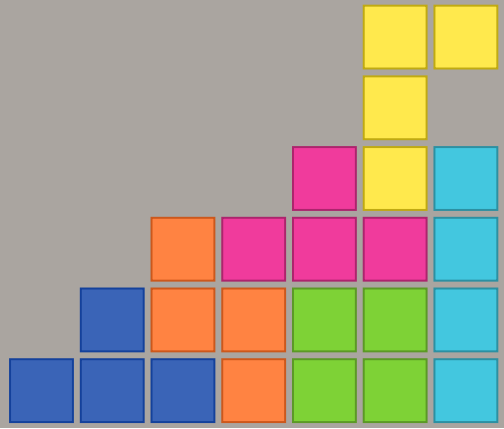
FIPS mode

- *client use kerberos = required* will be forced
- Beside Kerberos, SMB doesn't offer any other secure authentication methods in FIPS mode



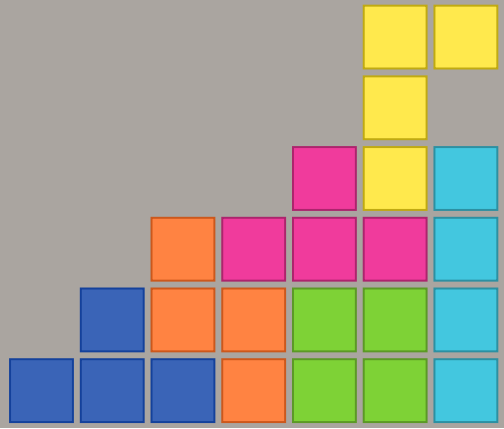
What is FIPS?

- Standard for Security Requirements for Cryptographic Modules by the US government
- Issued by the National Institute of Standards and Technology (NIST)



What is FIPS 140-2 mean?

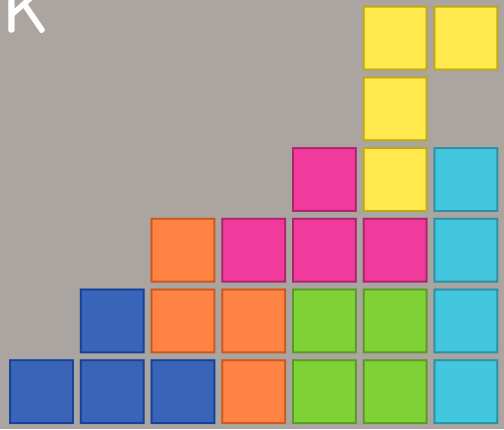
- Allows only a subset of "strong" crypto algorithms for security relevant functionality



What does FIPS 140-2 mean for Samba?

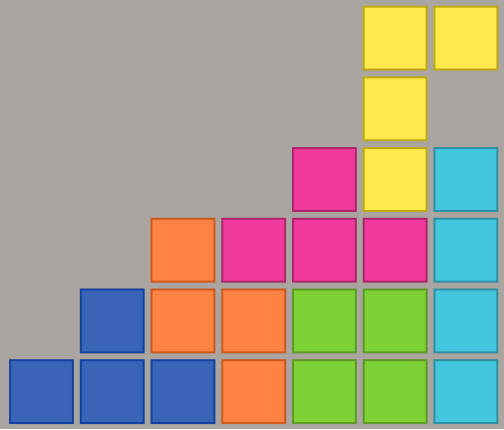
RC4 and MD5 are not available

1. NTLM doesn't work, only KRB5
2. SMB1 doesn't work
3. SMB guest shares don't work



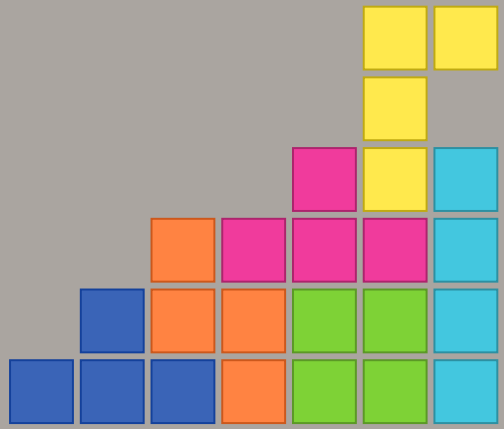
Legacy support

- `-k` and `-k yes|no` are kept as legacy options for now
- They will be removed in future!



New important common options (2)

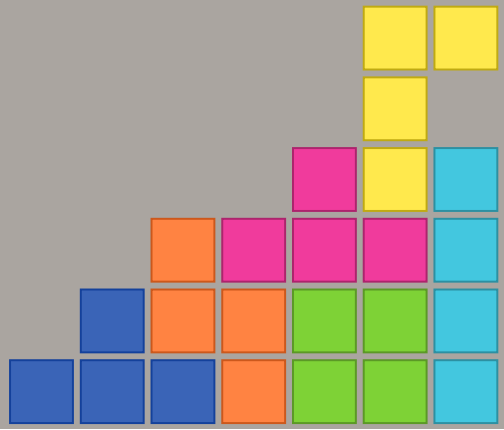
```
--client-protection=sign|encrypt|off
    Configure used protection for client connections
```



Corresponding smb.conf option

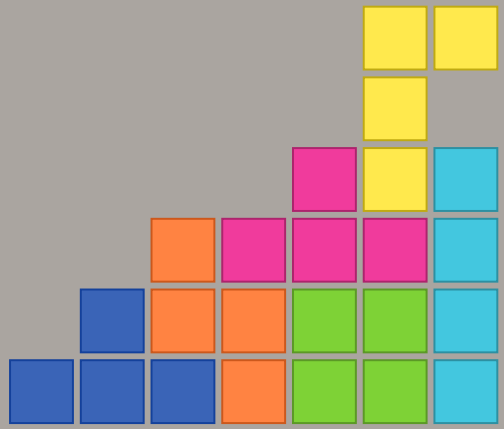
```
client protection = sign|encrypt|off|default
```

- `default` will use the default options of `client smb encrypt` and `client signing`.



Client protection

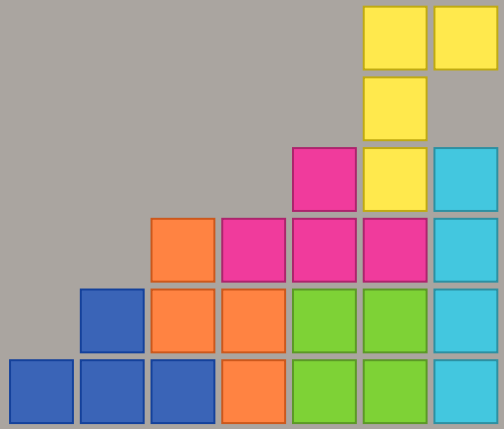
- This option will do the right thing for you.
- Works for SMB and DCEPRC connections!



Removed common options

```
1       -e|--encrypt
2       -S, --signing=on|off|required  Set the client signing state
```

Use `--client-protection` now!



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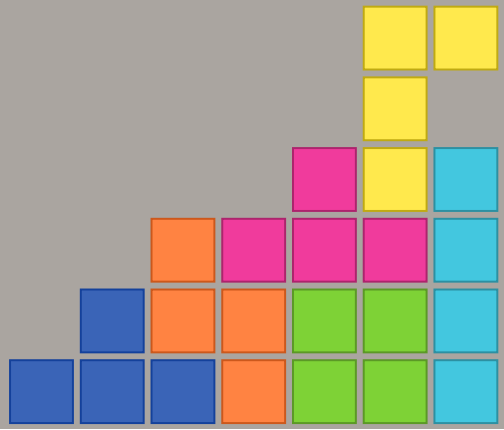
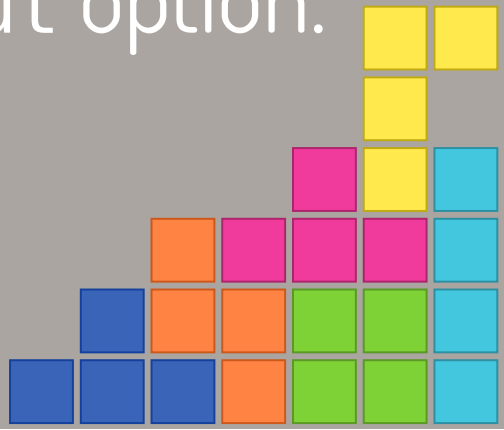


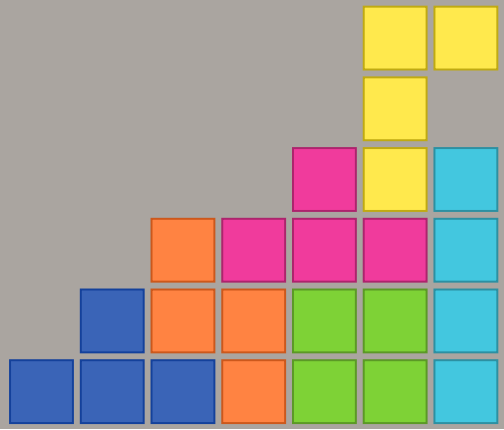
Logging

- All tools and daemons log to stderr by default now!
- Can be changed using `--debug-stdout` option.



smbd/winbindd/nmbd

```
1 $ smbd --log-stdout # has been removed
2 $ smbd --debug-stdout
```



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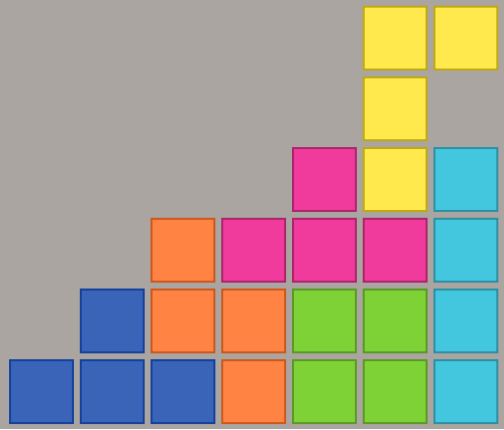
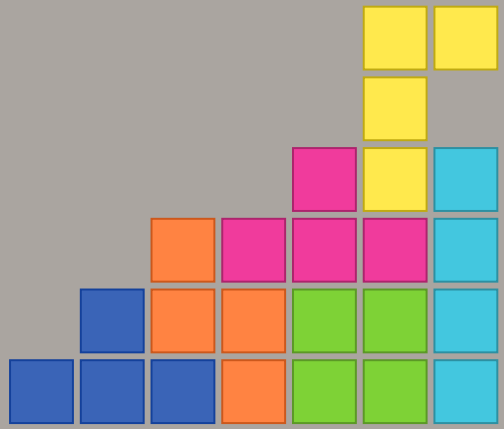


Debugging memory (talloc)

All tools are providing:

```
1  --leak-report        enable talloc leak reporting on exit
2  --leak-report-full   enable full talloc leak reporting on exit
```



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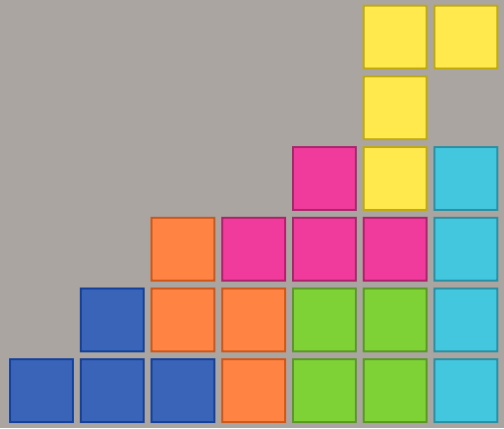
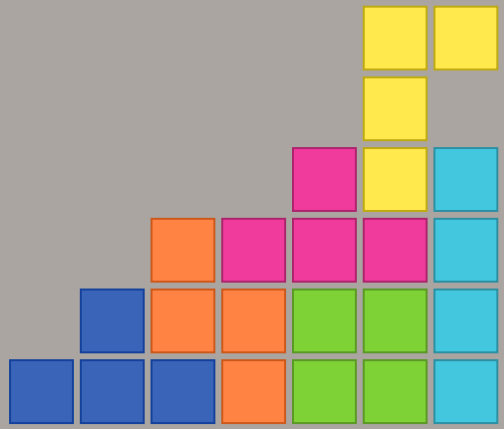


Tool options changed

Example ldbmodify:

```
1 -s is not used for --configfile anymore
2 -e is not available for --editor anymore
```

ldb tools use: `-s|--scope`



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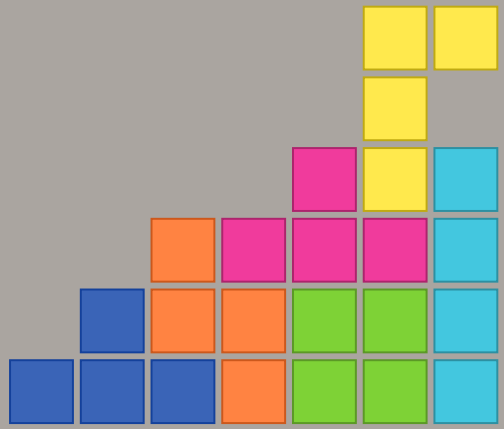
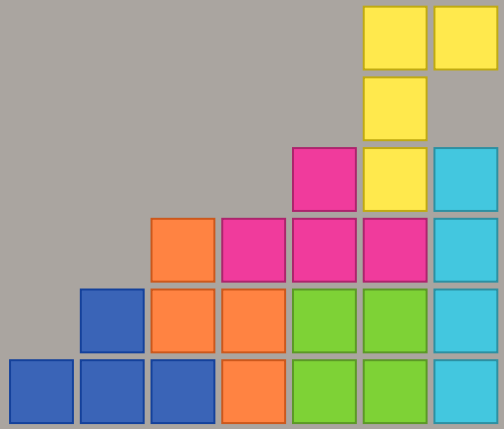
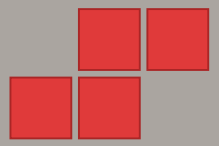


Tool options changed

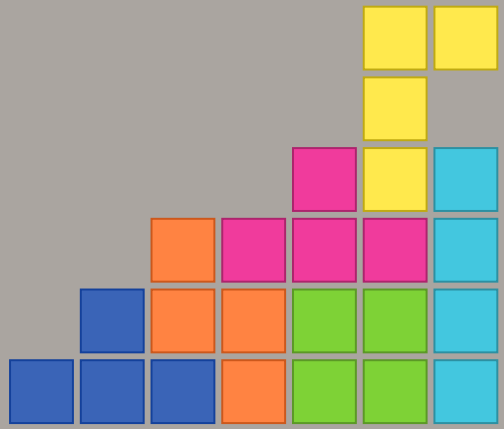
Check Samba 4.15 release notes for details!





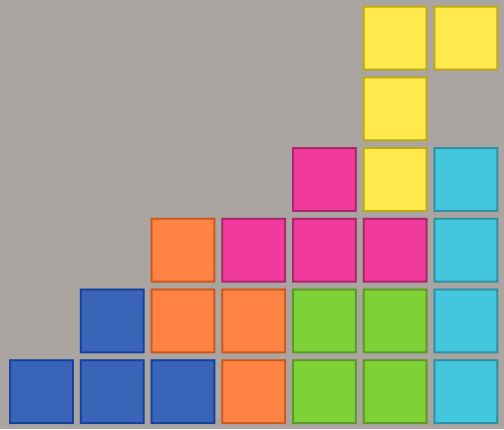
Other issues solved

- New cmdline parser fixes Kerberos support for `winexe`!
- BUG: #14616



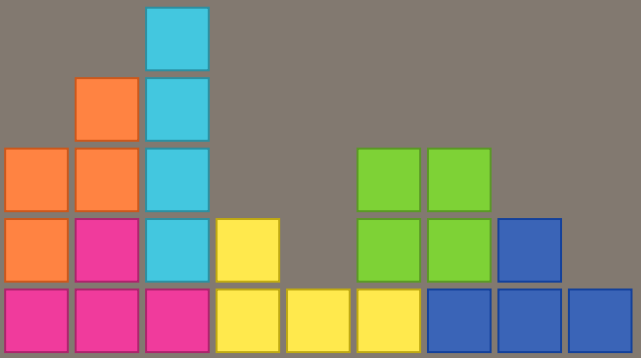
Big code cleanup

- This work is a big code cleanup
- Gets rid of a lot of global variables



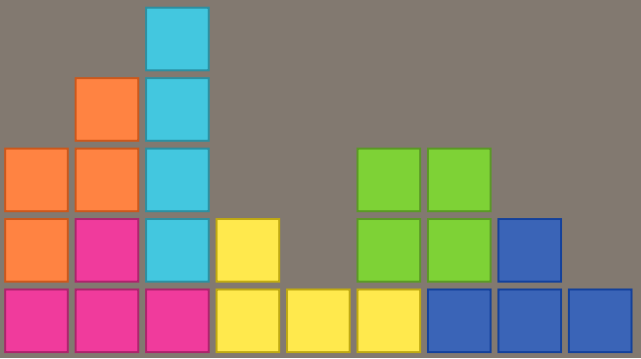
3

How do we prevent issues in future?



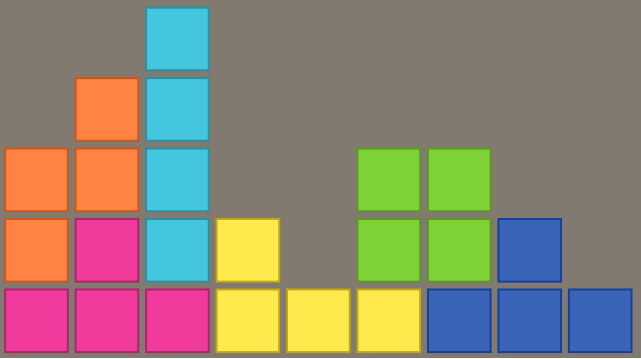
Improved cmdline parser

- New cmdline parser has a sanity checker!
- Walks over all short and long options looking for duplicates.



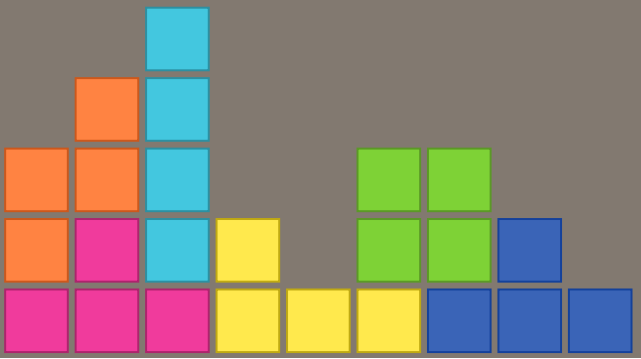
Improved cmdline parser

```
$ net help
cmdline_sanity_checker: Duplicate option --long|-l detected!
```



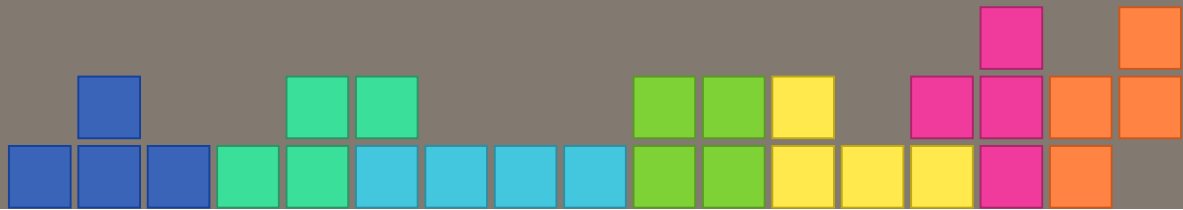
Unit tests

- The new commond cmdline parser has unit tests
- Santiy check is run in unit tests



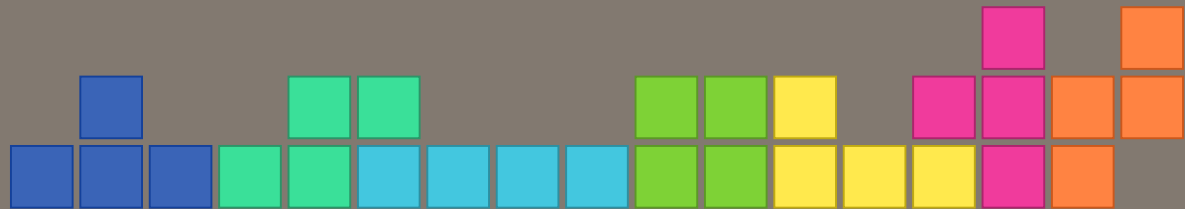
4

What can still be improved?



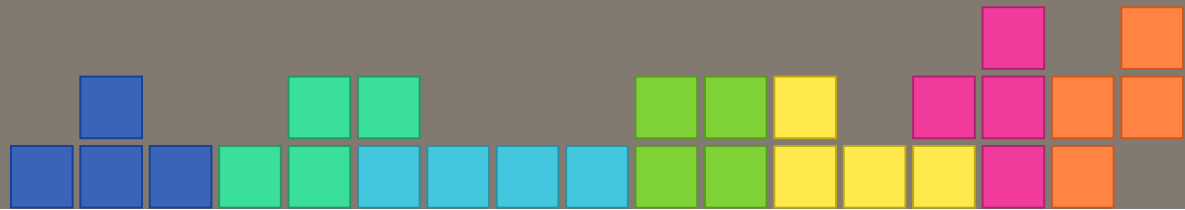
Add tests to execute each binary

```
./bin/tool --help
```



Compare with manpage

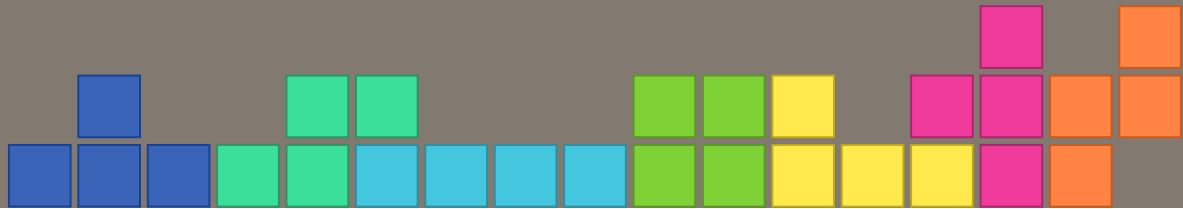
- Compare `--help` output with manpages



Cross tool consistency

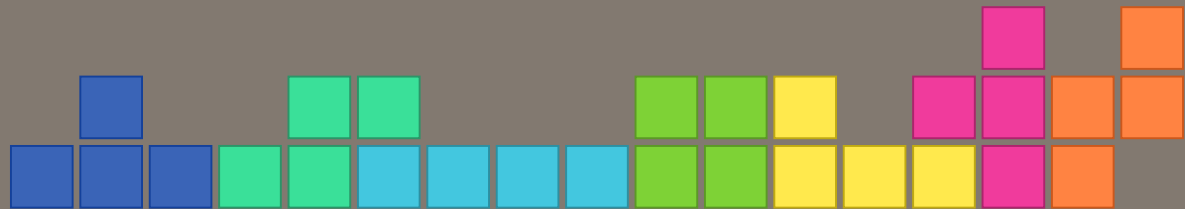
- Make sure certain options behave the same and are documented consisently.

```
-v|--verbose
-q|--quiet
```



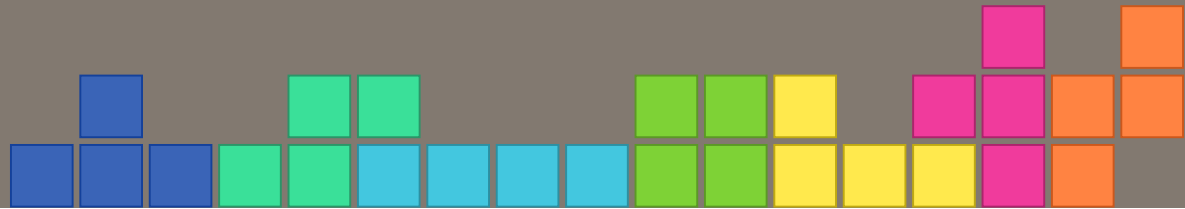
Example for `--verbose`

```
-v
    2 × -v, --verbose     Be verbose
    1 × -v, --verbose     Print more details of checking
    1 × -v, --verbose     Print all DN pairs that have been compared
    1 × -v, --verbose     Show default options too
```



Example for `--quiet`

```
-q
    2 × -q, --quiet        Be quiet
    1 × -q, --quiet        Do not print anything but relay on just exit co
    1 × -q, --quiet        don't print details of checking
```



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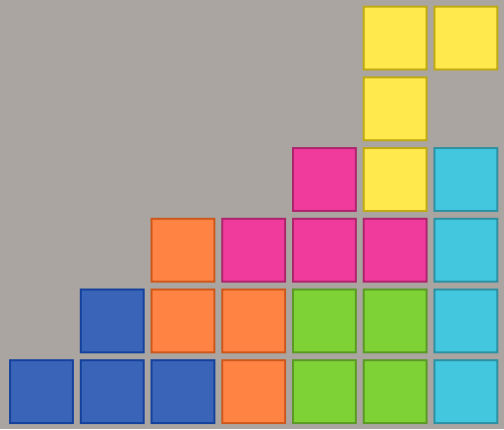
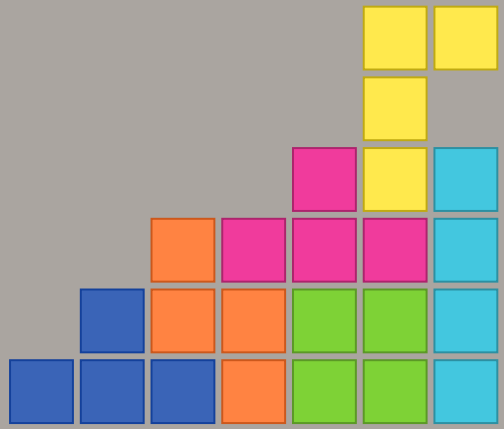
Has the documentation been updated?

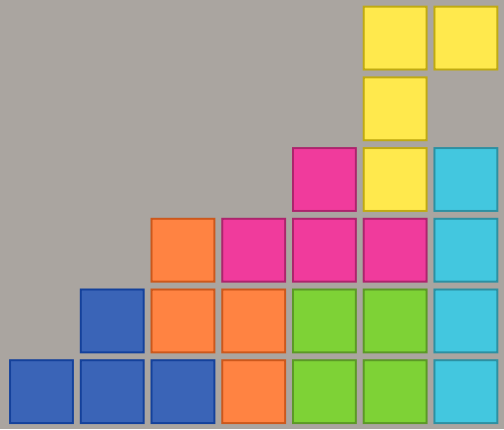


Yes, it has!

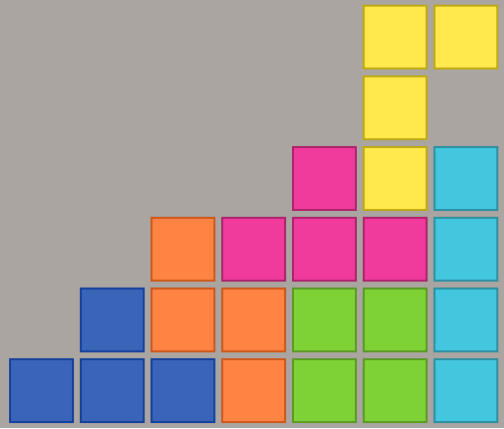


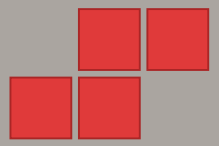
Doc update

- All existing manpages have been updated for the common commandline parser options!

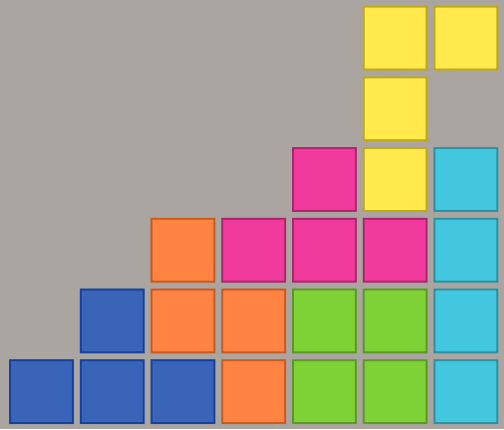


Will we get shell-completion one day?

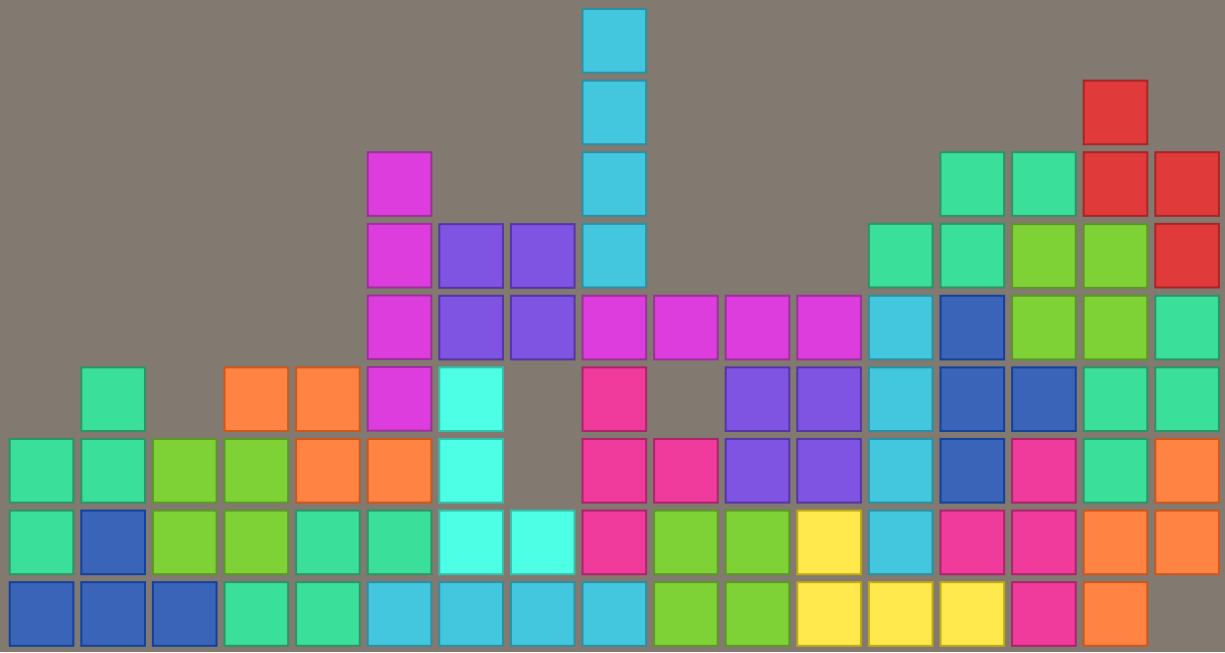


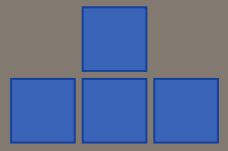


Maybe!



GAME OVER





Questions?

Twitter: @cryptomilk

Blog: blog.cryptomilk.org