Excel/CSV変換ツールのおかげで show ip routeのコピペ地獄から解放された話

2018年1月26日
JANOG41 Meeting

富士通株式会社
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自己紹介

@kooshin（コーシン）

- **仕事** ネットワークの運用
- **趣味** 面白ネタの実装
- **発表**
  - **2016/4/15 -JANOG 37.5 Interim Meeting**
    痒いところに手が届くネットワークリソースの視覚
  - **2017/1/19 - JANOG39**
    『紙の手順書』でルータ設定を半自動化してみた
    with 二次元バーコードリーダ
  - **2017/9/1 - JANOG BoF & LT Night #2**
    pingアスキーアート

kooshin
@kooshin

pingすると「にゃーん」を返すサービス。
シスコルータから「ping ping.kooshin.net repeat 1400」でOK

```
Router#ping ping.kooshin.net repeat 1400
Type escape sequence to abort.
Sending 1400, 100-byte ICMP Echos to 160.16.77.72, timeout is 2 seconds:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!UU!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!UU!!!!!!!
!!UU!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!UUU!!!!!!!
!!UU!!!UUUUUUUU!!!!!!!!!U!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!UU!!!!!!!
!!UU!!!UUUUUUUU!!!!!!U!UUUU!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!UUU!!!!!!!
!UU!!!!!!!!!!!!!!!!UU!!UUU!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!UU!!!!!!!!
!UU!!!!!!!!!!!!!!!!UUU!!UUUUU!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!UUU!!!!!!!!
!UU!!!!!!!!!!!!!!!!!UUUUUUUUUU!!!UUUUUUUUUUUUUUUUU!!!!!!UU!UU!!!!!!!
!UU!!!!!!!!!!!!!!!!!UUUUUUU!!!!UU!!UUUUUUUUUUUUUUUU!!!!!UUUUUUU!!!!!!!
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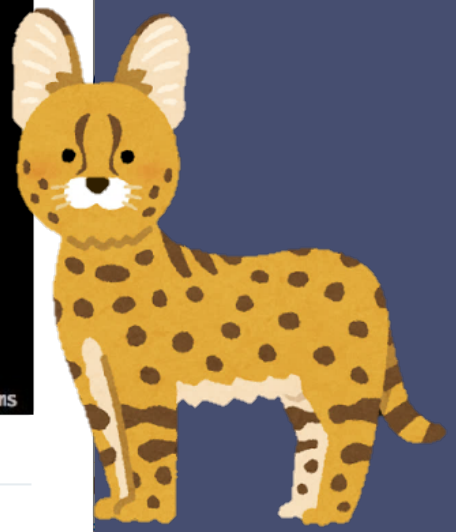
!UUU!!!!!!!!!!!!!!!!!!UU!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!UUU!!!!!UUUUU!!!
!!!!!!!!!!!!!!!!!!!!!!U!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!UUU!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 81 percent (1138/1400), round-trip min/avg/max = 1/4/17 ms
```

12:30 - 2017年8月25日

1,362件のリツイート 1,134件のいいね

2 1,362 1,134



https://twitter.com/kooshin/status/900923276049891328

皆様、ぜひ試してください

```
# ping pong.kooshin.net repeat 1400
```

ITmedia NEWS
pingを打つと「にゃーん」を返すサービス、ネットワークエンジニアが開発
IPv4と IPv6 の両方に対応。
http://www.itmedia.co.jp/news/articles/1709/07/news106.html

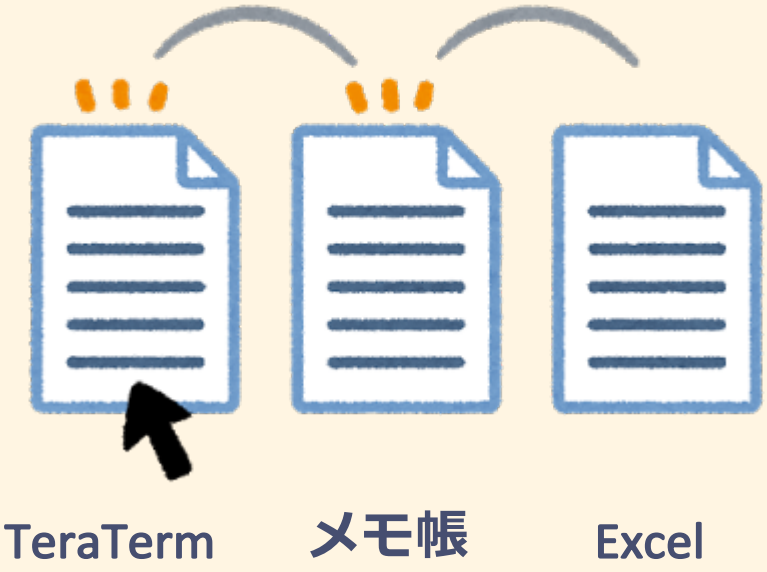
ネットワークエンジニアの皆さん

簡単なことから
コードを書いて
楽をしましょう

コピペに疲れてませんか？

- show ip routeを
  Excelに張り付けて
  報告しないといけない
- CLIの実行結果を
  TeraTermから
  メモ帳にコピペして
  Excelにコピペ

＿人人人人人＿
＞　ツライ　＜
￣Y^Y^Y^Y￣



Python + TextFSM + NTC-Templates

- **Python**
  プログラミング言語。記述が簡潔で覚えやすい
- **TextFSM**
  ネットワーク機器のコマンド実行結果を
  解析するPythonライブラリ
  https://github.com/google/textfsm
- **NTC-Templates**
  TextFSM用のテンプレート集
  Arista/Brocade/Cisco/Juniperなどに対応
  https://github.com/networktocode/ntc-templates

NTC-TemplatesはOSSで公開

- Cisco IOSは39種類のコマンドテンプレート
- cisco_ios_show_inventory.template

```
Value NAME (.*)
Value DESCR (.*)
Value PID (([¥S+]+|.*))
Value VID (.*)
Value SN ([¥w+¥d+]+)

Start
  ^NAME:¥s+"${NAME}",¥s+DESCR:¥s+"${DESCR}"
  ^PID:¥s+${PID}.*,.*VID:¥s+${VID},.*SN:¥s+${SN} -> Record
  ^PID:¥s+,.*VID:¥s+${VID},.*SN: -> Record
  ^PID:¥s+${PID}.*,.*VID:¥s+${VID},.*SN: -> Record
  ^PID:¥s+,.*VID:¥s+${VID},.*SN:¥s+${SN} -> Record
  ^PID:¥s+${PID}.*,.*VID:¥s+${VID}.*
  ^PID:¥s+,.*VID:¥s+${VID}.*
  ^.*SN:¥s+${SN} -> Record
  ^.*SN: -> Record
```

変数のパターン定義

ルールとアクションの定義

show ip routeを Excel/CSVに変換

変換ツール

show ip routeの結果をExcel/CSVに変換

show_ip_route.txt - TeraPad

```
csr1000v-1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

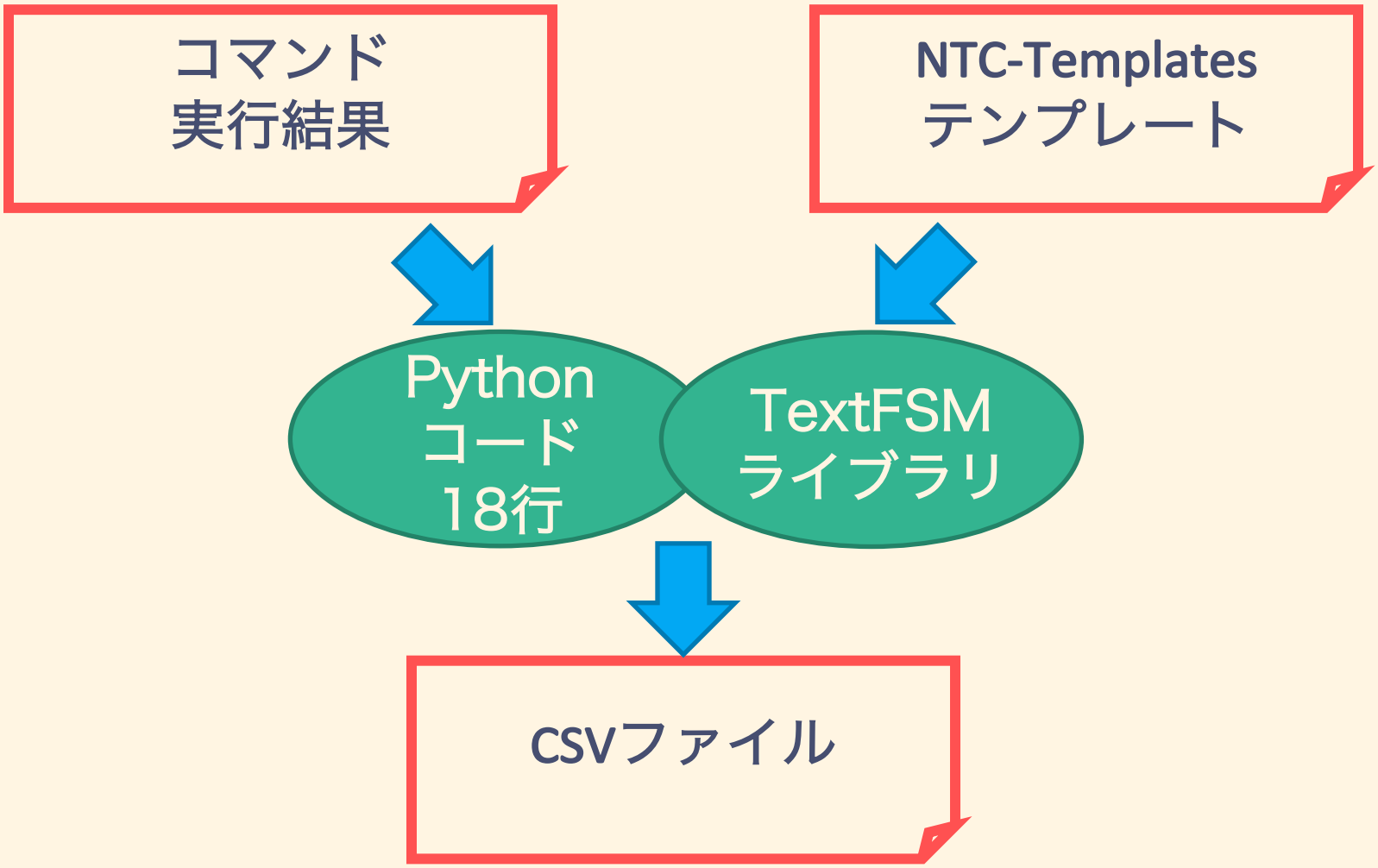
Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 12 subnets, 2 masks
O        10.0.0.4/30 [110/2] via 10.0.0.34, 5d13h, GigabitEthernet3
O        10.0.0.8/30 [110/3] via 10.0.0.34, 5d13h, GigabitEthernet3
O        10.0.0.12/30 [110/2] via 10.0.0.34, 1w0d, GigabitEthernet3
O        10.0.0.16/30 [110/3] via 10.0.0.34, 5d13h, GigabitEthernet3
O        10.0.0.20/30 [110/43] via 10.0.0.34, 5d13h, GigabitEthernet3
O        10.0.0.24/30 [110/4] via 10.0.0.42, 1w0d, GigabitEthernet2
                      [110/4] via 10.0.0.34, 1w0d, GigabitEthernet3
O        10.0.0.28/30 [110/3] via 10.0.0.42, 1w0d, GigabitEthernet2
                      [110/3] via 10.0.0.34, 1w0d, GigabitEthernet3
C        10.0.0.32/30 is directly connected, GigabitEthernet3
L        10.0.0.33/32 is directly connected, GigabitEthernet3
O        10.0.0.36/30 [110/2] via 10.0.0.42, 1w0d, GigabitEthernet2
C        10.0.0.40/30 is directly connected, GigabitEthernet2
L        10.0.0.41/32 is directly connected, GigabitEthernet2
      192.168.0.0/32 is subnetted, 8 subnets
O        192.168.0.1 [110/4] via 10.0.0.34, 5d13h, GigabitEthernet3
O        192.168.0.2 [110/2] via 10.0.0.34, 1w0d, GigabitEthernet3
O        192.168.0.3 [110/3] via 10.0.0.34, 5d13h, GigabitEthernet3
O        192.168.0.4 [110/5] via 10.0.0.42, 1w0d, GigabitEthernet2
                     [110/5] via 10.0.0.34, 1w0d, GigabitEthernet3
O        192.168.0.5 [110/4] via 10.0.0.42, 1w0d, GigabitEthernet2
                     [110/4] via 10.0.0.34, 1w0d, GigabitEthernet3
O        192.168.0.6 [110/3] via 10.0.0.42, 1w0d, GigabitEthernet2
                     [110/3] via 10.0.0.34, 1w0d, GigabitEthernet3
C        192.168.0.7 is directly connected, Loopback0
O        192.168.0.8 [110/2] via 10.0.0.42, 1w0d, GigabitEthernet2
csr1000v-1#
[EOF]
```

show_ip_route.csv - Excel

	A	B	C	D	E	F	G	H	I
1	PROT	TYPE	NETWORK	MASK	DISTANCE	METRIC	NEXTHOP_IP	NEXTHOP_IF	UPTIME
2	O		10.0.0.4	30	110	2	10.0.0.34	GigabitEthernet3	5d13h
3	O		10.0.0.8	30	110	3	10.0.0.34	GigabitEthernet3	5d13h
4	O		10.0.0.12	30	110	2	10.0.0.34	GigabitEthernet3	1w0d
5	O		10.0.0.16	30	110	3	10.0.0.34	GigabitEthernet3	5d13h
6	O		10.0.0.20	30	110	43	10.0.0.34	GigabitEthernet3	5d13h
7	O		10.0.0.24	30	110	4	10.0.0.42	GigabitEthernet2	1w0d
8	O		10.0.0.24	30	110	4	10.0.0.34	GigabitEthernet3	1w0d
9	O		10.0.0.28	30	110	3	10.0.0.42	GigabitEthernet2	1w0d
10	O		10.0.0.28	30	110	3	10.0.0.34	GigabitEthernet3	1w0d
11	C		10.0.0.32	30				GigabitEthernet3	
12	L		10.0.0.33	32				GigabitEthernet3	
13	O		10.0.0.36	30	110	2	10.0.0.42	GigabitEthernet2	1w0d
14	C		10.0.0.40	30				GigabitEthernet2	
15	L		10.0.0.41	32				GigabitEthernet2	
16	O		192.168.0.1	32	110	4	10.0.0.34	GigabitEthernet3	5d13h
17	O		192.168.0.2	32	110	2	10.0.0.34	GigabitEthernet3	1w0d
18	O		192.168.0.3	32	110	3	10.0.0.34	GigabitEthernet3	5d13h
19	O		192.168.0.4	32	110	5	10.0.0.42	GigabitEthernet2	1w0d
20	O		192.168.0.4	32	110	5	10.0.0.34	GigabitEthernet3	1w0d
21	O		192.168.0.5	32	110	4	10.0.0.42	GigabitEthernet2	1w0d
22	O		192.168.0.5	32	110	4	10.0.0.34	GigabitEthernet3	1w0d
23	O		192.168.0.6	32	110	3	10.0.0.42	GigabitEthernet2	1w0d
24	O		192.168.0.6	32	110	3	10.0.0.34	GigabitEthernet3	1w0d
25	C		192.168.0.7	32				Loopback0	
26	O		192.168.0.8	32	110	2	10.0.0.42	GigabitEthernet2	1w0d
27									

仕組み


コマンド
実行結果
NTC-Templates
テンプレート
Python
コード
18行
TextFSM
ライブラリ
CSVファイル

簡単なスクリプト

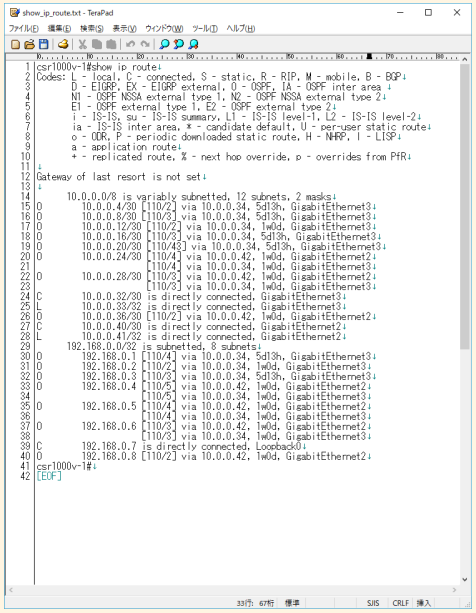
Pythonコード　18行　showiproute2csv.py

```
 1 #!/usr/bin/env python
 2 import sys
 3 import textfsm
 4 import csv
 5 import ipaddress
 6
 7 # TextFSMで標準入力を解析
 8 with open('cisco_ios_show_ip_route.template') as ftemplate:
 9     fsm = textfsm.TextFSM(ftemplate)
10     routes = fsm.ParseText(sys.stdin.read())
11
12 # IPアドレス順、マスク順でソート
13 routes.sort(key=lambda r: (ipaddress.ip_address(r[2]), r[3]))
14
15 # 標準出力にCSV形式で出力
16 w = csv.writer(sys.stdout)
17 w.writerow(fsm.header)
18 w.writerows(routes)
```

実行


```
$ python showiproute2csv.py ¥
  < show_ip_route.txt ¥
  > show_ip_route.csv
```

show_ip_route.txt



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O        10.0.0.12/30 [110/2] via 10.0.0.34, 1w0d, GigabitEthernet3
O        10.0.0.16/30 [110/3] via 10.0.0.34, 5d13h, GigabitEthernet3
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O        10.0.0.28/30 [110/3] via 10.0.0.42, 1w0d, GigabitEthernet2
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O        192.168.0.2 [110/2] via 10.0.0.34, 1w0d, GigabitEthernet3
O        192.168.0.3 [110/3] via 10.0.0.34, 5d13h, GigabitEthernet3
O        192.168.0.4 [110/5] via 10.0.0.42, 1w0d, GigabitEthernet2
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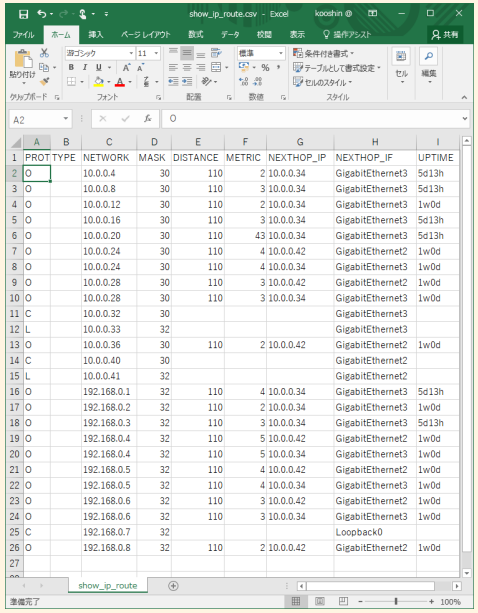
                     [110/4] via 10.0.0.34, 1w0d, GigabitEthernet3
O        192.168.0.6 [110/3] via 10.0.0.42, 1w0d, GigabitEthernet2
                     [110/3] via 10.0.0.34, 1w0d, GigabitEthernet3
C        192.168.0.7 is directly connected, Loopback0
O        192.168.0.8 [110/2] via 10.0.0.42, 1w0d, GigabitEthernet2
csr1000v-1#
[EOF]
```

show_ip_route.csv



PROT	TYPE	NETWORK	MASK	DISTANCE	METRIC	NEXTHOP_IP	NEXTHOP_IF	UPTIME
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O		10.0.0.8	30	110	3	10.0.0.34	GigabitEthernet3	5d13h
O		10.0.0.12	30	110	2	10.0.0.34	GigabitEthernet3	1w0d
O		10.0.0.16	30	110	3	10.0.0.34	GigabitEthernet3	5d13h
O		10.0.0.20	30	110	43	10.0.0.34	GigabitEthernet3	5d13h
O		10.0.0.24	30	110	4	10.0.0.42	GigabitEthernet2	1w0d
O		10.0.0.24	30	110	4	10.0.0.34	GigabitEthernet3	1w0d
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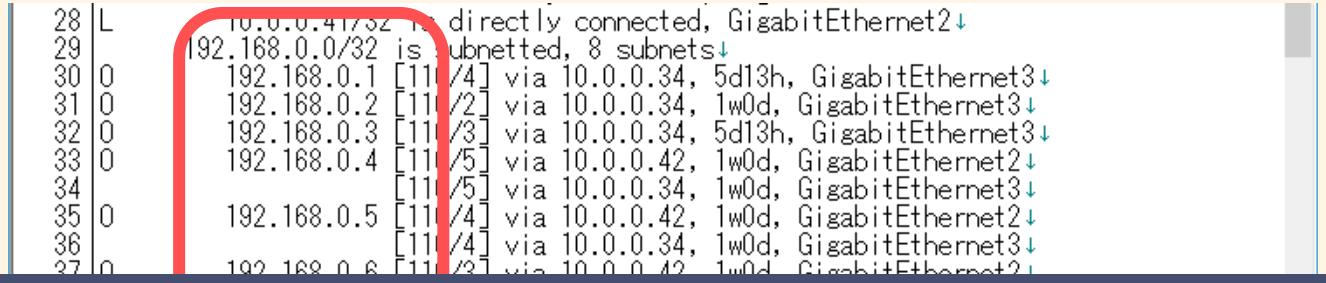
O		10.0.0.36	30	110	2	10.0.0.42	GigabitEthernet2	1w0d
C		10.0.0.40	30				GigabitEthernet2	
L		10.0.0.41	32				GigabitEthernet2	
O		192.168.0.1	32	110	4	10.0.0.34	GigabitEthernet3	5d13h
O		192.168.0.2	32	110	2	10.0.0.34	GigabitEthernet3	1w0d
O		192.168.0.3	32	110	3	10.0.0.34	GigabitEthernet3	5d13h
O		192.168.0.4	32	110	5	10.0.0.42	GigabitEthernet2	1w0d
O		192.168.0.4	32	110	5	10.0.0.34	GigabitEthernet3	1w0d
O		192.168.0.5	32	110	4	10.0.0.42	GigabitEthernet2	1w0d
O		192.168.0.5	32	110	4	10.0.0.34	GigabitEthernet3	1w0d
O		192.168.0.6	32	110	3	10.0.0.42	GigabitEthernet2	1w0d
O		192.168.0.6	32	110	3	10.0.0.34	GigabitEthernet3	1w0d
C		192.168.0.7	32				Loopback0	
O		192.168.0.8	32	110	2	10.0.0.42	GigabitEthernet2	1w0d

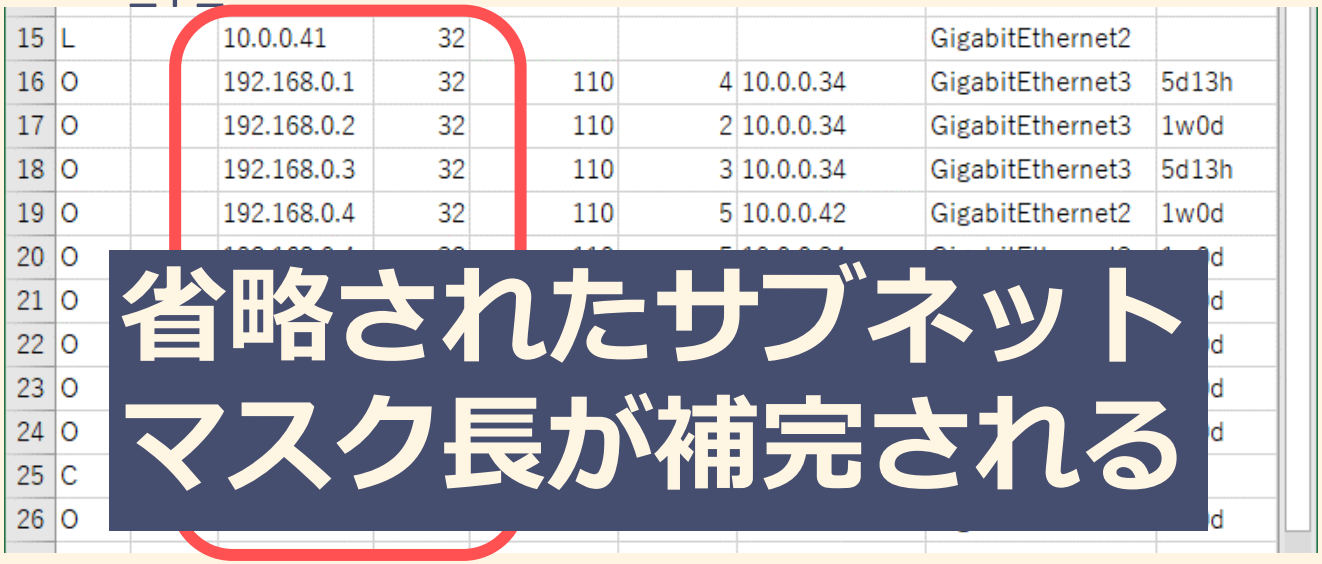
感動したポイント

show_ip_route.txt



おわかりいただけただろうか？

show_ip_route.csv



省略されたサブネット
マスク長が補完される

先人に感謝


```
Value Filldown PROTOCOL (\w)
Value Filldown TYPE (\w{0,2})
Value Required,Filldown NETWORK (\d{1,3}.\d{1,3}.\d{1,3}.\d{1,3})
Value Filldown MASK (\d{1,2})
Value DISTANCE (\d+)
Value METRIC (\d+)
Value NEXTHOP_IP (\d{1,3}.\d{1,3}.\d{1,3}.\d{1,3})
Value NEXTHOP_IF ([A-Z][\w\-\.:/]+)
Value UPTIME (\d[\w:\.]+)

Start
  ^Gateway.* -> Routes

Routes
  # For "is
  ^\s+\d{1,
  #
  # Match d
  ^${PROTOC
  #
  # Match d
  ^${PROTOC
  #
  # Match r
  ^${PROTOC                                                                    -> Record
  #
  # Match r
  ^${PROTOC                                                                    rd
  #
  # Match r
  ^${PROTOCOL}(\s|\*)${TYPE}\s+${NETWORK}\/${MASK}\s\[${DISTANCE}/${METRIC}\],\s${UPTIME},\s${NEXTHOP_IF} -> Record
  #
  # Match "is a summary" routes (often Null0)
  ^${PROTOCOL}(\s|\*)${TYPE}\s+${NETWORK}\/${MASK}\sis\sa\ssummary,\s${UPTIME},\s${NEXTHOP_IF} -> Record
  #
  # Match regular routes where the network/mask is on the line above the rest of the route
  ^${PROTOCOL}(\s|\*)${TYPE}\s+${NETWORK}\/${MASK} -> Next
  #
  # Match regular routes where the network only (mask from subnetted line) is on the line above the rest of the route
  ^${PROTOCOL}(\s|\*)${TYPE}\s+${NETWORK} -> Next
  #
  # Match the rest of the route information on line below network (and possibly mask)
  ^\s+\[${DISTANCE}\/${METRIC}\]\svia\s${NEXTHOP_IP}(,\s${UPTIME})?(,\s${NEXTHOP_IF})? -> Record
  #
  # Match load-balanced routes
  ^\s+\[${DISTANCE}\/${METRIC}\]\svia\s${NEXTHOP_IP} -> Record
  #
  # Clear all variables on empty lines
  ^\s* -> Clearall
```

show ip routeの解析のため
先人の苦労と知恵が
詰まったテンプレート

ネットワークエンジニアの皆さん

簡単なことから
コードを書いて
楽をしましょう