Cisco configuration files with Perl and Template Toolkit

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Corporate environment

- Blue shirts, ties … and spreadsheets
- Manual typing => tedious and error prone

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Input data

	A	B	C	D	E	F	G	H	I	J
								Rack 6		
	Vlan number	Vlan name	Name of device	Category of device	Current Switch	CurrentPort switch	New Switch	New port	Duplex	Speed
	NA	Trunk	BG-NC2-SW1 Fa2/0/6	Network	mp-swi02	22	mp-swi2-1	1/0/1	full	100
	NA	Trunk	BG-NC2-SW1 Fa2/0/5	Network	mp-swi02	23	mp-swi2-1	1/0/2	full	100
	NA	Trunk	BG-NC2-SW1 Fa2/0/4	Network	mp-swi02	24	mp-swi2-1	1/0/3	full	100
	4	RAS_main	MP-RAS1 Fa3/0	Network	mp-swi02	16	mp-swi2-1	1/0/4	full	100
	10	Backend_main	MP-ACS1	Network	mp-swi04	8	mp-swi2-1	1/0/5	full	100
	130	PIX-FO	MP-PIX2 Eth2	Network	mp-swi04	23	mp-swi2-1	1/0/6	full	100
	8	ITS_main	MP-PIX2 Eth3	Network	mp-swi04	4	mp-swi2-1	1/0/7	full	100
	Trun	Trunk (4,201,202,203)	MP-PIX2 Eth4	Network	mp-swi04	6	mp-swi2-1	1/0/8	full	100
	7	PTC_main	MP-PIX2 Eth5	Network	mp-swi04	14	mp-swi2-1	1/0/9	full	100
	6	WWW_main	MP-PIX2 Eth6	Network	mp-swi04	12	mp-swi2-1	1/0/10	full	100
	5	FTP_main	MP-PIX2 Eth7	Network	mp-swi04	9	mp-swi2-1	1/0/11	full	100
	101	APPLI_MAIN	MP-CSS2 eth2	Network	mp-swi06	4	mp-swi2-1	1/0/12	Full-duplex	100Mb/s
	102	APPLI_TAS	MP-CSS2 eth4	Network	mp-swi06	7	mp-swi2-1	1/0/13	Full-duplex	100Mb/s
	103	APPLI_DEVELOP	MP-CSS2 eth6	Network	mp-swi06	10	mp-swi2-1	1/0/14	Full-duplex	100Mb/s
	6	WWW	MP-CSS4 Eth6	network	mp-swi04	10	mp-swi2-1	1/0/15	full	100
	260	HP2cust	BGMINDGW1 Fa0/1	Network	mp-swi02	7	mp-swi2-1	1/0/24	full	100
	NA	Trunk	BG-NC2-SW1 Fa2/0/4	Network	mp-swi02	24	mp-swi2-1	1/0/3	full	100
	4	RAS_main	MP-RAS1 Fa3/0	Network	mp-swi02	16	mp-swi2-1	1/0/4	full	100
	10	Backend_main	To be used for intervention	on site	mp-swi08	18	mp-swi2-1	1/0/43	full	100
	10	Backend_main	To be used for intervention	on site	mp-swi08	19	mp-swi2-1	1/0/44	full	100
	204	Internet	MP-PIX2 Eth0	Network	mp-swi04	2	mp-swi2-1	1/0/45	full	100

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The procedure

- Prepare templates
- Read spreadsheet and build internal representation
- Generate configurations
- Copy files from TFTP to running-config

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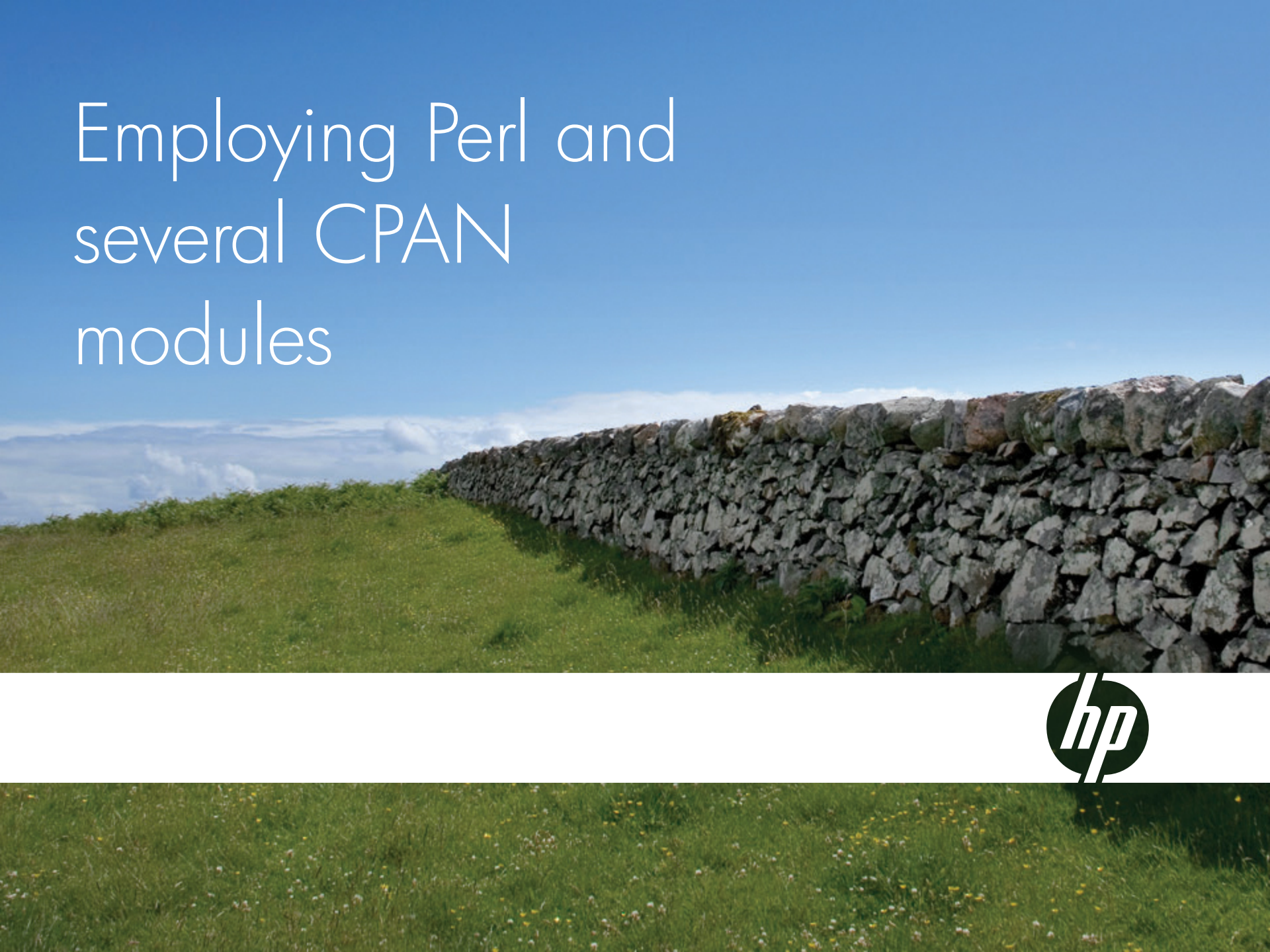
Employing Perl and several CPAN modules



Spreadsheet::ParseExcel

- supported formats: Excel95, 97, 2000
- easy and convenient reading

```
use Spreadsheet::ParseExcel;

my $excel = Spreadsheet::ParseExcel::Workbook->Parse($file);

# read single sheet
my $sheetPorts = $excel->Worksheet("Mach_Main_R5");

[...]
# getting data
my %port;

$port{duplex} = $sheetPorts->{Cells}[$row][8]{Val};
$port{description} = $sheetPorts->{Cells}[$row][2]{Val};
```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Internal representation

```
{
  'speed' => 100,
  'name' => '4/0/6',
  'description' => 'VLAPCT1',
  'vlan' => 90,
  'duplex' => 'full'
},
{
  'speed' => 100,
  'name' => '4/0/7',
  'description' => 'VLAPCT2',
  'vlan' => 90,
  'duplex' => 'full'
},
{
  'speed' => 'auto',
  'name' => '4/0/8',
  'description' => 'SERVLA2 ilo',
  'vlan' => 10,
  'duplex' => 'auto'
},
```

- array of hash references
- interface information
  - name
  - speed
  - duplex
  - vlan
  - …
- other information

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Template Toolkit

- fast and flexible template system
- very good documentation
- specific syntax [% ... %]

```
use Template;

my $vars = {
ports => \@Ports,
};

my $tplfile = "config.tpl";
my $template = Template->new();

$template->process($tplfile, $vars)
        || die "Template process failed: ",
                $template->error(), "\n";
```


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Template file

- config.tpl:

```
[%- FOREACH port IN ports -%]
!
interface GigabitEthernet[% port.name %]
 description - [% port.description %]
 switchport access vlan [% port.vlan %]
 switchport mode access
 speed [% port.speed %]
 duplex [% port.duplex %]
 spanning-tree portfast
end
[% END %]
```


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Summary

- Excellent modules available on CPAN :-)

```
interface GigabitEthernet4/0/6
 description - VLAPCT1
 switchport access vlan 90
 switchport mode access
 speed 100
 duplex full
 spanning-tree portfast
end
!
interface GigabitEthernet4/0/7
 description - VLAPCT2
 switchport access vlan 90
 switchport mode access
 speed 100
 duplex full
 spanning-tree portfast
end
```


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Other modules

- Net::Patricia - Patricia Trie perl module for fast IP address lookups
- Regexp::Common - Provide commonly requested regular expressions

```
use Net::Patricia;

my $pt = new Net::Patricia;

$pt->add_string('127.0.0.0/8', \$user_data);
$pt->match_string('127.0.0.1');


use Regexp::Common qw /net/;

$logrec->{Destination} =~ m/^$RE{net}{IPv4}$/
$logrec->{mac} =~ m/^$RE{net}{MAC}$/
```


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