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DESEMPENHO E DIMENSIONAMENTO DE REDES

NETWORK TRAFFIC ENGINEERING

8240 - MESTRADO INTEGRADO EM ENGENHARIA DE
COMPUTADORES E TELEMÁTICA

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1 Introdução

Este relatório vem explicar os exercícios referentes ao guião de engenharia de tráfego. Com este guião pretende-se adquirir conhecimento na área do encaminhamento de tráfego quando diferentes caminhos estão disponíveis e como balancear diferentes fluxos entre eles de forma a conseguir a melhor qualidade de serviço para os clientes e utilizadores da rede. Nos diferentes exercícios deste guião são apresentadas várias maneiras de tomar essas decisões e vamos concluir sobre esses algoritmos e quais os melhores e o porque.

Este relatório vai ser estruturado da mesma forma que o guião, seguindo a mesma numeração dos exercícios. Durante este relatório são referidos dados que se encontram em anexo no final deste, ainda assim poderão ser referidos outros dados e retiradas conclusões baseadas em dados que não se encontram neste relatório por motivos de falta de maneiras de representação dos dados. Ainda assim dentro da pasta code fornecida em conjunto com este relatório encontram-se ficheiros .txt que representam todo o output que o programa gera e todos os dados por onde é possível retirar todas as conclusões aqui referidas.

2 Exercício 1

No primeiro exercício era pedido para realizar a criação de duas redes diferentes, uma com 4 cidades portuguesas, mais pequena usada para testar os algoritmos em escala mais reduzida, e outra rede com 18 cidades ibéricas, onde já vão ser obtidos resultados mais realistas no sentido da aplicação dos diferentes algoritmos.

Em baixo estão demonstradas as duas diferentes redes usadas neste guião e descritas no paragrafo anterior.

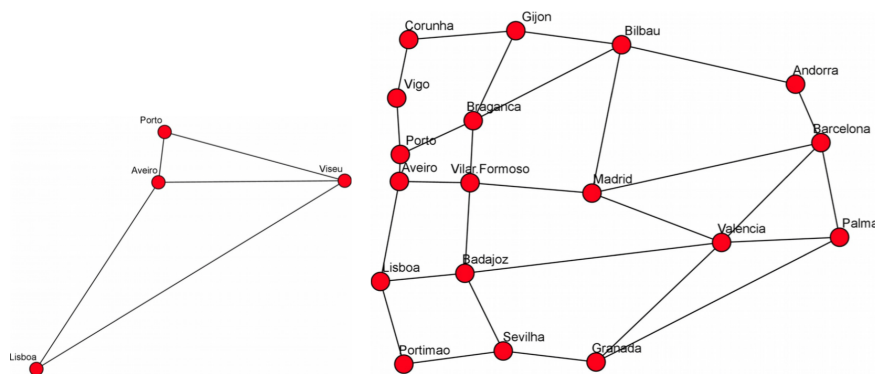


Figura 1: Redes usadas ao longo dos exercícios

3 Exercício 2,3 e 4

No exercício 2 era pedido para, assumindo que o encaminhamento era feito pelo caminho com a menor distancia física, determinar uma solução de encaminhamento do tráfego para ambas as redes usando um algoritmo ganancioso.

Podemos ver no final deste relatório o anexo 9.1 que contém todo o output gerado sobre o atraso entre cada nó da rede maior, e o anexo 9.2 que contém alguns valores estatísticos para todos os links existentes na rede maior.

Contudo para melhor explicar o que está a acontecer na escolha de caminhos vamos usar a rede pequena como exemplo e para isso temos os valores mostrados em baixo como sumário do que está a acontecer na rede.

Average link load of: 35.02%
Worst link load on link ('Aveiro', 'Porto') with load of: 50.11%
Average one way time delay of: 12.80 micro sec
Worst one way time on link ('Aveiro', 'Porto') with delay of: 16.04 micro sec

```
Worst QoS on flow ('Lisboa', 'Porto') with delay of: 32.05 micro
sec
```

Como podemos ver e como era esperado a pior carga do link é em Aveiro-Porto e a carga do link Aveiro-Lisboa teria um valor semelhante, 15% acima da média, isto porque como o algoritmo apenas considera a distancia física o caminho pelo litoral é preferível e não a rota por Viseu. Assim sendo temos que este link fica mais saturado e aumenta o tempo de atraso dos pacotes nesse link. Isto verifica-se quando se vê que o link com pior QoS é o do Lisboa-Porto com 32.05 micro segundos. Isto confirma o que acabamos de concluir e quando olhamos para a rede maior vemos que o mesmo acontece e podemos observar os links e fluxos com piores QoS em baixo.

```
Average link load of: 18.22%
Worst link load on link ('Porto', 'Aveiro') with load of: 51.11%
Average one way time delay of: 9.99 micro sec
Worst one way time on link ('Porto', 'Aveiro') with delay of:
16.36 micro sec
Worst QoS on flow ('Corunha', 'Granada') with delay of: 83.78
micro sec
```

4 Exercício 5, 6 e 7

No exercício 5 era pedido para, assumindo que o encaminhamento era feito pelo link com a menor carga, determinar uma solução de encaminhamento do tráfego para ambas as redes usando um algoritmo ganancioso.

Podemos ver no final deste relatório o anexo 9.3 que contém todo o output gerado sobre o atraso entre cada nó da rede maior, e o anexo 9.4 que contém alguns valores estatísticos para todos os links existentes na rede maior.

Contudo para melhor explicar o que está a acontecer na escolha de caminhos vamos usar a rede pequena como exemplo e para isso temos os valores mostrados em baixo como sumário do que está a acontecer na rede.

```
Average link load of: 37.52%
Worst link load on link ('Aveiro', 'Porto') with load of: 50.11%
Average one way time delay of: 13.33 micro sec
Worst one way time on link ('Aveiro', 'Porto') with delay of:
16.04 micro sec
Worst QoS on flow ('Lisboa', 'Porto') with delay of: 32.05 micro
sec
```

No exemplo da rede pequena a melhoria não é visível com as estatísticas mostradas a cima, mas analisando a solução que foi encontrada é possível ver que o caminho Porto-Lisboa e o inverso foi escolhido uma vez pelo litoral e outra por Viseu de forma a equilibrar a carga pelos diferentes links. Quando olhamos para a rede maior e as estatísticas presentes para esta em baixo e comparando com o algoritmo do exercício anterior vimos que obtivemos uma melhoria de mais de 20% na carga máxima dos links.

```
Average link load of: 18.55%
Worst link load on link ('Vilar.Formoso', 'Braganca') with load
of: 28.27%

Average one way time delay of: 9.85 micro sec
Worst one way time on link ('Vilar.Formoso', 'Braganca') with
delay of: 11.15 micro sec

Worst QoS on flow ('Valencia', 'Badajoz') with delay of: 98.94
micro sec
```

Esta melhoria na carga dos links era o esperado do algoritmo, quanto a este ser melhor do que o primeiro depende da aplicação pratica e do que é necessário melhorar na rede à qual for aplicado. Este algoritmo embora tenha melhorado a carga do link mais saturado em 20% aumentou o atraso máximo em aproximadamente 15 micro segundos isto representa um aumento de 18%, logo se é melhor ou não depende inteiramente da rede e do que se está a tentar otimizar.

5 Exercício 8, 9 e 10

No exercício 8 era pedido para, assumindo que o encaminhamento era feito pelo link com menor atraso, determinar uma solução de encaminhamento do tráfego para ambas as redes usando um algoritmo ganancioso.

Podemos ver no final deste relatório o anexo 9.5 que contém todo o output gerado sobre o atraso entre cada nó da rede maior, e o anexo 9.6 que contém alguns valores estatísticos para todos os links existentes na rede maior.

Contudo para melhor explicar o que está a acontecer na escolha de caminhos vamos usar a rede pequena como exemplo e para isso temos os valores mostrados em baixo como sumário do que está a acontecer na rede.

```
Average link load of: 37.52%
Worst link load on link ('Aveiro', 'Porto') with load of: 50.11%

Average one way time delay of: 13.33 micro sec
Worst one way time on link ('Aveiro', 'Porto') with delay of:
16.04 micro sec
```

Worst QoS on flow ('Lisboa', 'Porto') with delay of: 32.05 micro sec
--

No exemplo da rede pequena a melhoria não é visível com as estatísticas mostradas a cima, mas analisando a solução que foi encontrada é possível ver que o caminho Porto-Lisboa e o inverso foi escolhido uma vez pelo litoral e outra por Viseu isto foi devido ao fato de o atraso ser superior para a ligação Porto-Lisboa caso esta fosse realizada pelo litoral nos dois sentidos. Quando olhamos para a rede maior e as estatísticas presentes em baixo e comparando com os algoritmos dos exercícios anteriores vimos que obtivemos os mesmos resultados para o caso do algoritmo do exercício 5 e, com o algoritmo do exercício 2, obtivemos uma melhoria semelhante à que foi conseguida com o algoritmo do exercício 5, ou seja de 20%.

Average link load of: 18.55%
Worst link load on link ('Vilar.Formoso', 'Braganca') with load of: 28.27%
—
Average one way time delay of: 9.85 micro sec
Worst one way time on link ('Vilar.Formoso', 'Braganca') with delay of: 11.15 micro sec
—
Worst QoS on flow ('Valencia', 'Badajoz') with delay of: 98.95 micro sec

A melhoria face ao algoritmo do primeiro exercício era esperada, uma vez que este tem em consideração o estado atual da rede e não se baseia em métricas externas à rede. Por outro lado, quanto ao algoritmo do exercício 5 era esperado uma melhoria no tempo máximo de atraso ainda que para isso prejudicasse a carga dos links. Isso não se verificou e na realidade os resultados foram em tudo semelhantes ao do exercício anterior.

Mais uma vez falando de qual dos algoritmos é melhor não existe uma resposta apenas mas sim tudo depende do contexto da rede que se quer otimizar e das suas características. Olhando para um exemplo em que temos uma rede sem problemas de capacidade dos links, seria mais lógico aplicar este ultimo algoritmo por forma a proporcionar uma maior qualidade de serviço aos seus utilizadores. Por outro lado se tivermos uma rede que está frequentemente congestionada em certos links seria mais sensato aplicar o algoritmo do exercício 5 por forma a equilibrar mais a carga entre links e assim provocar o mínimo de congestionamento ainda que sacrificando um pouco o atraso máximo. O primeiro algoritmo visto seria usado numa situação em que se quer instalar a infraestrutura da rede economizando o valor da instalação

e por isso tomando o caminho mais curto.

6 Exercício 11 e 12

Nos exercícios 11 e 12 era pedido para determinar a melhor solução de encaminhamento de tráfego minimizando o one-way delay, em que a ordem inicial dos pares é aleatória.

Podemos ver no final deste relatório o anexo 9.7 que contém todo o output gerado sobre o atraso entre cada nó da rede maior, e o anexo 9.8 que contém alguns valores estatísticos para todos os links existentes na rede maior.

Contudo para melhor explicar o que está a acontecer na escolha de caminhos vamos usar a rede pequena como exemplo e para isso temos os valores mostrados em baixo como sumário do que está a acontecer na rede.

```
Average link load of: 35.02%
Worst link load on link ('Aveiro', 'Porto') with load of: 50.11%
-----
Average one way time delay of: 12.80 micro sec
Worst one way time on link ('Aveiro', 'Porto') with delay of:
    16.04 micro sec
-----
Worst QoS on flow ('Lisboa', 'Porto') with delay of: 32.05 micro
    sec
```

No exemplo da rede pequena foram realizadas 10 iterações e escolheu-se a que se obteve o menor one-way delay. Como é possível verificar, o resultado obtido foi o mesmo do obtido na solução 1. Isto já seria previsível devido tamanho da rede, que não fornece um leque muito alargado de soluções de ordem inicial de pares.

No exemplo da rede grande foram realizadas 100 iterações e olhando para as estatísticas presentes em baixo, vemos que obtivemos melhores resultados quando comparados com os obtidos anteriormente nas soluções 1, 2 e 3.

```
Average link load of: 18.09%
Worst link load on link ('Braganca', 'Vilar.Formoso') with load
    of: 26.10%
-----
Average one way time delay of: 9.79 micro sec
Worst one way time on link ('Braganca', 'Vilar.Formoso') with
    delay of: 10.82 micro sec
-----
Worst QoS on flow ('Vigo', 'Granada') with delay of: 60.23 micro
    sec
```

Esta melhoria já era previsível que pudesse acontecer, isto devido a que sendo esta uma rede com muitos nós, há bastantes possibilidades diferentes

de ordem inicial dos pares, e por conseguinte, há uma maior possibilidade de obtenção de melhores resultados, como aconteceu neste caso. Apesar deste algoritmo considerar o menor one-way delay, houve uma melhoria em todas as estatísticas apresentadas.

7 Exercício 13 e 14

Nos exercícios 13 e 14 era pedido para determinar a melhor solução de encaminhamento de tráfego otimizando individualmente cada caminho e com os pares iniciais escolhidos aleatoriamente.

Podemos ver no final deste relatório o anexo 9.9 que contém todo o output gerado sobre o atraso entre cada nó da rede maior, e o anexo 9.10 que contém alguns valores estatísticos para todos os links existentes na rede maior.

Contudo para melhor explicar o que está a acontecer na escolha de caminhos vamos usar a rede pequena como exemplo e para isso temos os valores mostrados em baixo como sumário do que está a acontecer na rede.

```
Average link load of: 35.02%
Worst link load on link ('Aveiro', 'Porto') with load of: 50.11%
-----
Average one way time delay of: 12.80 micro sec
Worst one way time on link ('Aveiro', 'Porto') with delay of:
    16.04 micro sec
-----
Worst QoS on flow ('Lisboa', 'Porto') with delay of: 32.05 micro
    sec
```

No exemplo da rede pequena foram realizadas 10 iterações e, como é possível verificar, o resultado obtido foi o mesmo do obtido na solução anterior. Isto já seria previsível devido tamanho da rede, que não fornece um leque muito alargado de soluções para otimizar cada caminho individualmente.

No exemplo da rede grande foram realizadas 100 iterações e olhando para as estatísticas presentes em baixo, vemos que obtivemos melhores resultados quando comparados com as anteriores soluções.

```
Average link load of: 17.77%
Worst link load on link ('Porto', 'Aveiro') with load of: 24.96%
-----
Average one way time delay of: 9.76 micro sec
Worst one way time on link ('Porto', 'Aveiro') with delay of:
    10.66 micro sec
-----
Worst QoS on flow ('Granada', 'Vigo') with delay of: 59.88 micro
    sec
```

Esta melhoria já era previsível, isto devido ao facto de este algoritmo considerar um grande número de situações, tais como serem feitas várias iterações com ordem inicial dos pares diferente e ser usada uma procura local para a otimização individual de cada caminho.

Apesar de estes serem os melhores resultados obtidos ao longo destas experiências, é preciso ter em consideração que são também os mais exigentes computacionalmente, o que pode ser um entrave ao seu uso em tempo real no caso de ocorrência de falhas.

8 Conclusão

Com este trabalho prático, podemos conhecer várias técnicas de otimização de vários parâmetros como o atraso global médio dos pacotes, pior caso de atraso de pacotes e o pior load numa ligação, de forma a ganhar um conhecimento mais aprofundado acerca da performance e qualidade de serviço numa rede.

9 Anexos

9.1 One way delay de cada fluxo (Exercícios 2,3 e 4)

```
#flow ('Portimao', 'Palma'): one way delay: 27.38 micro sec
#flow ('Vilar.Formoso', 'Granada'): one way delay: 32.67 micro sec
#flow ('Valencia', 'Andorra'): one way delay: 19.22 micro sec
#flow ('Aveiro', 'Barcelona'): one way delay: 33.42 micro sec
#flow ('Madrid', 'Gijon'): one way delay: 18.05 micro sec
#flow ('Portimao', 'Porto'): one way delay: 35.98 micro sec
#flow ('Portimao', 'Badajoz'): one way delay: 18.01 micro sec
#flow ('Palma', 'Porto'): one way delay: 60.34 micro sec
#flow ('Granada', 'Sevilha'): one way delay: 10.45 micro sec
#flow ('Badajoz', 'Vigo'): one way delay: 52.58 micro sec
#flow ('Portimao', 'Barcelona'): one way delay: 37.58 micro sec
#flow ('Lisboa', 'Vigo'): one way delay: 37.89 micro sec
#flow ('Braganca', 'Lisboa'): one way delay: 36.98 micro sec
#flow ('Aveiro', 'Porto'): one way delay: 16.24 micro sec
#flow ('Palma', 'Gijon'): one way delay: 38.20 micro sec
#flow ('Sevilha', 'Vigo'): one way delay: 63.22 micro sec
#flow ('Valencia', 'Madrid'): one way delay: 10.14 micro sec
#flow ('Valencia', 'Aveiro'): one way delay: 35.10 micro sec
#flow ('Palma', 'Andorra'): one way delay: 18.51 micro sec
#flow ('Porto', 'Braganca'): one way delay: 10.10 micro sec
#flow ('Braganca', 'Palma'): one way delay: 40.33 micro sec
#flow ('Palma', 'Valencia'): one way delay: 8.99 micro sec
#flow ('Porto', 'Vigo'): one way delay: 11.17 micro sec
#flow ('Granada', 'Valencia'): one way delay: 9.25 micro sec
#flow ('Badajoz', 'Sevilha'): one way delay: 10.63 micro sec
#flow ('Aveiro', 'Andorra'): one way delay: 46.15 micro sec
#flow ('Barcelona', 'Portimao'): one way delay: 37.59 micro sec
#flow ('Portimao', 'Sevilha'): one way delay: 8.63 micro sec
#flow ('Vigo', 'Sevilha'): one way delay: 63.33 micro sec
#flow ('Madrid', 'Andorra'): one way delay: 18.50 micro sec
#flow ('Sevilha', 'Granada'): one way delay: 10.45 micro sec
#flow ('Vilar.Formoso', 'Porto'): one way delay: 29.83 micro sec
#flow ('Porto', 'Madrid'): one way delay: 41.26 micro sec
#flow ('Porto', 'Aveiro'): one way delay: 16.36 micro sec
#flow ('Valencia', 'Braganca'): one way delay: 31.32 micro sec
#flow ('Braganca', 'Sevilha'): one way delay: 32.04 micro sec
#flow ('Aveiro', 'Valencia'): one way delay: 35.04 micro sec
#flow ('Madrid', 'Vigo'): one way delay: 52.39 micro sec
#flow ('Andorra', 'Sevilha'): one way delay: 38.92 micro sec
#flow ('Gijon', 'Badajoz'): one way delay: 30.42 micro sec
#flow ('Lisboa', 'Andorra'): one way delay: 56.62 micro sec
#flow ('Madrid', 'Aveiro'): one way delay: 24.97 micro sec
#flow ('Valencia', 'Vigo'): one way delay: 62.52 micro sec
#flow ('Braganca', 'Madrid'): one way delay: 21.18 micro sec
#flow ('Granada', 'Palma'): one way delay: 8.30 micro sec
#flow ('Corunha', 'Braganca'): one way delay: 31.32 micro sec
#flow ('Braganca', 'Granada'): one way delay: 42.49 micro sec
#flow ('Andorra', 'Gijon'): one way delay: 19.69 micro sec
#flow ('Granada', 'Porto'): one way delay: 62.49 micro sec
#flow ('Braganca', 'Badajoz'): one way delay: 21.41 micro sec
#flow ('Corunha', 'Bilbau'): one way delay: 18.55 micro sec
#flow ('Vigo', 'Aveiro'): one way delay: 27.58 micro sec
#flow ('Vigo', 'Madrid'): one way delay: 52.47 micro sec
#flow ('Madrid', 'Badajoz'): one way delay: 22.98 micro sec
#flow ('Vigo', 'Corunha'): one way delay: 9.98 micro sec
#flow ('Badajoz', 'Braganca'): one way delay: 21.38 micro sec
#flow ('Sevilha', 'Barcelona'): one way delay: 28.94 micro sec
#flow ('Madrid', 'Barcelona'): one way delay: 8.53 micro sec
#flow ('Bilbau', 'Braganca'): one way delay: 9.67 micro sec
#flow ('Sevilha', 'Porto'): one way delay: 52.04 micro sec
#flow ('Sevilha', 'Badajoz'): one way delay: 10.64 micro sec
#flow ('Madrid', 'Braganca'): one way delay: 21.19 micro sec
#flow ('Braganca', 'Aveiro'): one way delay: 26.49 micro sec
#flow ('Braganca', 'Corunha'): one way delay: 31.29 micro sec
#flow ('Aveiro', 'Bilbau'): one way delay: 36.01 micro sec
#flow ('Portimao', 'Corunha'): one way delay: 57.14 micro sec
#flow ('Corunha', 'Palma'): one way delay: 47.18 micro sec
#flow ('Palma', 'Madrid'): one way delay: 19.13 micro sec
#flow ('Bilbau', 'Granada'): one way delay: 27.95 micro sec
#flow ('Andorra', 'Vigo'): one way delay: 38.69 micro sec
#flow ('Barcelona', 'Palma'): one way delay: 8.53 micro sec
#flow ('Corunha', 'Valencia'): one way delay: 72.63 micro sec
#flow ('Valencia', 'Vilar.Formoso'): one way delay: 21.52 micro sec
#flow ('Vilar.Formoso', 'Portimao'): one way delay: 33.32 micro sec
#flow ('Porto', 'Bilbau'): one way delay: 19.77 micro sec
```

```

#flow ('Porto', 'Corunha'): one way delay: 21.16 micro sec
#flow ('Vilar.Formoso', 'Madrid'): one way delay: 11.36 micro sec
#flow ('Vilar.Formoso', 'Corunha'): one way delay: 50.99 micro sec
#flow ('Valencia', 'Corunha'): one way delay: 72.51 micro sec
#flow ('Valencia', 'Badajoz'): one way delay: 8.74 micro sec
#flow ('Badajoz', 'Lisboa'): one way delay: 8.74 micro sec
#flow ('Vilar.Formoso', 'Bilbau'): one way delay: 19.47 micro sec
#flow ('Portimao', 'Bilbau'): one way delay: 55.75 micro sec
#flow ('Portimao', 'Andorra'): one way delay: 47.55 micro sec
#flow ('Porto', 'Vilar.Formoso'): one way delay: 29.89 micro sec
#flow ('Badajoz', 'Andorra'): one way delay: 27.97 micro sec
#flow ('Valencia', 'Bilbau'): one way delay: 18.67 micro sec
#flow ('Granada', 'Aveiro'): one way delay: 46.25 micro sec
#flow ('Granada', 'Corunha'): one way delay: 83.65 micro sec
#flow ('Lisboa', 'Bilbau'): one way delay: 46.48 micro sec
#flow ('Bilbau', 'Lisboa'): one way delay: 46.65 micro sec
#flow ('Gijon', 'Andorra'): one way delay: 19.68 micro sec
#flow ('Valencia', 'Sevilha'): one way delay: 19.70 micro sec
#flow ('Bilbau', 'Sevilha'): one way delay: 41.70 micro sec
#flow ('Porto', 'Badajoz'): one way delay: 41.49 micro sec
#flow ('Porto', 'Granada'): one way delay: 62.56 micro sec
#flow ('Palma', 'Braganca'): one way delay: 40.32 micro sec
#flow ('Bilbau', 'Vilar.Formoso'): one way delay: 19.48 micro sec
#flow ('Porto', 'Barcelona'): one way delay: 49.79 micro sec
#flow ('Madrid', 'Vilar.Formoso'): one way delay: 11.38 micro sec
#flow ('Corunha', 'Portimao'): one way delay: 57.32 micro sec
#flow ('Bilbau', 'Gijon'): one way delay: 9.52 micro sec
#flow ('Aveiro', 'Palma'): one way delay: 44.04 micro sec
#flow ('Braganca', 'Andorra'): one way delay: 19.80 micro sec
#flow ('Andorra', 'Valencia'): one way delay: 19.21 micro sec
#flow ('Sevilha', 'Vilar.Formoso'): one way delay: 22.22 micro sec
#flow ('Aveiro', 'Sevilha'): one way delay: 35.75 micro sec
#flow ('Bilbau', 'Portimao'): one way delay: 55.90 micro sec
#flow ('Gijon', 'Barcelona'): one way delay: 29.64 micro sec
#flow ('Vigo', 'Vilar.Formoso'): one way delay: 41.11 micro sec
#flow ('Aveiro', 'Lisboa'): one way delay: 10.49 micro sec
#flow ('Badajoz', 'Gijon'): one way delay: 30.36 micro sec
#flow ('Badajoz', 'Porto'): one way delay: 41.40 micro sec
#flow ('Aveiro', 'Madrid'): one way delay: 24.89 micro sec
#flow ('Barcelona', 'Vilar.Formoso'): one way delay: 19.92 micro sec
#flow ('Madrid', 'Bilbau'): one way delay: 8.53 micro sec
#flow ('Badajoz', 'Portimao'): one way delay: 18.00 micro sec
#flow ('Barcelona', 'Sevilha'): one way delay: 28.95 micro sec
#flow ('Andorra', 'Corunha'): one way delay: 28.69 micro sec
#flow ('Madrid', 'Corunha'): one way delay: 62.37 micro sec
#flow ('Gijon', 'Granada'): one way delay: 51.50 micro sec
#flow ('Palma', 'Sevilha'): one way delay: 18.76 micro sec
#flow ('Andorra', 'Bilbau'): one way delay: 10.17 micro sec
#flow ('Granada', 'Madrid'): one way delay: 19.39 micro sec
#flow ('Andorra', 'Palma'): one way delay: 18.50 micro sec
#flow ('Sevilha', 'Aveiro'): one way delay: 35.80 micro sec
#flow ('Andorra', 'Barcelona'): one way delay: 9.97 micro sec
#flow ('Gijon', 'Corunha'): one way delay: 9.00 micro sec
#flow ('Corunha', 'Madrid'): one way delay: 62.48 micro sec
#flow ('Lisboa', 'Corunha'): one way delay: 47.87 micro sec
#flow ('Andorra', 'Badajoz'): one way delay: 27.95 micro sec
#flow ('Aveiro', 'Granada'): one way delay: 46.20 micro sec
#flow ('Barcelona', 'Andorra'): one way delay: 9.97 micro sec
#flow ('Braganca', 'Bilbau'): one way delay: 9.67 micro sec
#flow ('Granada', 'Andorra'): one way delay: 28.47 micro sec
#flow ('Lisboa', 'Aveiro'): one way delay: 10.47 micro sec
#flow ('Barcelona', 'Vigo'): one way delay: 48.67 micro sec
#flow ('Gijon', 'Lisboa'): one way delay: 46.00 micro sec
#flow ('Vilar.Formoso', 'Braganca'): one way delay: 9.80 micro sec
#flow ('Gijon', 'Braganca'): one way delay: 9.01 micro sec
#flow ('Gijon', 'Aveiro'): one way delay: 35.51 micro sec
#flow ('Sevilha', 'Andorra'): one way delay: 38.92 micro sec
#flow ('Vilar.Formoso', 'Barcelona'): one way delay: 19.89 micro sec
#flow ('Palma', 'Granada'): one way delay: 8.31 micro sec
#flow ('Barcelona', 'Gijon'): one way delay: 29.66 micro sec
#flow ('Barcelona', 'Madrid'): one way delay: 8.53 micro sec
#flow ('Vilar.Formoso', 'Badajoz'): one way delay: 11.59 micro sec
#flow ('Barcelona', 'Corunha'): one way delay: 38.66 micro sec
#flow ('Granada', 'Badajoz'): one way delay: 21.09 micro sec
#flow ('Portimao', 'Gijon'): one way delay: 55.06 micro sec
#flow ('Corunha', 'Sevilha'): one way delay: 73.34 micro sec
#flow ('Bilbau', 'Andorra'): one way delay: 10.13 micro sec
#flow ('Granada', 'Vilar.Formoso'): one way delay: 32.66 micro sec
#flow ('Palma', 'Bilbau'): one way delay: 28.68 micro sec
#flow ('Bilbau', 'Aveiro'): one way delay: 36.16 micro sec
#flow ('Gijon', 'Palma'): one way delay: 38.17 micro sec
#flow ('Lisboa', 'Granada'): one way delay: 29.82 micro sec
#flow ('Palma', 'Corunha'): one way delay: 47.20 micro sec

```

```

#flow ('Corunha', 'Vigo'): one way delay: 10.00 micro sec
#flow ('Badajoz', 'Granada'): one way delay: 21.08 micro sec
#flow ('Portimao', 'Vilar.Formoso'): one way delay: 33.27 micro sec
#flow ('Granada', 'Bilbau'): one way delay: 27.92 micro sec
#flow ('Vigo', 'Palma'): one way delay: 71.62 micro sec
#flow ('Vigo', 'Bilbau'): one way delay: 28.53 micro sec
#flow ('Vilar.Formoso', 'Vigo'): one way delay: 41.00 micro sec
#flow ('Sevilha', 'Corunha'): one way delay: 73.20 micro sec
#flow ('Sevilha', 'Gijon'): one way delay: 41.00 micro sec
#flow ('Sevilha', 'Bilbau'): one way delay: 41.69 micro sec
#flow ('Madrid', 'Porto'): one way delay: 41.21 micro sec
#flow ('Vilar.Formoso', 'Andorra'): one way delay: 29.61 micro sec
#flow ('Andorra', 'Madrid'): one way delay: 18.50 micro sec
#flow ('Bilbau', 'Porto'): one way delay: 19.80 micro sec
#flow ('Lisboa', 'Vilar.Formoso'): one way delay: 24.00 micro sec
#flow ('Gijon', 'Porto'): one way delay: 19.14 micro sec
#flow ('Barcelona', 'Lisboa'): one way delay: 26.73 micro sec
#flow ('Andorra', 'Porto'): one way delay: 29.96 micro sec
#flow ('Bilbau', 'Madrid'): one way delay: 8.54 micro sec
#flow ('Gijon', 'Portimao'): one way delay: 55.25 micro sec
#flow ('Gijon', 'Vilar.Formoso'): one way delay: 18.83 micro sec
#flow ('Vilar.Formoso', 'Lisboa'): one way delay: 24.07 micro sec
#flow ('Braganca', 'Porto'): one way delay: 10.13 micro sec
#flow ('Lisboa', 'Palma'): one way delay: 26.50 micro sec
#flow ('Palma', 'Barcelona'): one way delay: 8.54 micro sec
#flow ('Porto', 'Palma'): one way delay: 60.41 micro sec
#flow ('Granada', 'Braganca'): one way delay: 42.47 micro sec
#flow ('Braganca', 'Vigo'): one way delay: 21.31 micro sec
#flow ('Barcelona', 'Valencia'): one way delay: 9.24 micro sec
#flow ('Corunha', 'Vilar.Formoso'): one way delay: 51.11 micro sec
#flow ('Vigo', 'Granada'): one way delay: 73.78 micro sec
#flow ('Portimao', 'Vigo'): one way delay: 47.16 micro sec
#flow ('Lisboa', 'Valencia'): one way delay: 17.49 micro sec
#flow ('Gijon', 'Sevilha'): one way delay: 41.05 micro sec
#flow ('Palma', 'Aveiro'): one way delay: 44.10 micro sec
#flow ('Valencia', 'Porto'): one way delay: 51.35 micro sec
#flow ('Valencia', 'Palma'): one way delay: 9.00 micro sec
#flow ('Lisboa', 'Porto'): one way delay: 26.72 micro sec
#flow ('Madrid', 'Granada'): one way delay: 19.41 micro sec
#flow ('Vigo', 'Portimao'): one way delay: 47.32 micro sec
#flow ('Vilar.Formoso', 'Valencia'): one way delay: 21.51 micro sec
#flow ('Aveiro', 'Badajoz'): one way delay: 25.12 micro sec
#flow ('Vilar.Formoso', 'Palma'): one way delay: 30.51 micro sec
#flow ('Lisboa', 'Gijon'): one way delay: 45.79 micro sec
#flow ('Lisboa', 'Madrid'): one way delay: 35.36 micro sec
#flow ('Aveiro', 'Braganca'): one way delay: 26.34 micro sec
#flow ('Corunha', 'Granada'): one way delay: 83.78 micro sec
#flow ('Palma', 'Vigo'): one way delay: 71.52 micro sec
#flow ('Aveiro', 'Gijon'): one way delay: 35.32 micro sec
#flow ('Corunha', 'Lisboa'): one way delay: 48.07 micro sec
#flow ('Aveiro', 'Corunha'): one way delay: 37.40 micro sec
#flow ('Granada', 'Portimao'): one way delay: 19.08 micro sec
#flow ('Sevilha', 'Lisboa'): one way delay: 19.38 micro sec
#flow ('Corunha', 'Barcelona'): one way delay: 38.65 micro sec
#flow ('Granada', 'Vigo'): one way delay: 73.67 micro sec
#flow ('Barcelona', 'Porto'): one way delay: 49.75 micro sec
#flow ('Barcelona', 'Bilbau'): one way delay: 20.14 micro sec
#flow ('Valencia', 'Barcelona'): one way delay: 9.25 micro sec
#flow ('Bilbau', 'Badajoz'): one way delay: 31.07 micro sec
#flow ('Aveiro', 'Vigo'): one way delay: 27.42 micro sec
#flow ('Lisboa', 'Badajoz'): one way delay: 8.75 micro sec
#flow ('Badajoz', 'Bilbau'): one way delay: 31.05 micro sec
#flow ('Braganca', 'Valencia'): one way delay: 31.33 micro sec
#flow ('Bilbau', 'Palma'): one way delay: 28.63 micro sec
#flow ('Sevilha', 'Braganca'): one way delay: 32.02 micro sec
#flow ('Madrid', 'Portimao'): one way delay: 44.71 micro sec
#flow ('Badajoz', 'Barcelona'): one way delay: 17.99 micro sec
#flow ('Madrid', 'Palma'): one way delay: 19.15 micro sec
#flow ('Palma', 'Portimao'): one way delay: 27.40 micro sec
#flow ('Gijon', 'Bilbau'): one way delay: 9.54 micro sec
#flow ('Valencia', 'Granada'): one way delay: 9.26 micro sec
#flow ('Valencia', 'Lisboa'): one way delay: 17.49 micro sec
#flow ('Bilbau', 'Corunha'): one way delay: 18.52 micro sec
#flow ('Vigo', 'Valencia'): one way delay: 62.62 micro sec
#flow ('Portimao', 'Valencia'): one way delay: 28.33 micro sec
#flow ('Bilbau', 'Barcelona'): one way delay: 20.10 micro sec
#flow ('Badajoz', 'Palma'): one way delay: 17.75 micro sec
#flow ('Vigo', 'Barcelona'): one way delay: 48.63 micro sec
#flow ('Vigo', 'Porto'): one way delay: 11.21 micro sec
#flow ('Vigo', 'Gijon'): one way delay: 18.99 micro sec
#flow ('Corunha', 'Porto'): one way delay: 21.22 micro sec
#flow ('Corunha', 'Badajoz'): one way delay: 62.70 micro sec
#flow ('Portimao', 'Aveiro'): one way delay: 19.74 micro sec

```

```

#flow ('Vilar.Formoso', 'Sevilha'): one way delay: 22.22 micro sec
#flow ('Badajoz', 'Vilar.Formoso'): one way delay: 11.58 micro sec
#flow ('Aveiro', 'Portimao'): one way delay: 19.74 micro sec
#flow ('Andorra', 'Portimao'): one way delay: 47.55 micro sec
#flow ('Sevilha', 'Madrid'): one way delay: 33.58 micro sec
#flow ('Sevilha', 'Palma'): one way delay: 18.75 micro sec
#flow ('Bilbau', 'Valencia'): one way delay: 18.69 micro sec
#flow ('Porto', 'Lisboa'): one way delay: 26.85 micro sec
#flow ('Braganca', 'Portimao'): one way delay: 46.24 micro sec
#flow ('Gijon', 'Valencia'): one way delay: 28.23 micro sec
#flow ('Lisboa', 'Sevilha'): one way delay: 19.38 micro sec
#flow ('Corunha', 'Aveiro'): one way delay: 37.58 micro sec
#flow ('Andorra', 'Vilar.Formoso'): one way delay: 29.65 micro sec
#flow ('Granada', 'Barcelona'): one way delay: 18.50 micro sec
#flow ('Barcelona', 'Badajoz'): one way delay: 17.99 micro sec
#flow ('Palma', 'Vilar.Formoso'): one way delay: 30.51 micro sec
#flow ('Porto', 'Portimao'): one way delay: 36.10 micro sec
#flow ('Andorra', 'Braganca'): one way delay: 19.83 micro sec
#flow ('Madrid', 'Lisboa'): one way delay: 35.45 micro sec
#flow ('Andorra', 'Lisboa'): one way delay: 56.81 micro sec
#flow ('Porto', 'Gijon'): one way delay: 19.08 micro sec
#flow ('Madrid', 'Sevilha'): one way delay: 33.61 micro sec
#flow ('Barcelona', 'Aveiro'): one way delay: 33.50 micro sec
#flow ('Vigo', 'Andorra'): one way delay: 38.66 micro sec
#flow ('Palma', 'Badajoz'): one way delay: 17.73 micro sec
#flow ('Corunha', 'Andorra'): one way delay: 28.68 micro sec
#flow ('Lisboa', 'Portimao'): one way delay: 9.25 micro sec
#flow ('Vigo', 'Lisboa'): one way delay: 38.07 micro sec
#flow ('Aveiro', 'Vilar.Formoso'): one way delay: 13.53 micro sec
#flow ('Portimao', 'Lisboa'): one way delay: 9.27 micro sec
#flow ('Braganca', 'Gijon'): one way delay: 8.98 micro sec
#flow ('Valencia', 'Portimao'): one way delay: 28.34 micro sec
#flow ('Lisboa', 'Barcelona'): one way delay: 26.74 micro sec
#flow ('Granada', 'Gijon'): one way delay: 51.45 micro sec
#flow ('Portimao', 'Granada'): one way delay: 19.08 micro sec
#flow ('Badajoz', 'Valencia'): one way delay: 8.75 micro sec
#flow ('Vigo', 'Badajoz'): one way delay: 52.70 micro sec
#flow ('Valencia', 'Gijon'): one way delay: 28.19 micro sec
#flow ('Porto', 'Sevilha'): one way delay: 52.12 micro sec
#flow ('Andorra', 'Aveiro'): one way delay: 46.33 micro sec
#flow ('Andorra', 'Granada'): one way delay: 28.47 micro sec
#flow ('Barcelona', 'Braganca'): one way delay: 29.80 micro sec
#flow ('Braganca', 'Barcelona'): one way delay: 29.77 micro sec
#flow ('Bilbau', 'Vigo'): one way delay: 28.53 micro sec
#flow ('Portimao', 'Braganca'): one way delay: 46.08 micro sec
#flow ('Gijon', 'Vigo'): one way delay: 19.00 micro sec
#flow ('Porto', 'Valencia'): one way delay: 51.41 micro sec
#flow ('Barcelona', 'Granada'): one way delay: 18.50 micro sec
#flow ('Braganca', 'Vilar.Formoso'): one way delay: 9.82 micro sec
#flow ('Lisboa', 'Braganca'): one way delay: 36.81 micro sec
#flow ('Porto', 'Andorra'): one way delay: 29.90 micro sec
#flow ('Palma', 'Lisboa'): one way delay: 26.48 micro sec
#flow ('Sevilha', 'Portimao'): one way delay: 8.64 micro sec
#flow ('Granada', 'Lisboa'): one way delay: 29.83 micro sec
#flow ('Sevilha', 'Valencia'): one way delay: 19.70 micro sec
#flow ('Corunha', 'Gijon'): one way delay: 9.00 micro sec
#flow ('Vilar.Formoso', 'Gijon'): one way delay: 18.78 micro sec
#flow ('Gijon', 'Madrid'): one way delay: 18.08 micro sec
#flow ('Vilar.Formoso', 'Aveiro'): one way delay: 13.58 micro sec
#flow ('Vigo', 'Braganca'): one way delay: 21.31 micro sec
#flow ('Badajoz', 'Corunha'): one way delay: 62.56 micro sec
#flow ('Badajoz', 'Aveiro'): one way delay: 25.16 micro sec
#flow ('Badajoz', 'Madrid'): one way delay: 22.94 micro sec
#flow ('Madrid', 'Valencia'): one way delay: 10.15 micro sec
#flow ('Portimao', 'Madrid'): one way delay: 44.63 micro sec

```

9.2 Lambda, link-load e one way delay para cada link (Exercícios 2,3 e 4)

```
#link Gijon-Bilbau: 20187 pkts/sec -- link-load: 16.15% -- one_way_delay: 9.54 micro sec
#link Bilbao-Gijon: 19995 pkts/sec -- link-load: 16.00% -- one_way_delay: 9.52 micro sec
#link Granada-Sevilha: 29294 pkts/sec -- link-load: 23.44% -- one_way_delay: 10.45 micro
sec
#link Sevilha-Granada: 29272 pkts/sec -- link-load: 23.42% -- one_way_delay: 10.45 micro
sec
#link Badajoz-Lisboa: 10647 pkts/sec -- link-load: 8.52% -- one_way_delay: 8.74 micro
sec
#link Lisboa-Badajoz: 10650 pkts/sec -- link-load: 8.52% -- one_way_delay: 8.75 micro
sec
#link Badajoz-Sevilha: 30939 pkts/sec -- link-load: 24.75% -- one_way_delay: 10.63 micro
sec
#link Sevilha-Badajoz: 30999 pkts/sec -- link-load: 24.80% -- one_way_delay: 10.64 micro
sec
#link Aveiro-Porto: 63442 pkts/sec -- link-load: 50.75% -- one_way_delay: 16.24 micro
sec
#link Porto-Aveiro: 63890 pkts/sec -- link-load: 51.11% -- one_way_delay: 16.36 micro
sec
#link Badajoz-Vilar.Formoso: 38626 pkts/sec -- link-load: 30.90% -- one_way_delay: 11.58
micro sec
#link Vilar.Formoso-Badajoz: 38722 pkts/sec -- link-load: 30.98% -- one_way_delay: 11.59
micro sec
#link Porto-Braganca: 25959 pkts/sec -- link-load: 20.77% -- one_way_delay: 10.10 micro
sec
#link Braganca-Porto: 26290 pkts/sec -- link-load: 21.03% -- one_way_delay: 10.13 micro
sec
#link Braganca-Gijon: 13625 pkts/sec -- link-load: 10.90% -- one_way_delay: 8.98 micro
sec
#link Gijon-Braganca: 14057 pkts/sec -- link-load: 11.25% -- one_way_delay: 9.01 micro
sec
#link Palma-Valencia: 13815 pkts/sec -- link-load: 11.05% -- one_way_delay: 8.99 micro
sec
#link Valencia-Palma: 13909 pkts/sec -- link-load: 11.13% -- one_way_delay: 9.00 micro
sec
#link Barcelona-Andorra: 24729 pkts/sec -- link-load: 19.78% -- one_way_delay: 9.97
micro sec
#link Andorra-Barcelona: 24655 pkts/sec -- link-load: 19.72% -- one_way_delay: 9.97
micro sec
#link Bilbao-Madrid: 7920 pkts/sec -- link-load: 6.34% -- one_way_delay: 8.54 micro sec
#link Madrid-Bilbau: 7778 pkts/sec -- link-load: 6.22% -- one_way_delay: 8.53 micro sec
#link Barcelona-Valencia: 16833 pkts/sec -- link-load: 13.47% -- one_way_delay: 9.24
micro sec
#link Valencia-Barcelona: 16841 pkts/sec -- link-load: 13.47% -- one_way_delay: 9.25
micro sec
#link Portimao-Sevilha: 9184 pkts/sec -- link-load: 7.35% -- one_way_delay: 8.63 micro
sec
#link Sevilha-Portimao: 9202 pkts/sec -- link-load: 7.36% -- one_way_delay: 8.64 micro
sec
#link Madrid-Vilar.Formoso: 37162 pkts/sec -- link-load: 29.73% -- one_way_delay: 11.38
micro sec
#link Vilar.Formoso-Madrid: 36992 pkts/sec -- link-load: 29.59% -- one_way_delay: 11.36
micro sec
#link Granada-Valencia: 16918 pkts/sec -- link-load: 13.53% -- one_way_delay: 9.25 micro
sec
#link Valencia-Granada: 16962 pkts/sec -- link-load: 13.57% -- one_way_delay: 9.26 micro
sec
#link Aveiro-Lisboa: 29642 pkts/sec -- link-load: 23.71% -- one_way_delay: 10.49 micro
sec
#link Lisboa-Aveiro: 29496 pkts/sec -- link-load: 23.60% -- one_way_delay: 10.47 micro
sec
#link Badajoz-Valencia: 10700 pkts/sec -- link-load: 8.56% -- one_way_delay: 8.75 micro
sec
#link Valencia-Badajoz: 10592 pkts/sec -- link-load: 8.47% -- one_way_delay: 8.74 micro
sec
#link Braganca-Vilar.Formoso: 23137 pkts/sec -- link-load: 18.51% -- one_way_delay: 9.82
micro sec
#link Vilar.Formoso-Braganca: 23000 pkts/sec -- link-load: 18.40% -- one_way_delay: 9.80
micro sec
#link Aveiro-Vilar.Formoso: 51094 pkts/sec -- link-load: 40.88% -- one_way_delay: 13.53
micro sec
#link Vilar.Formoso-Aveiro: 51373 pkts/sec -- link-load: 41.10% -- one_way_delay: 13.58
micro sec
#link Portimao-Lisboa: 17113 pkts/sec -- link-load: 13.69% -- one_way_delay: 9.27 micro
sec
#link Lisboa-Portimao: 16935 pkts/sec -- link-load: 13.55% -- one_way_delay: 9.25 micro
sec
#link Granada-Palma: 4556 pkts/sec -- link-load: 3.64% -- one_way_delay: 8.30 micro sec
```



```

#link Palma-Granada: 4686 pkts/sec -- link-load: 3.75% -- one_way_delay: 8.31 micro sec
#link Bilbao-Andorra: 26327 pkts/sec -- link-load: 21.06% -- one_way_delay: 10.13 micro
sec
#link Andorra-Bilbao: 26636 pkts/sec -- link-load: 21.31% -- one_way_delay: 10.17 micro
sec
#link Vigo-Corunha: 24836 pkts/sec -- link-load: 19.87% -- one_way_delay: 9.98 micro sec
#link Corunha-Vigo: 25041 pkts/sec -- link-load: 20.03% -- one_way_delay: 10.00 micro
sec
#link Madrid-Barcelona: 7736 pkts/sec -- link-load: 6.19% -- one_way_delay: 8.53 micro
sec
#link Barcelona-Madrid: 7835 pkts/sec -- link-load: 6.27% -- one_way_delay: 8.53 micro
sec
#link Braganca-Bilbao: 21583 pkts/sec -- link-load: 17.27% -- one_way_delay: 9.67 micro
sec
#link Bilbao-Braganca: 21537 pkts/sec -- link-load: 17.23% -- one_way_delay: 9.67 micro
sec
#link Madrid-Valencia: 26478 pkts/sec -- link-load: 21.18% -- one_way_delay: 10.15 micro
sec
#link Valencia-Madrid: 26335 pkts/sec -- link-load: 21.07% -- one_way_delay: 10.14 micro
sec
#link Corunha-Gijon: 13949 pkts/sec -- link-load: 11.16% -- one_way_delay: 9.00 micro
sec
#link Gijon-Corunha: 13889 pkts/sec -- link-load: 11.11% -- one_way_delay: 9.00 micro
sec
#link Barcelona-Palma: 7780 pkts/sec -- link-load: 6.22% -- one_way_delay: 8.53 micro
sec
#link Palma-Barcelona: 7876 pkts/sec -- link-load: 6.30% -- one_way_delay: 8.54 micro
sec
#link Porto-Vigo: 35514 pkts/sec -- link-load: 28.41% -- one_way_delay: 11.17 micro sec
#link Vigo-Porto: 35830 pkts/sec -- link-load: 28.66% -- one_way_delay: 11.21 micro sec

```

9.3 One way delay de cada fluxo (Exercícios 5, 6 e 7)

```
#flow ('Portimao', 'Palma'): one way delay: 37.89 micro sec
#flow ('Vilar.Formoso', 'Granada'): one way delay: 29.39 micro sec
#flow ('Valencia', 'Andorra'): one way delay: 30.23 micro sec
#flow ('Aveiro', 'Barcelona'): one way delay: 29.21 micro sec
#flow ('Madrid', 'Gijon'): one way delay: 20.57 micro sec
#flow ('Portimao', 'Porto'): one way delay: 31.00 micro sec
#flow ('Portimao', 'Badajoz'): one way delay: 19.23 micro sec
#flow ('Palma', 'Porto'): one way delay: 49.55 micro sec
#flow ('Granada', 'Sevilha'): one way delay: 9.53 micro sec
#flow ('Badajoz', 'Vigo'): one way delay: 41.09 micro sec
#flow ('Portimao', 'Barcelona'): one way delay: 38.07 micro sec
#flow ('Lisboa', 'Vigo'): one way delay: 31.42 micro sec
#flow ('Braganca', 'Lisboa'): one way delay: 31.26 micro sec
#flow ('Aveiro', 'Porto'): one way delay: 10.81 micro sec
#flow ('Palma', 'Gijon'): one way delay: 39.38 micro sec
#flow ('Sevilha', 'Vigo'): one way delay: 51.07 micro sec
#flow ('Valencia', 'Madrid'): one way delay: 9.81 micro sec
#flow ('Valencia', 'Aveiro'): one way delay: 49.22 micro sec
#flow ('Palma', 'Andorra'): one way delay: 19.52 micro sec
#flow ('Porto', 'Braganca'): one way delay: 9.96 micro sec
#flow ('Braganca', 'Palma'): one way delay: 39.78 micro sec
#flow ('Palma', 'Valencia'): one way delay: 9.00 micro sec
#flow ('Porto', 'Vigo'): one way delay: 9.96 micro sec
#flow ('Granada', 'Valencia'): one way delay: 9.00 micro sec
#flow ('Badajoz', 'Sevilha'): one way delay: 9.83 micro sec
#flow ('Aveiro', 'Andorra'): one way delay: 41.18 micro sec
#flow ('Barcelona', 'Portimao'): one way delay: 37.36 micro sec
#flow ('Portimao', 'Sevilha'): one way delay: 9.25 micro sec
#flow ('Vigo', 'Sevilha'): one way delay: 50.58 micro sec
#flow ('Madrid', 'Andorra'): one way delay: 20.42 micro sec
#flow ('Sevilha', 'Granada'): one way delay: 9.39 micro sec
#flow ('Vilar.Formoso', 'Porto'): one way delay: 21.13 micro sec
#flow ('Porto', 'Madrid'): one way delay: 30.88 micro sec
#flow ('Porto', 'Aveiro'): one way delay: 10.83 micro sec
#flow ('Valencia', 'Braganca'): one way delay: 39.91 micro sec
#flow ('Braganca', 'Sevilha'): one way delay: 31.66 micro sec
#flow ('Aveiro', 'Valencia'): one way delay: 30.09 micro sec
#flow ('Madrid', 'Vigo'): one way delay: 40.13 micro sec
#flow ('Andorra', 'Sevilha'): one way delay: 37.60 micro sec
#flow ('Gijon', 'Badajoz'): one way delay: 31.52 micro sec
#flow ('Lisboa', 'Andorra'): one way delay: 49.83 micro sec
#flow ('Madrid', 'Aveiro'): one way delay: 19.93 micro sec
#flow ('Valencia', 'Vigo'): one way delay: 59.37 micro sec
#flow ('Braganca', 'Madrid'): one way delay: 20.92 micro sec
#flow ('Granada', 'Palma'): one way delay: 9.12 micro sec
#flow ('Corunha', 'Braganca'): one way delay: 20.01 micro sec
#flow ('Braganca', 'Granada'): one way delay: 40.34 micro sec
#flow ('Andorra', 'Gijon'): one way delay: 20.59 micro sec
#flow ('Granada', 'Porto'): one way delay: 58.32 micro sec
#flow ('Braganca', 'Badajoz'): one way delay: 21.83 micro sec
#flow ('Corunha', 'Bilbau'): one way delay: 20.48 micro sec
#flow ('Vigo', 'Aveiro'): one way delay: 20.81 micro sec
#flow ('Vigo', 'Madrid'): one way delay: 40.86 micro sec
#flow ('Madrid', 'Badajoz'): one way delay: 20.92 micro sec
#flow ('Vigo', 'Corunha'): one way delay: 9.26 micro sec
#flow ('Badajoz', 'Braganca'): one way delay: 21.79 micro sec
#flow ('Sevilha', 'Barcelona'): one way delay: 28.06 micro sec
#flow ('Madrid', 'Barcelona'): one way delay: 9.27 micro sec
#flow ('Bilbau', 'Braganca'): one way delay: 9.98 micro sec
#flow ('Sevilha', 'Porto'): one way delay: 41.74 micro sec
#flow ('Sevilha', 'Badajoz'): one way delay: 9.97 micro sec
#flow ('Madrid', 'Braganca'): one way delay: 20.27 micro sec
#flow ('Braganca', 'Aveiro'): one way delay: 20.81 micro sec
#flow ('Braganca', 'Corunha'): one way delay: 19.81 micro sec
#flow ('Aveiro', 'Bilbau'): one way delay: 31.05 micro sec
#flow ('Portimao', 'Corunha'): one way delay: 50.22 micro sec
#flow ('Corunha', 'Palma'): one way delay: 49.95 micro sec
#flow ('Palma', 'Madrid'): one way delay: 18.81 micro sec
#flow ('Bilbau', 'Granada'): one way delay: 30.06 micro sec
#flow ('Andorra', 'Vigo'): one way delay: 40.14 micro sec
#flow ('Barcelona', 'Palma'): one way delay: 9.55 micro sec
#flow ('Corunha', 'Valencia'): one way delay: 41.28 micro sec
#flow ('Valencia', 'Vilar.Formoso'): one way delay: 19.92 micro sec
#flow ('Vilar.Formoso', 'Portimao'): one way delay: 29.91 micro sec
#flow ('Porto', 'Bilbau'): one way delay: 20.24 micro sec
#flow ('Porto', 'Corunha'): one way delay: 19.22 micro sec
#flow ('Vilar.Formoso', 'Madrid'): one way delay: 9.97 micro sec
#flow ('Vilar.Formoso', 'Corunha'): one way delay: 30.96 micro sec
#flow ('Valencia', 'Corunha'): one way delay: 78.99 micro sec
#flow ('Valencia', 'Badajoz'): one way delay: 98.94 micro sec
```

```

#flow ('Badajoz', 'Lisboa'): one way delay: 9.67 micro sec
#flow ('Vilar.Formoso', 'Bilbau'): one way delay: 21.43 micro sec
#flow ('Portimao', 'Bilbau'): one way delay: 51.58 micro sec
#flow ('Portimao', 'Andorra'): one way delay: 47.29 micro sec
#flow ('Porto', 'Vilar.Formoso'): one way delay: 20.97 micro sec
#flow ('Badajoz', 'Andorra'): one way delay: 29.01 micro sec
#flow ('Valencia', 'Bilbau'): one way delay: 20.10 micro sec
#flow ('Granada', 'Aveiro'): one way delay: 38.98 micro sec
#flow ('Granada', 'Corunha'): one way delay: 49.67 micro sec
#flow ('Lisboa', 'Bilbau'): one way delay: 41.70 micro sec
#flow ('Bilbau', 'Lisboa'): one way delay: 41.23 micro sec
#flow ('Gijon', 'Andorra'): one way delay: 20.29 micro sec
#flow ('Valencia', 'Sevilha'): one way delay: 49.41 micro sec
#flow ('Bilbau', 'Sevilha'): one way delay: 41.64 micro sec
#flow ('Porto', 'Badajoz'): one way delay: 31.61 micro sec
#flow ('Porto', 'Granada'): one way delay: 49.43 micro sec
#flow ('Palma', 'Braganca'): one way delay: 40.21 micro sec
#flow ('Bilbau', 'Vilar.Formoso'): one way delay: 20.75 micro sec
#flow ('Porto', 'Barcelona'): one way delay: 40.19 micro sec
#flow ('Madrid', 'Vilar.Formoso'): one way delay: 10.11 micro sec
#flow ('Corunha', 'Portimao'): one way delay: 60.93 micro sec
#flow ('Bilbau', 'Gijon'): one way delay: 10.27 micro sec
#flow ('Aveiro', 'Palma'): one way delay: 38.61 micro sec
#flow ('Braganca', 'Andorra'): one way delay: 20.40 micro sec
#flow ('Andorra', 'Valencia'): one way delay: 18.81 micro sec
#flow ('Sevilha', 'Vilar.Formoso'): one way delay: 20.61 micro sec
#flow ('Aveiro', 'Sevilha'): one way delay: 29.21 micro sec
#flow ('Bilbau', 'Portimao'): one way delay: 50.54 micro sec
#flow ('Gijon', 'Barcelona'): one way delay: 30.08 micro sec
#flow ('Vigo', 'Vilar.Formoso'): one way delay: 30.95 micro sec
#flow ('Aveiro', 'Lisboa'): one way delay: 10.45 micro sec
#flow ('Badajoz', 'Gijon'): one way delay: 31.31 micro sec
#flow ('Badajoz', 'Porto'): one way delay: 31.13 micro sec
#flow ('Aveiro', 'Madrid'): one way delay: 19.93 micro sec
#flow ('Barcelona', 'Vilar.Formoso'): one way delay: 19.51 micro sec
#flow ('Madrid', 'Bilbau'): one way delay: 10.29 micro sec
#flow ('Badajoz', 'Portimao'): one way delay: 19.18 micro sec
#flow ('Barcelona', 'Sevilha'): one way delay: 28.49 micro sec
#flow ('Andorra', 'Corunha'): one way delay: 30.88 micro sec
#flow ('Madrid', 'Corunha'): one way delay: 30.86 micro sec
#flow ('Gijon', 'Granada'): one way delay: 40.22 micro sec
#flow ('Palma', 'Sevilha'): one way delay: 18.54 micro sec
#flow ('Andorra', 'Bilbau'): one way delay: 10.31 micro sec
#flow ('Granada', 'Madrid'): one way delay: 18.81 micro sec
#flow ('Andorra', 'Palma'): one way delay: 19.38 micro sec
#flow ('Sevilha', 'Aveiro'): one way delay: 30.44 micro sec
#flow ('Andorra', 'Barcelona'): one way delay: 9.83 micro sec
#flow ('Gijon', 'Corunha'): one way delay: 10.29 micro sec
#flow ('Corunha', 'Madrid'): one way delay: 31.12 micro sec
#flow ('Lisboa', 'Corunha'): one way delay: 40.68 micro sec
#flow ('Andorra', 'Badajoz'): one way delay: 28.49 micro sec
#flow ('Aveiro', 'Granada'): one way delay: 38.60 micro sec
#flow ('Barcelona', 'Andorra'): one way delay: 9.98 micro sec
#flow ('Braganca', 'Bilbau'): one way delay: 10.28 micro sec
#flow ('Granada', 'Andorra'): one way delay: 28.23 micro sec
#flow ('Lisboa', 'Aveiro'): one way delay: 10.65 micro sec
#flow ('Barcelona', 'Vigo'): one way delay: 49.62 micro sec
#flow ('Gijon', 'Lisboa'): one way delay: 40.95 micro sec
#flow ('Vilar.Formoso', 'Braganca'): one way delay: 11.15 micro sec
#flow ('Gijon', 'Braganca'): one way delay: 9.69 micro sec
#flow ('Gijon', 'Aveiro'): one way delay: 30.50 micro sec
#flow ('Sevilha', 'Andorra'): one way delay: 37.62 micro sec
#flow ('Vilar.Formoso', 'Barcelona'): one way delay: 19.25 micro sec
#flow ('Palma', 'Granada'): one way delay: 9.01 micro sec
#flow ('Barcelona', 'Gijon'): one way delay: 29.97 micro sec
#flow ('Barcelona', 'Madrid'): one way delay: 9.41 micro sec
#flow ('Vilar.Formoso', 'Badajoz'): one way delay: 10.82 micro sec
#flow ('Barcelona', 'Corunha'): one way delay: 40.86 micro sec
#flow ('Granada', 'Badajoz'): one way delay: 19.51 micro sec
#flow ('Portimao', 'Gijon'): one way delay: 50.34 micro sec
#flow ('Corunha', 'Sevilha'): one way delay: 51.67 micro sec
#flow ('Bilbau', 'Andorra'): one way delay: 10.13 micro sec
#flow ('Granada', 'Vilar.Formoso'): one way delay: 30.14 micro sec
#flow ('Palma', 'Bilbau'): one way delay: 29.24 micro sec
#flow ('Bilbau', 'Aveiro'): one way delay: 30.81 micro sec
#flow ('Gijon', 'Palma'): one way delay: 39.84 micro sec
#flow ('Lisboa', 'Granada'): one way delay: 28.72 micro sec
#flow ('Palma', 'Corunha'): one way delay: 49.67 micro sec
#flow ('Corunha', 'Vigo'): one way delay: 9.26 micro sec
#flow ('Badajoz', 'Granada'): one way delay: 19.05 micro sec
#flow ('Portimao', 'Vilar.Formoso'): one way delay: 29.86 micro sec
#flow ('Granada', 'Bilbau'): one way delay: 38.96 micro sec
#flow ('Vigo', 'Palma'): one way delay: 59.77 micro sec

```

```

#flow ('Vigo', 'Bilbau'): one way delay: 30.22 micro sec
#flow ('Vilar.Formoso', 'Vigo'): one way delay: 30.60 micro sec
#flow ('Sevilha', 'Corunha'): one way delay: 68.50 micro sec
#flow ('Sevilha', 'Gijon'): one way delay: 41.28 micro sec
#flow ('Sevilha', 'Bilbau'): one way delay: 48.35 micro sec
#flow ('Madrid', 'Porto'): one way delay: 30.74 micro sec
#flow ('Vilar.Formoso', 'Andorra'): one way delay: 31.55 micro sec
#flow ('Andorra', 'Madrid'): one way delay: 20.96 micro sec
#flow ('Bilbau', 'Porto'): one way delay: 19.96 micro sec
#flow ('Lisboa', 'Vilar.Formoso'): one way delay: 20.61 micro sec
#flow ('Gijon', 'Porto'): one way delay: 19.67 micro sec
#flow ('Barcelona', 'Lisboa'): one way delay: 28.33 micro sec
#flow ('Andorra', 'Porto'): one way delay: 30.27 micro sec
#flow ('Bilbau', 'Madrid'): one way delay: 10.65 micro sec
#flow ('Gijon', 'Portimao'): one way delay: 50.49 micro sec
#flow ('Gijon', 'Vilar.Formoso'): one way delay: 20.70 micro sec
#flow ('Vilar.Formoso', 'Lisboa'): one way delay: 20.49 micro sec
#flow ('Braganca', 'Porto'): one way delay: 9.98 micro sec
#flow ('Lisboa', 'Palma'): one way delay: 28.16 micro sec
#flow ('Palma', 'Barcelona'): one way delay: 9.54 micro sec
#flow ('Porto', 'Palma'): one way delay: 49.59 micro sec
#flow ('Granada', 'Braganca'): one way delay: 49.58 micro sec
#flow ('Braganca', 'Vigo'): one way delay: 19.94 micro sec
#flow ('Barcelona', 'Valencia'): one way delay: 8.99 micro sec
#flow ('Corunha', 'Vilar.Formoso'): one way delay: 31.02 micro sec
#flow ('Vigo', 'Granada'): one way delay: 60.15 micro sec
#flow ('Portimao', 'Vigo'): one way delay: 40.96 micro sec
#flow ('Lisboa', 'Valencia'): one way delay: 19.29 micro sec
#flow ('Gijon', 'Sevilha'): one way delay: 41.35 micro sec
#flow ('Palma', 'Aveiro'): one way delay: 38.88 micro sec
#flow ('Valencia', 'Porto'): one way delay: 40.81 micro sec
#flow ('Valencia', 'Palma'): one way delay: 8.87 micro sec
#flow ('Lisboa', 'Porto'): one way delay: 21.46 micro sec
#flow ('Madrid', 'Granada'): one way delay: 19.41 micro sec
#flow ('Vigo', 'Portimao'): one way delay: 40.76 micro sec
#flow ('Vilar.Formoso', 'Valencia'): one way delay: 20.13 micro sec
#flow ('Aveiro', 'Badajoz'): one way delay: 20.78 micro sec
#flow ('Vilar.Formoso', 'Palma'): one way delay: 28.80 micro sec
#flow ('Lisboa', 'Gijon'): one way delay: 41.28 micro sec
#flow ('Lisboa', 'Madrid'): one way delay: 29.10 micro sec
#flow ('Aveiro', 'Braganca'): one way delay: 21.11 micro sec
#flow ('Corunha', 'Granada'): one way delay: 58.99 micro sec
#flow ('Palma', 'Vigo'): one way delay: 58.93 micro sec
#flow ('Aveiro', 'Gijon'): one way delay: 30.29 micro sec
#flow ('Corunha', 'Lisboa'): one way delay: 40.52 micro sec
#flow ('Aveiro', 'Corunha'): one way delay: 30.03 micro sec
#flow ('Granada', 'Portimao'): one way delay: 18.80 micro sec
#flow ('Sevilha', 'Lisboa'): one way delay: 18.80 micro sec
#flow ('Corunha', 'Barcelona'): one way delay: 40.43 micro sec
#flow ('Granada', 'Vigo'): one way delay: 70.37 micro sec
#flow ('Barcelona', 'Porto'): one way delay: 40.25 micro sec
#flow ('Barcelona', 'Bilbau'): one way delay: 20.29 micro sec
#flow ('Valencia', 'Barcelona'): one way delay: 9.25 micro sec
#flow ('Bilbau', 'Badajoz'): one way delay: 31.81 micro sec
#flow ('Aveiro', 'Vigo'): one way delay: 20.77 micro sec
#flow ('Lisboa', 'Badajoz'): one way delay: 9.50 micro sec
#flow ('Badajoz', 'Bilbau'): one way delay: 30.90 micro sec
#flow ('Braganca', 'Valencia'): one way delay: 31.08 micro sec
#flow ('Bilbau', 'Palma'): one way delay: 29.47 micro sec
#flow ('Sevilha', 'Braganca'): one way delay: 31.76 micro sec
#flow ('Madrid', 'Portimao'): one way delay: 40.10 micro sec
#flow ('Badajoz', 'Barcelona'): one way delay: 19.04 micro sec
#flow ('Madrid', 'Palma'): one way delay: 18.82 micro sec
#flow ('Palma', 'Portimao'): one way delay: 27.81 micro sec
#flow ('Gijon', 'Bilbau'): one way delay: 10.16 micro sec
#flow ('Valencia', 'Granada'): one way delay: 9.26 micro sec
#flow ('Valencia', 'Lisboa'): one way delay: 19.34 micro sec
#flow ('Bilbau', 'Corunha'): one way delay: 20.57 micro sec
#flow ('Vigo', 'Valencia'): one way delay: 50.90 micro sec
#flow ('Portimao', 'Valencia'): one way delay: 28.83 micro sec
#flow ('Bilbau', 'Barcelona'): one way delay: 19.95 micro sec
#flow ('Badajoz', 'Palma'): one way delay: 18.66 micro sec
#flow ('Vigo', 'Barcelona'): one way delay: 49.69 micro sec
#flow ('Vigo', 'Porto'): one way delay: 9.98 micro sec
#flow ('Vigo', 'Gijon'): one way delay: 19.58 micro sec
#flow ('Corunha', 'Porto'): one way delay: 19.24 micro sec
#flow ('Corunha', 'Badajoz'): one way delay: 41.84 micro sec
#flow ('Portimao', 'Aveiro'): one way delay: 20.19 micro sec
#flow ('Vilar.Formoso', 'Sevilha'): one way delay: 20.65 micro sec
#flow ('Badajoz', 'Vilar.Formoso'): one way delay: 10.63 micro sec
#flow ('Aveiro', 'Portimao'): one way delay: 19.96 micro sec
#flow ('Andorra', 'Portimao'): one way delay: 47.19 micro sec
#flow ('Sevilha', 'Madrid'): one way delay: 29.57 micro sec

```

```

#flow ('Sevilha', 'Palma'): one way delay: 18.51 micro sec
#flow ('Bilbau', 'Valencia'): one way delay: 20.80 micro sec
#flow ('Porto', 'Lisboa'): one way delay: 21.27 micro sec
#flow ('Braganca', 'Portimao'): one way delay: 41.01 micro sec
#flow ('Gijon', 'Valencia'): one way delay: 30.96 micro sec
#flow ('Lisboa', 'Sevilha'): one way delay: 18.76 micro sec
#flow ('Corunha', 'Aveiro'): one way delay: 30.07 micro sec
#flow ('Andorra', 'Vilar.Formoso'): one way delay: 31.30 micro sec
#flow ('Granada', 'Barcelona'): one way delay: 18.67 micro sec
#flow ('Barcelona', 'Badajoz'): one way delay: 18.66 micro sec
#flow ('Palma', 'Vilar.Formoso'): one way delay: 29.05 micro sec
#flow ('Porto', 'Portimao'): one way delay: 30.78 micro sec
#flow ('Andorra', 'Braganca'): one way delay: 20.29 micro sec
#flow ('Madrid', 'Lisboa'): one way delay: 30.38 micro sec
#flow ('Andorra', 'Lisboa'): one way delay: 38.16 micro sec
#flow ('Porto', 'Gijon'): one way delay: 29.54 micro sec
#flow ('Madrid', 'Sevilha'): one way delay: 29.66 micro sec
#flow ('Barcelona', 'Aveiro'): one way delay: 29.34 micro sec
#flow ('Vigo', 'Andorra'): one way delay: 39.86 micro sec
#flow ('Palma', 'Badajoz'): one way delay: 18.67 micro sec
#flow ('Corunha', 'Andorra'): one way delay: 30.60 micro sec
#flow ('Lisboa', 'Portimao'): one way delay: 9.51 micro sec
#flow ('Vigo', 'Lisboa'): one way delay: 31.25 micro sec
#flow ('Aveiro', 'Vilar.Formoso'): one way delay: 9.96 micro sec
#flow ('Portimao', 'Lisboa'): one way delay: 9.54 micro sec
#flow ('Braganca', 'Gijon'): one way delay: 9.52 micro sec
#flow ('Valencia', 'Portimao'): one way delay: 36.69 micro sec
#flow ('Lisboa', 'Barcelona'): one way delay: 28.54 micro sec
#flow ('Granada', 'Gijon'): one way delay: 39.38 micro sec
#flow ('Portimao', 'Granada'): one way delay: 18.64 micro sec
#flow ('Badajoz', 'Valencia'): one way delay: 9.79 micro sec
#flow ('Vigo', 'Badajoz'): one way delay: 41.77 micro sec
#flow ('Valencia', 'Gijon'): one way delay: 40.98 micro sec
#flow ('Porto', 'Sevilha'): one way delay: 70.89 micro sec
#flow ('Andorra', 'Aveiro'): one way delay: 41.13 micro sec
#flow ('Andorra', 'Granada'): one way delay: 28.39 micro sec
#flow ('Barcelona', 'Braganca'): one way delay: 30.27 micro sec
#flow ('Braganca', 'Barcelona'): one way delay: 30.23 micro sec
#flow ('Bilbau', 'Vigo'): one way delay: 29.83 micro sec
#flow ('Portimao', 'Braganca'): one way delay: 41.02 micro sec
#flow ('Gijon', 'Vigo'): one way delay: 19.56 micro sec
#flow ('Porto', 'Valencia'): one way delay: 41.10 micro sec
#flow ('Barcelona', 'Granada'): one way delay: 18.57 micro sec
#flow ('Braganca', 'Vilar.Formoso'): one way delay: 11.01 micro sec
#flow ('Lisboa', 'Braganca'): one way delay: 31.29 micro sec
#flow ('Porto', 'Andorra'): one way delay: 39.77 micro sec
#flow ('Palma', 'Lisboa'): one way delay: 28.34 micro sec
#flow ('Sevilha', 'Portimao'): one way delay: 9.27 micro sec
#flow ('Granada', 'Lisboa'): one way delay: 28.35 micro sec
#flow ('Sevilha', 'Valencia'): one way delay: 18.39 micro sec
#flow ('Corunha', 'Gijon'): one way delay: 10.32 micro sec
#flow ('Vilar.Formoso', 'Gijon'): one way delay: 20.67 micro sec
#flow ('Gijon', 'Madrid'): one way delay: 20.81 micro sec
#flow ('Vilar.Formoso', 'Aveiro'): one way delay: 9.83 micro sec
#flow ('Vigo', 'Braganca'): one way delay: 19.94 micro sec
#flow ('Badajoz', 'Corunha'): one way delay: 41.60 micro sec
#flow ('Badajoz', 'Aveiro'): one way delay: 20.46 micro sec
#flow ('Badajoz', 'Madrid'): one way delay: 19.60 micro sec
#flow ('Madrid', 'Valencia'): one way delay: 18.26 micro sec
#flow ('Portimao', 'Madrid'): one way delay: 40.12 micro sec

```

9.4 Lambda, link-load e one way delay para cada link (Exercícios 5,6 e 7)

```

#link Gijon-Bilbau: 26584 pkts/sec -- link-load: 21.27% -- one_way_delay: 10.16 micro
sec
#link Bilbau-Gijon: 27676 pkts/sec -- link-load: 22.14% -- one_way_delay: 10.27 micro
sec
#link Granada-Sevilha: 20079 pkts/sec -- link-load: 16.06% -- one_way_delay: 9.53 micro
sec
#link Sevilha-Granada: 18508 pkts/sec -- link-load: 14.81% -- one_way_delay: 9.39 micro
sec
#link Badajoz-Lisboa: 21577 pkts/sec -- link-load: 17.26% -- one_way_delay: 9.67 micro
sec
#link Lisboa-Badajoz: 19741 pkts/sec -- link-load: 15.79% -- one_way_delay: 9.50 micro
sec
#link Badajoz-Sevilha: 23257 pkts/sec -- link-load: 18.61% -- one_way_delay: 9.83 micro
sec

```

```

#link Sevilha-Badajoz: 24744 pkts/sec -- link-load: 19.80% -- one_way_delay: 9.97 micro
sec
#link Aveiro-Porto: 32504 pkts/sec -- link-load: 26.00% -- one_way_delay: 10.81 micro
sec
#link Porto-Aveiro: 32640 pkts/sec -- link-load: 26.11% -- one_way_delay: 10.83 micro
sec
#link Badajoz-Vilar.Formoso: 30961 pkts/sec -- link-load: 24.77% -- one_way_delay: 10.63
micro sec
#link Vilar.Formoso-Badajoz: 32569 pkts/sec -- link-load: 26.06% -- one_way_delay: 10.82
micro sec
#link Porto-Braganca: 24623 pkts/sec -- link-load: 19.70% -- one_way_delay: 9.96 micro
sec
#link Braganca-Porto: 24801 pkts/sec -- link-load: 19.84% -- one_way_delay: 9.98 micro
sec
#link Braganca-Gijon: 19935 pkts/sec -- link-load: 15.95% -- one_way_delay: 9.52 micro
sec
#link Gijon-Braganca: 21810 pkts/sec -- link-load: 17.45% -- one_way_delay: 9.69 micro
sec
#link Palma-Valencia: 13870 pkts/sec -- link-load: 11.10% -- one_way_delay: 9.00 micro
sec
#link Valencia-Palma: 12313 pkts/sec -- link-load: 9.85% -- one_way_delay: 8.87 micro
sec
#link Barcelona-Andorra: 24770 pkts/sec -- link-load: 19.82% -- one_way_delay: 9.98
micro sec
#link Andorra-Barcelona: 23220 pkts/sec -- link-load: 18.58% -- one_way_delay: 9.83
micro sec
#link Bilbao-Madrid: 31074 pkts/sec -- link-load: 24.86% -- one_way_delay: 10.65 micro
sec
#link Madrid-Bilbao: 27859 pkts/sec -- link-load: 22.29% -- one_way_delay: 10.29 micro
sec
#link Barcelona-Valencia: 13757 pkts/sec -- link-load: 11.01% -- one_way_delay: 8.99
micro sec
#link Valencia-Barcelona: 16858 pkts/sec -- link-load: 13.49% -- one_way_delay: 9.25
micro sec
#link Portimao-Sevilha: 16941 pkts/sec -- link-load: 13.55% -- one_way_delay: 9.25 micro
sec
#link Sevilha-Portimao: 17081 pkts/sec -- link-load: 13.66% -- one_way_delay: 9.27 micro
sec
#link Madrid-Vilar.Formoso: 26050 pkts/sec -- link-load: 20.84% -- one_way_delay: 10.11
micro sec
#link Vilar.Formoso-Madrid: 24732 pkts/sec -- link-load: 19.79% -- one_way_delay: 9.97
micro sec
#link Granada-Valencia: 13927 pkts/sec -- link-load: 11.14% -- one_way_delay: 9.00 micro
sec
#link Valencia-Granada: 16978 pkts/sec -- link-load: 13.58% -- one_way_delay: 9.26 micro
sec
#link Aveiro-Lisboa: 29286 pkts/sec -- link-load: 23.43% -- one_way_delay: 10.45 micro
sec
#link Lisboa-Aveiro: 31101 pkts/sec -- link-load: 24.88% -- one_way_delay: 10.65 micro
sec
#link Badajoz-Valencia: 22855 pkts/sec -- link-load: 18.28% -- one_way_delay: 9.79 micro
sec
#link Valencia-Badajoz: 21647 pkts/sec -- link-load: 17.32% -- one_way_delay: 9.68 micro
sec
#link Braganca-Vilar.Formoso: 34192 pkts/sec -- link-load: 27.35% -- one_way_delay:
11.01 micro sec
#link Vilar.Formoso-Braganca: 35340 pkts/sec -- link-load: 28.27% -- one_way_delay:
11.15 micro sec
#link Aveiro-Vilar.Formoso: 24608 pkts/sec -- link-load: 19.69% -- one_way_delay: 9.96
micro sec
#link Vilar.Formoso-Aveiro: 23238 pkts/sec -- link-load: 18.59% -- one_way_delay: 9.83
micro sec
#link Portimao-Lisboa: 20131 pkts/sec -- link-load: 16.10% -- one_way_delay: 9.54 micro
sec
#link Lisboa-Portimao: 19831 pkts/sec -- link-load: 15.86% -- one_way_delay: 9.51 micro
sec
#link Granada-Palma: 15387 pkts/sec -- link-load: 12.31% -- one_way_delay: 9.12 micro
sec
#link Palma-Granada: 14059 pkts/sec -- link-load: 11.25% -- one_way_delay: 9.01 micro
sec
#link Bilbao-Andorra: 26246 pkts/sec -- link-load: 21.00% -- one_way_delay: 10.13 micro
sec
#link Andorra-Bilbao: 28031 pkts/sec -- link-load: 22.42% -- one_way_delay: 10.31 micro
sec
#link Vigo-Corunha: 17000 pkts/sec -- link-load: 13.60% -- one_way_delay: 9.26 micro sec
#link Corunha-Vigo: 17046 pkts/sec -- link-load: 13.64% -- one_way_delay: 9.26 micro sec
#link Madrid-Barcelona: 17156 pkts/sec -- link-load: 13.72% -- one_way_delay: 9.27 micro
sec
#link Barcelona-Madrid: 18679 pkts/sec -- link-load: 14.94% -- one_way_delay: 9.41 micro
sec
#link Braganca-Bilbao: 27681 pkts/sec -- link-load: 22.14% -- one_way_delay: 10.28 micro
sec

```

```
#link Bilbao-Braganca: 24754 pkts/sec -- link-load: 19.80% -- one_way_delay: 9.98 micro
sec
#link Madrid-Valencia: 26545 pkts/sec -- link-load: 21.24% -- one_way_delay: 10.16 micro
sec
#link Valencia-Madrid: 23053 pkts/sec -- link-load: 18.44% -- one_way_delay: 9.81 micro
sec
#link Corunha-Gijon: 28063 pkts/sec -- link-load: 22.45% -- one_way_delay: 10.32 micro
sec
#link Gijon-Corunha: 27844 pkts/sec -- link-load: 22.28% -- one_way_delay: 10.29 micro
sec
#link Barcelona-Palma: 20307 pkts/sec -- link-load: 16.25% -- one_way_delay: 9.55 micro
sec
#link Palma-Barcelona: 20210 pkts/sec -- link-load: 16.17% -- one_way_delay: 9.54 micro
sec
#link Porto-Vigo: 24625 pkts/sec -- link-load: 19.70% -- one_way_delay: 9.96 micro sec
#link Vigo-Porto: 24782 pkts/sec -- link-load: 19.83% -- one_way_delay: 9.98 micro sec
```

9.5 One way delay de cada fluxo (Exercícios 8, 9 e 10)

```
#flow ('Portimao', 'Palma'): one way delay: 37.89 micro sec
#flow ('Vilar.Formoso', 'Granada'): one way delay: 29.39 micro sec
#flow ('Valencia', 'Andorra'): one way delay: 30.23 micro sec
#flow ('Aveiro', 'Barcelona'): one way delay: 29.21 micro sec
#flow ('Madrid', 'Gijon'): one way delay: 20.57 micro sec
#flow ('Portimao', 'Porto'): one way delay: 31.00 micro sec
#flow ('Portimao', 'Badajoz'): one way delay: 19.23 micro sec
#flow ('Palma', 'Porto'): one way delay: 49.55 micro sec
#flow ('Granada', 'Sevilha'): one way delay: 9.53 micro sec
#flow ('Badajoz', 'Vigo'): one way delay: 41.09 micro sec
#flow ('Portimao', 'Barcelona'): one way delay: 38.08 micro sec
#flow ('Lisboa', 'Vigo'): one way delay: 31.42 micro sec
#flow ('Braganca', 'Lisboa'): one way delay: 31.26 micro sec
#flow ('Aveiro', 'Porto'): one way delay: 10.81 micro sec
#flow ('Palma', 'Gijon'): one way delay: 39.38 micro sec
#flow ('Sevilha', 'Vigo'): one way delay: 51.07 micro sec
#flow ('Valencia', 'Madrid'): one way delay: 9.81 micro sec
#flow ('Valencia', 'Aveiro'): one way delay: 49.22 micro sec
#flow ('Palma', 'Andorra'): one way delay: 19.52 micro sec
#flow ('Porto', 'Braganca'): one way delay: 9.96 micro sec
#flow ('Braganca', 'Palma'): one way delay: 39.78 micro sec
#flow ('Palma', 'Valencia'): one way delay: 9.00 micro sec
#flow ('Porto', 'Vigo'): one way delay: 9.96 micro sec
#flow ('Granada', 'Valencia'): one way delay: 9.00 micro sec
#flow ('Badajoz', 'Sevilha'): one way delay: 9.83 micro sec
#flow ('Aveiro', 'Andorra'): one way delay: 41.18 micro sec
#flow ('Barcelona', 'Portimao'): one way delay: 37.36 micro sec
#flow ('Portimao', 'Sevilha'): one way delay: 9.25 micro sec
#flow ('Vigo', 'Sevilha'): one way delay: 50.59 micro sec
#flow ('Madrid', 'Andorra'): one way delay: 20.42 micro sec
#flow ('Sevilha', 'Granada'): one way delay: 9.39 micro sec
#flow ('Vilar.Formoso', 'Porto'): one way delay: 21.13 micro sec
#flow ('Porto', 'Madrid'): one way delay: 30.88 micro sec
#flow ('Porto', 'Aveiro'): one way delay: 10.83 micro sec
#flow ('Valencia', 'Braganca'): one way delay: 39.91 micro sec
#flow ('Braganca', 'Sevilha'): one way delay: 31.66 micro sec
#flow ('Aveiro', 'Valencia'): one way delay: 30.09 micro sec
#flow ('Madrid', 'Vigo'): one way delay: 40.13 micro sec
#flow ('Andorra', 'Sevilha'): one way delay: 37.60 micro sec
#flow ('Gijon', 'Badajoz'): one way delay: 31.52 micro sec
#flow ('Lisboa', 'Andorra'): one way delay: 49.83 micro sec
#flow ('Madrid', 'Aveiro'): one way delay: 19.93 micro sec
#flow ('Valencia', 'Vigo'): one way delay: 59.37 micro sec
#flow ('Braganca', 'Madrid'): one way delay: 20.92 micro sec
#flow ('Granada', 'Palma'): one way delay: 9.12 micro sec
#flow ('Corunha', 'Braganca'): one way delay: 20.01 micro sec
#flow ('Braganca', 'Granada'): one way delay: 40.34 micro sec
#flow ('Andorra', 'Gijon'): one way delay: 20.59 micro sec
#flow ('Granada', 'Porto'): one way delay: 58.32 micro sec
#flow ('Braganca', 'Badajoz'): one way delay: 21.83 micro sec
#flow ('Corunha', 'Bilbau'): one way delay: 20.48 micro sec
#flow ('Vigo', 'Aveiro'): one way delay: 20.81 micro sec
#flow ('Vigo', 'Madrid'): one way delay: 40.86 micro sec
#flow ('Madrid', 'Badajoz'): one way delay: 20.92 micro sec
#flow ('Vigo', 'Corunha'): one way delay: 9.26 micro sec
#flow ('Badajoz', 'Braganca'): one way delay: 21.79 micro sec
#flow ('Sevilha', 'Barcelona'): one way delay: 28.06 micro sec
#flow ('Madrid', 'Barcelona'): one way delay: 9.27 micro sec
#flow ('Bilbau', 'Braganca'): one way delay: 9.98 micro sec
#flow ('Sevilha', 'Porto'): one way delay: 41.74 micro sec
#flow ('Sevilha', 'Badajoz'): one way delay: 9.97 micro sec
#flow ('Madrid', 'Braganca'): one way delay: 20.27 micro sec
#flow ('Braganca', 'Aveiro'): one way delay: 20.81 micro sec
#flow ('Braganca', 'Corunha'): one way delay: 19.81 micro sec
#flow ('Aveiro', 'Bilbau'): one way delay: 31.05 micro sec
#flow ('Portimao', 'Corunha'): one way delay: 50.22 micro sec
#flow ('Corunha', 'Palma'): one way delay: 49.95 micro sec
#flow ('Palma', 'Madrid'): one way delay: 18.81 micro sec
#flow ('Bilbau', 'Granada'): one way delay: 30.06 micro sec
#flow ('Andorra', 'Vigo'): one way delay: 40.14 micro sec
#flow ('Barcelona', 'Palma'): one way delay: 9.55 micro sec
#flow ('Corunha', 'Valencia'): one way delay: 41.28 micro sec
#flow ('Valencia', 'Vilar.Formoso'): one way delay: 19.92 micro sec
#flow ('Vilar.Formoso', 'Portimao'): one way delay: 29.92 micro sec
#flow ('Porto', 'Bilbau'): one way delay: 20.24 micro sec
#flow ('Porto', 'Corunha'): one way delay: 19.22 micro sec
#flow ('Vilar.Formoso', 'Madrid'): one way delay: 9.97 micro sec
#flow ('Vilar.Formoso', 'Corunha'): one way delay: 30.96 micro sec
#flow ('Valencia', 'Corunha'): one way delay: 78.99 micro sec
#flow ('Valencia', 'Badajoz'): one way delay: 98.95 micro sec
```



```

#flow ('Badajoz', 'Lisboa'): one way delay: 9.67 micro sec
#flow ('Vilar.Formoso', 'Bilbau'): one way delay: 21.43 micro sec
#flow ('Portimao', 'Bilbau'): one way delay: 51.58 micro sec
#flow ('Portimao', 'Andorra'): one way delay: 47.29 micro sec
#flow ('Porto', 'Vilar.Formoso'): one way delay: 20.97 micro sec
#flow ('Badajoz', 'Andorra'): one way delay: 29.01 micro sec
#flow ('Valencia', 'Bilbau'): one way delay: 20.10 micro sec
#flow ('Granada', 'Aveiro'): one way delay: 38.98 micro sec
#flow ('Granada', 'Corunha'): one way delay: 49.67 micro sec
#flow ('Lisboa', 'Bilbau'): one way delay: 41.70 micro sec
#flow ('Bilbau', 'Lisboa'): one way delay: 41.23 micro sec
#flow ('Gijon', 'Andorra'): one way delay: 20.29 micro sec
#flow ('Valencia', 'Sevilha'): one way delay: 49.41 micro sec
#flow ('Bilbau', 'Sevilha'): one way delay: 41.64 micro sec
#flow ('Porto', 'Badajoz'): one way delay: 31.61 micro sec
#flow ('Porto', 'Granada'): one way delay: 49.42 micro sec
#flow ('Palma', 'Braganca'): one way delay: 40.21 micro sec
#flow ('Bilbau', 'Vilar.Formoso'): one way delay: 20.75 micro sec
#flow ('Porto', 'Barcelona'): one way delay: 40.19 micro sec
#flow ('Madrid', 'Vilar.Formoso'): one way delay: 10.11 micro sec
#flow ('Corunha', 'Portimao'): one way delay: 60.94 micro sec
#flow ('Bilbau', 'Gijon'): one way delay: 10.27 micro sec
#flow ('Aveiro', 'Palma'): one way delay: 38.61 micro sec
#flow ('Braganca', 'Andorra'): one way delay: 20.40 micro sec
#flow ('Andorra', 'Valencia'): one way delay: 18.81 micro sec
#flow ('Sevilha', 'Vilar.Formoso'): one way delay: 20.61 micro sec
#flow ('Aveiro', 'Sevilha'): one way delay: 29.21 micro sec
#flow ('Bilbau', 'Portimao'): one way delay: 50.53 micro sec
#flow ('Gijon', 'Barcelona'): one way delay: 30.08 micro sec
#flow ('Vigo', 'Vilar.Formoso'): one way delay: 30.95 micro sec
#flow ('Aveiro', 'Lisboa'): one way delay: 10.45 micro sec
#flow ('Badajoz', 'Gijon'): one way delay: 31.31 micro sec
#flow ('Badajoz', 'Porto'): one way delay: 31.13 micro sec
#flow ('Aveiro', 'Madrid'): one way delay: 19.93 micro sec
#flow ('Barcelona', 'Vilar.Formoso'): one way delay: 19.51 micro sec
#flow ('Madrid', 'Bilbau'): one way delay: 10.29 micro sec
#flow ('Badajoz', 'Portimao'): one way delay: 19.18 micro sec
#flow ('Barcelona', 'Sevilha'): one way delay: 28.50 micro sec
#flow ('Andorra', 'Corunha'): one way delay: 30.88 micro sec
#flow ('Madrid', 'Corunha'): one way delay: 30.86 micro sec
#flow ('Gijon', 'Granada'): one way delay: 40.22 micro sec
#flow ('Palma', 'Sevilha'): one way delay: 18.54 micro sec
#flow ('Andorra', 'Bilbau'): one way delay: 10.31 micro sec
#flow ('Granada', 'Madrid'): one way delay: 18.81 micro sec
#flow ('Andorra', 'Palma'): one way delay: 19.38 micro sec
#flow ('Sevilha', 'Aveiro'): one way delay: 30.44 micro sec
#flow ('Andorra', 'Barcelona'): one way delay: 9.83 micro sec
#flow ('Gijon', 'Corunha'): one way delay: 10.29 micro sec
#flow ('Corunha', 'Madrid'): one way delay: 31.12 micro sec
#flow ('Lisboa', 'Corunha'): one way delay: 40.68 micro sec
#flow ('Andorra', 'Badajoz'): one way delay: 28.49 micro sec
#flow ('Aveiro', 'Granada'): one way delay: 38.60 micro sec
#flow ('Barcelona', 'Andorra'): one way delay: 9.98 micro sec
#flow ('Braganca', 'Bilbau'): one way delay: 10.28 micro sec
#flow ('Granada', 'Andorra'): one way delay: 28.23 micro sec
#flow ('Lisboa', 'Aveiro'): one way delay: 10.65 micro sec
#flow ('Barcelona', 'Vigo'): one way delay: 49.62 micro sec
#flow ('Gijon', 'Lisboa'): one way delay: 40.95 micro sec
#flow ('Vilar.Formoso', 'Braganca'): one way delay: 11.15 micro sec
#flow ('Gijon', 'Braganca'): one way delay: 9.69 micro sec
#flow ('Gijon', 'Aveiro'): one way delay: 30.50 micro sec
#flow ('Sevilha', 'Andorra'): one way delay: 37.62 micro sec
#flow ('Vilar.Formoso', 'Barcelona'): one way delay: 19.25 micro sec
#flow ('Palma', 'Granada'): one way delay: 9.01 micro sec
#flow ('Barcelona', 'Gijon'): one way delay: 29.97 micro sec
#flow ('Barcelona', 'Madrid'): one way delay: 9.41 micro sec
#flow ('Vilar.Formoso', 'Badajoz'): one way delay: 10.82 micro sec
#flow ('Barcelona', 'Corunha'): one way delay: 40.86 micro sec
#flow ('Granada', 'Badajoz'): one way delay: 19.51 micro sec
#flow ('Portimao', 'Gijon'): one way delay: 50.34 micro sec
#flow ('Corunha', 'Sevilha'): one way delay: 51.67 micro sec
#flow ('Bilbau', 'Andorra'): one way delay: 10.13 micro sec
#flow ('Granada', 'Vilar.Formoso'): one way delay: 30.14 micro sec
#flow ('Palma', 'Bilbau'): one way delay: 29.24 micro sec
#flow ('Bilbau', 'Aveiro'): one way delay: 30.81 micro sec
#flow ('Gijon', 'Palma'): one way delay: 39.84 micro sec
#flow ('Lisboa', 'Granada'): one way delay: 28.15 micro sec
#flow ('Palma', 'Corunha'): one way delay: 49.67 micro sec
#flow ('Corunha', 'Vigo'): one way delay: 9.26 micro sec
#flow ('Badajoz', 'Granada'): one way delay: 19.05 micro sec
#flow ('Portimao', 'Vilar.Formoso'): one way delay: 29.86 micro sec
#flow ('Granada', 'Bilbau'): one way delay: 38.96 micro sec
#flow ('Vigo', 'Palma'): one way delay: 59.77 micro sec

```

```

#flow ('Vigo', 'Bilbau'): one way delay: 30.22 micro sec
#flow ('Vilar.Formoso', 'Vigo'): one way delay: 30.60 micro sec
#flow ('Sevilha', 'Corunha'): one way delay: 68.50 micro sec
#flow ('Sevilha', 'Gijon'): one way delay: 41.28 micro sec
#flow ('Sevilha', 'Bilbau'): one way delay: 48.35 micro sec
#flow ('Madrid', 'Porto'): one way delay: 30.74 micro sec
#flow ('Vilar.Formoso', 'Andorra'): one way delay: 31.55 micro sec
#flow ('Andorra', 'Madrid'): one way delay: 20.96 micro sec
#flow ('Bilbau', 'Porto'): one way delay: 19.96 micro sec
#flow ('Lisboa', 'Vilar.Formoso'): one way delay: 20.61 micro sec
#flow ('Gijon', 'Porto'): one way delay: 19.67 micro sec
#flow ('Barcelona', 'Lisboa'): one way delay: 28.33 micro sec
#flow ('Andorra', 'Porto'): one way delay: 30.27 micro sec
#flow ('Bilbau', 'Madrid'): one way delay: 10.65 micro sec
#flow ('Gijon', 'Portimao'): one way delay: 50.48 micro sec
#flow ('Gijon', 'Vilar.Formoso'): one way delay: 20.70 micro sec
#flow ('Vilar.Formoso', 'Lisboa'): one way delay: 20.49 micro sec
#flow ('Braganca', 'Porto'): one way delay: 9.98 micro sec
#flow ('Lisboa', 'Palma'): one way delay: 28.17 micro sec
#flow ('Palma', 'Barcelona'): one way delay: 9.54 micro sec
#flow ('Porto', 'Palma'): one way delay: 49.59 micro sec
#flow ('Granada', 'Braganca'): one way delay: 49.58 micro sec
#flow ('Braganca', 'Vigo'): one way delay: 19.94 micro sec
#flow ('Barcelona', 'Valencia'): one way delay: 8.99 micro sec
#flow ('Corunha', 'Vilar.Formoso'): one way delay: 31.02 micro sec
#flow ('Vigo', 'Granada'): one way delay: 60.15 micro sec
#flow ('Portimao', 'Vigo'): one way delay: 40.96 micro sec
#flow ('Lisboa', 'Valencia'): one way delay: 19.29 micro sec
#flow ('Gijon', 'Sevilha'): one way delay: 41.35 micro sec
#flow ('Palma', 'Aveiro'): one way delay: 38.88 micro sec
#flow ('Valencia', 'Porto'): one way delay: 40.81 micro sec
#flow ('Valencia', 'Palma'): one way delay: 8.87 micro sec
#flow ('Lisboa', 'Porto'): one way delay: 21.46 micro sec
#flow ('Madrid', 'Granada'): one way delay: 19.41 micro sec
#flow ('Vigo', 'Portimao'): one way delay: 40.76 micro sec
#flow ('Vilar.Formoso', 'Valencia'): one way delay: 20.13 micro sec
#flow ('Aveiro', 'Badajoz'): one way delay: 20.78 micro sec
#flow ('Vilar.Formoso', 'Palma'): one way delay: 28.80 micro sec
#flow ('Lisboa', 'Gijon'): one way delay: 41.28 micro sec
#flow ('Lisboa', 'Madrid'): one way delay: 29.10 micro sec
#flow ('Aveiro', 'Braganca'): one way delay: 21.11 micro sec
#flow ('Corunha', 'Granada'): one way delay: 58.99 micro sec
#flow ('Palma', 'Vigo'): one way delay: 58.93 micro sec
#flow ('Aveiro', 'Gijon'): one way delay: 30.29 micro sec
#flow ('Corunha', 'Lisboa'): one way delay: 40.52 micro sec
#flow ('Aveiro', 'Corunha'): one way delay: 30.03 micro sec
#flow ('Granada', 'Portimao'): one way delay: 18.80 micro sec
#flow ('Sevilha', 'Lisboa'): one way delay: 18.80 micro sec
#flow ('Corunha', 'Barcelona'): one way delay: 40.43 micro sec
#flow ('Granada', 'Vigo'): one way delay: 70.37 micro sec
#flow ('Barcelona', 'Porto'): one way delay: 40.25 micro sec
#flow ('Barcelona', 'Bilbau'): one way delay: 20.29 micro sec
#flow ('Valencia', 'Barcelona'): one way delay: 9.25 micro sec
#flow ('Bilbau', 'Badajoz'): one way delay: 31.81 micro sec
#flow ('Aveiro', 'Vigo'): one way delay: 20.77 micro sec
#flow ('Lisboa', 'Badajoz'): one way delay: 9.50 micro sec
#flow ('Badajoz', 'Bilbau'): one way delay: 30.90 micro sec
#flow ('Braganca', 'Valencia'): one way delay: 31.08 micro sec
#flow ('Bilbau', 'Palma'): one way delay: 29.47 micro sec
#flow ('Sevilha', 'Braganca'): one way delay: 31.76 micro sec
#flow ('Madrid', 'Portimao'): one way delay: 40.10 micro sec
#flow ('Badajoz', 'Barcelona'): one way delay: 19.04 micro sec
#flow ('Madrid', 'Palma'): one way delay: 18.82 micro sec
#flow ('Palma', 'Portimao'): one way delay: 27.81 micro sec
#flow ('Gijon', 'Bilbau'): one way delay: 10.16 micro sec
#flow ('Valencia', 'Granada'): one way delay: 9.26 micro sec
#flow ('Valencia', 'Lisboa'): one way delay: 19.34 micro sec
#flow ('Bilbau', 'Corunha'): one way delay: 20.57 micro sec
#flow ('Vigo', 'Valencia'): one way delay: 50.90 micro sec
#flow ('Portimao', 'Valencia'): one way delay: 28.83 micro sec
#flow ('Bilbau', 'Barcelona'): one way delay: 19.95 micro sec
#flow ('Badajoz', 'Palma'): one way delay: 18.66 micro sec
#flow ('Vigo', 'Barcelona'): one way delay: 49.69 micro sec
#flow ('Vigo', 'Porto'): one way delay: 9.98 micro sec
#flow ('Vigo', 'Gijon'): one way delay: 19.58 micro sec
#flow ('Corunha', 'Porto'): one way delay: 19.24 micro sec
#flow ('Corunha', 'Badajoz'): one way delay: 41.84 micro sec
#flow ('Portimao', 'Aveiro'): one way delay: 20.19 micro sec
#flow ('Vilar.Formoso', 'Sevilha'): one way delay: 20.65 micro sec
#flow ('Badajoz', 'Vilar.Formoso'): one way delay: 10.63 micro sec
#flow ('Aveiro', 'Portimao'): one way delay: 19.95 micro sec
#flow ('Andorra', 'Portimao'): one way delay: 47.19 micro sec
#flow ('Sevilha', 'Madrid'): one way delay: 29.57 micro sec

```

```
#flow ('Sevilha', 'Palma'): one way delay: 18.51 micro sec
#flow ('Bilbau', 'Valencia'): one way delay: 20.80 micro sec
#flow ('Porto', 'Lisboa'): one way delay: 21.27 micro sec
#flow ('Braganca', 'Portimao'): one way delay: 41.01 micro sec
#flow ('Gijon', 'Valencia'): one way delay: 30.96 micro sec
#flow ('Lisboa', 'Sevilha'): one way delay: 19.33 micro sec
#flow ('Corunha', 'Aveiro'): one way delay: 30.07 micro sec
#flow ('Andorra', 'Vilar.Formoso'): one way delay: 31.30 micro sec
#flow ('Granada', 'Barcelona'): one way delay: 18.67 micro sec
#flow ('Barcelona', 'Badajoz'): one way delay: 18.66 micro sec
#flow ('Palma', 'Vilar.Formoso'): one way delay: 29.05 micro sec
#flow ('Porto', 'Portimao'): one way delay: 30.78 micro sec
#flow ('Andorra', 'Braganca'): one way delay: 20.29 micro sec
#flow ('Madrid', 'Lisboa'): one way delay: 30.38 micro sec
#flow ('Andorra', 'Lisboa'): one way delay: 38.16 micro sec
#flow ('Porto', 'Gijon'): one way delay: 29.54 micro sec
#flow ('Madrid', 'Sevilha'): one way delay: 29.66 micro sec
#flow ('Barcelona', 'Aveiro'): one way delay: 29.34 micro sec
#flow ('Vigo', 'Andorra'): one way delay: 39.86 micro sec
#flow ('Palma', 'Badajoz'): one way delay: 18.67 micro sec
#flow ('Corunha', 'Andorra'): one way delay: 30.60 micro sec
#flow ('Lisboa', 'Portimao'): one way delay: 9.51 micro sec
#flow ('Vigo', 'Lisboa'): one way delay: 31.25 micro sec
#flow ('Aveiro', 'Vilar.Formoso'): one way delay: 9.96 micro sec
#flow ('Portimao', 'Lisboa'): one way delay: 9.54 micro sec
#flow ('Braganca', 'Gijon'): one way delay: 9.52 micro sec
#flow ('Valencia', 'Portimao'): one way delay: 36.69 micro sec
#flow ('Lisboa', 'Barcelona'): one way delay: 28.54 micro sec
#flow ('Granada', 'Gijon'): one way delay: 39.38 micro sec
#flow ('Portimao', 'Granada'): one way delay: 18.64 micro sec
#flow ('Badajoz', 'Valencia'): one way delay: 9.79 micro sec
#flow ('Vigo', 'Badajoz'): one way delay: 41.77 micro sec
#flow ('Valencia', 'Gijon'): one way delay: 40.98 micro sec
#flow ('Porto', 'Sevilha'): one way delay: 70.89 micro sec
#flow ('Andorra', 'Aveiro'): one way delay: 41.13 micro sec
#flow ('Andorra', 'Granada'): one way delay: 28.39 micro sec
#flow ('Barcelona', 'Braganca'): one way delay: 30.27 micro sec
#flow ('Braganca', 'Barcelona'): one way delay: 30.23 micro sec
#flow ('Bilbau', 'Vigo'): one way delay: 29.83 micro sec
#flow ('Portimao', 'Braganca'): one way delay: 41.01 micro sec
#flow ('Gijon', 'Vigo'): one way delay: 19.56 micro sec
#flow ('Porto', 'Valencia'): one way delay: 41.10 micro sec
#flow ('Barcelona', 'Granada'): one way delay: 18.57 micro sec
#flow ('Braganca', 'Vilar.Formoso'): one way delay: 11.01 micro sec
#flow ('Lisboa', 'Braganca'): one way delay: 31.29 micro sec
#flow ('Porto', 'Andorra'): one way delay: 39.77 micro sec
#flow ('Palma', 'Lisboa'): one way delay: 28.34 micro sec
#flow ('Sevilha', 'Portimao'): one way delay: 9.27 micro sec
#flow ('Granada', 'Lisboa'): one way delay: 28.35 micro sec
#flow ('Sevilha', 'Valencia'): one way delay: 18.39 micro sec
#flow ('Corunha', 'Gijon'): one way delay: 10.32 micro sec
#flow ('Vilar.Formoso', 'Gijon'): one way delay: 20.67 micro sec
#flow ('Gijon', 'Madrid'): one way delay: 20.81 micro sec
#flow ('Vilar.Formoso', 'Aveiro'): one way delay: 9.83 micro sec
#flow ('Vigo', 'Braganca'): one way delay: 19.94 micro sec
#flow ('Badajoz', 'Corunha'): one way delay: 41.60 micro sec
#flow ('Badajoz', 'Aveiro'): one way delay: 20.46 micro sec
#flow ('Badajoz', 'Madrid'): one way delay: 19.60 micro sec
#flow ('Madrid', 'Valencia'): one way delay: 18.26 micro sec
#flow ('Portimao', 'Madrid'): one way delay: 40.12 micro sec
```

9.6 Lambda, link-load e one way delay para cada link (Exercícios 8, 9 e 10)

```
#link Gijon-Bilbau: 26584 pkts/sec -- link-load: 21.27% -- one_way_delay: 10.16 micro
sec
#link Bilbau-Gijon: 27676 pkts/sec -- link-load: 22.14% -- one_way_delay: 10.27 micro
sec
#link Granada-Sevilha: 20079 pkts/sec -- link-load: 16.06% -- one_way_delay: 9.53 micro
sec
#link Sevilha-Granada: 18508 pkts/sec -- link-load: 14.81% -- one_way_delay: 9.39 micro
sec
#link Badajoz-Lisboa: 21577 pkts/sec -- link-load: 17.26% -- one_way_delay: 9.67 micro
sec
#link Lisboa-Badajoz: 19768 pkts/sec -- link-load: 15.81% -- one_way_delay: 9.50 micro
sec
#link Badajoz-Sevilha: 23284 pkts/sec -- link-load: 18.63% -- one_way_delay: 9.83 micro
sec
```

```

#link Sevilha-Badajoz: 24744 pkts/sec -- link-load: 19.80% -- one_way_delay: 9.97 micro
sec
#link Aveiro-Porto: 32504 pkts/sec -- link-load: 26.00% -- one_way_delay: 10.81 micro
sec
#link Porto-Aveiro: 32640 pkts/sec -- link-load: 26.11% -- one_way_delay: 10.83 micro
sec
#link Badajoz-Vilar.Formoso: 30961 pkts/sec -- link-load: 24.77% -- one_way_delay: 10.63
micro sec
#link Vilar.Formoso-Badajoz: 32569 pkts/sec -- link-load: 26.06% -- one_way_delay: 10.82
micro sec
#link Porto-Braganca: 24623 pkts/sec -- link-load: 19.70% -- one_way_delay: 9.96 micro
sec
#link Braganca-Porto: 24801 pkts/sec -- link-load: 19.84% -- one_way_delay: 9.98 micro
sec
#link Braganca-Gijon: 19935 pkts/sec -- link-load: 15.95% -- one_way_delay: 9.52 micro
sec
#link Gijon-Braganca: 21810 pkts/sec -- link-load: 17.45% -- one_way_delay: 9.69 micro
sec
#link Palma-Valencia: 13870 pkts/sec -- link-load: 11.10% -- one_way_delay: 9.00 micro
sec
#link Valencia-Palma: 12313 pkts/sec -- link-load: 9.85% -- one_way_delay: 8.87 micro
sec
#link Barcelona-Andorra: 24770 pkts/sec -- link-load: 19.82% -- one_way_delay: 9.98
micro sec
#link Andorra-Barcelona: 23220 pkts/sec -- link-load: 18.58% -- one_way_delay: 9.83
micro sec
#link Bilbao-Madrid: 31074 pkts/sec -- link-load: 24.86% -- one_way_delay: 10.65 micro
sec
#link Madrid-Bilbao: 27859 pkts/sec -- link-load: 22.29% -- one_way_delay: 10.29 micro
sec
#link Barcelona-Valencia: 13757 pkts/sec -- link-load: 11.01% -- one_way_delay: 8.99
micro sec
#link Valencia-Barcelona: 16858 pkts/sec -- link-load: 13.49% -- one_way_delay: 9.25
micro sec
#link Portimao-Sevilha: 16914 pkts/sec -- link-load: 13.53% -- one_way_delay: 9.25 micro
sec
#link Sevilha-Portimao: 17081 pkts/sec -- link-load: 13.66% -- one_way_delay: 9.27 micro
sec
#link Madrid-Vilar.Formoso: 26050 pkts/sec -- link-load: 20.84% -- one_way_delay: 10.11
micro sec
#link Vilar.Formoso-Madrid: 24732 pkts/sec -- link-load: 19.79% -- one_way_delay: 9.97
micro sec
#link Granada-Valencia: 13927 pkts/sec -- link-load: 11.14% -- one_way_delay: 9.00 micro
sec
#link Valencia-Granada: 16978 pkts/sec -- link-load: 13.58% -- one_way_delay: 9.26 micro
sec
#link Aveiro-Lisboa: 29286 pkts/sec -- link-load: 23.43% -- one_way_delay: 10.45 micro
sec
#link Lisboa-Aveiro: 31101 pkts/sec -- link-load: 24.88% -- one_way_delay: 10.65 micro
sec
#link Badajoz-Valencia: 22855 pkts/sec -- link-load: 18.28% -- one_way_delay: 9.79 micro
sec
#link Valencia-Badajoz: 21647 pkts/sec -- link-load: 17.32% -- one_way_delay: 9.68 micro
sec
#link Braganca-Vilar.Formoso: 34192 pkts/sec -- link-load: 27.35% -- one_way_delay:
11.01 micro sec
#link Vilar.Formoso-Braganca: 35340 pkts/sec -- link-load: 28.27% -- one_way_delay:
11.15 micro sec
#link Aveiro-Vilar.Formoso: 24608 pkts/sec -- link-load: 19.69% -- one_way_delay: 9.96
micro sec
#link Vilar.Formoso-Aveiro: 23238 pkts/sec -- link-load: 18.59% -- one_way_delay: 9.83
micro sec
#link Portimao-Lisboa: 20131 pkts/sec -- link-load: 16.10% -- one_way_delay: 9.54 micro
sec
#link Lisboa-Portimao: 19804 pkts/sec -- link-load: 15.84% -- one_way_delay: 9.51 micro
sec
#link Granada-Palma: 15387 pkts/sec -- link-load: 12.31% -- one_way_delay: 9.12 micro
sec
#link Palma-Granada: 14059 pkts/sec -- link-load: 11.25% -- one_way_delay: 9.01 micro
sec
#link Bilbao-Andorra: 26246 pkts/sec -- link-load: 21.00% -- one_way_delay: 10.13 micro
sec
#link Andorra-Bilbao: 28031 pkts/sec -- link-load: 22.42% -- one_way_delay: 10.31 micro
sec
#link Vigo-Corunha: 17000 pkts/sec -- link-load: 13.60% -- one_way_delay: 9.26 micro sec
#link Corunha-Vigo: 17046 pkts/sec -- link-load: 13.64% -- one_way_delay: 9.26 micro sec
#link Madrid-Barcelona: 17156 pkts/sec -- link-load: 13.72% -- one_way_delay: 9.27 micro
sec
#link Barcelona-Madrid: 18679 pkts/sec -- link-load: 14.94% -- one_way_delay: 9.41 micro
sec
#link Braganca-Bilbao: 27681 pkts/sec -- link-load: 22.14% -- one_way_delay: 10.28 micro
sec

```

```
#link Bilbao-Braganca: 24754 pkts/sec -- link-load: 19.80% -- one_way_delay: 9.98 micro
sec
#link Madrid-Valencia: 26545 pkts/sec -- link-load: 21.24% -- one_way_delay: 10.16 micro
sec
#link Valencia-Madrid: 23053 pkts/sec -- link-load: 18.44% -- one_way_delay: 9.81 micro
sec
#link Corunha-Gijon: 28063 pkts/sec -- link-load: 22.45% -- one_way_delay: 10.32 micro
sec
#link Gijon-Corunha: 27844 pkts/sec -- link-load: 22.28% -- one_way_delay: 10.29 micro
sec
#link Barcelona-Palma: 20307 pkts/sec -- link-load: 16.25% -- one_way_delay: 9.55 micro
sec
#link Palma-Barcelona: 20210 pkts/sec -- link-load: 16.17% -- one_way_delay: 9.54 micro
sec
#link Porto-Vigo: 24625 pkts/sec -- link-load: 19.70% -- one_way_delay: 9.96 micro sec
#link Vigo-Porto: 24782 pkts/sec -- link-load: 19.83% -- one_way_delay: 9.98 micro sec
```

9.7 One way delay de cada fluxo (Exercícios 11 e 12)

```
#flow ('Vilar.Formoso', 'Granada'): one way delay: 49.29 micro sec
#flow ('Portimao', 'Palma'): one way delay: 28.48 micro sec
#flow ('Bilbao', 'Gijon'): one way delay: 10.46 micro sec
#flow ('Madrid', 'Gijon'): one way delay: 21.09 micro sec
#flow ('Portimao', 'Porto'): one way delay: 30.66 micro sec
#flow ('Portimao', 'Badajoz'): one way delay: 19.06 micro sec
#flow ('Palma', 'Porto'): one way delay: 48.74 micro sec
#flow ('Granada', 'Sevilha'): one way delay: 9.68 micro sec
#flow ('Badajoz', 'Vigo'): one way delay: 40.73 micro sec
#flow ('Portimao', 'Barcelona'): one way delay: 38.23 micro sec
#flow ('Lisboa', 'Vigo'): one way delay: 30.92 micro sec
#flow ('Braganca', 'Lisboa'): one way delay: 31.10 micro sec
#flow ('Portimao', 'Andorra'): one way delay: 48.42 micro sec
#flow ('Badajoz', 'Sevilha'): one way delay: 9.39 micro sec
#flow ('Bilbao', 'Sevilha'): one way delay: 39.88 micro sec
#flow ('Valencia', 'Madrid'): one way delay: 10.44 micro sec
#flow ('Lisboa', 'Badajoz'): one way delay: 9.64 micro sec
#flow ('Palma', 'Andorra'): one way delay: 19.71 micro sec
#flow ('Barcelona', 'Vilar.Formoso'): one way delay: 19.36 micro sec
#flow ('Braganca', 'Palma'): one way delay: 39.45 micro sec
#flow ('Palma', 'Valencia'): one way delay: 8.63 micro sec
#flow ('Porto', 'Vigo'): one way delay: 9.80 micro sec
#flow ('Granada', 'Valencia'): one way delay: 9.53 micro sec
#flow ('Barcelona', 'Valencia'): one way delay: 9.12 micro sec
#flow ('Aveiro', 'Andorra'): one way delay: 39.82 micro sec
#flow ('Barcelona', 'Portimao'): one way delay: 37.50 micro sec
#flow ('Palma', 'Portimao'): one way delay: 28.23 micro sec
#flow ('Vigo', 'Sevilha'): one way delay: 50.12 micro sec
#flow ('Madrid', 'Andorra'): one way delay: 19.68 micro sec
#flow ('Gijon', 'Vilar.Formoso'): one way delay: 20.37 micro sec
#flow ('Vilar.Formoso', 'Porto'): one way delay: 39.91 micro sec
#flow ('Porto', 'Madrid'): one way delay: 30.28 micro sec
#flow ('Porto', 'Aveiro'): one way delay: 10.65 micro sec
#flow ('Valencia', 'Braganca'): one way delay: 30.38 micro sec
#flow ('Braganca', 'Sevilha'): one way delay: 30.68 micro sec
#flow ('Corunha', 'Lisboa'): one way delay: 40.51 micro sec
#flow ('Madrid', 'Vigo'): one way delay: 40.82 micro sec
#flow ('Andorra', 'Sevilha'): one way delay: 38.33 micro sec
#flow ('Palma', 'Gijon'): one way delay: 39.88 micro sec
#flow ('Lisboa', 'Andorra'): one way delay: 38.98 micro sec
#flow ('Madrid', 'Aveiro'): one way delay: 19.65 micro sec
#flow ('Valencia', 'Vigo'): one way delay: 51.26 micro sec
#flow ('Braganca', 'Madrid'): one way delay: 20.29 micro sec
#flow ('Granada', 'Palma'): one way delay: 9.00 micro sec
#flow ('Corunha', 'Braganca'): one way delay: 19.70 micro sec
#flow ('Braganca', 'Granada'): one way delay: 40.01 micro sec
#flow ('Andorra', 'Gijon'): one way delay: 20.17 micro sec
#flow ('Granada', 'Porto'): one way delay: 49.31 micro sec
#flow ('Braganca', 'Badajoz'): one way delay: 21.29 micro sec
#flow ('Vigo', 'Aveiro'): one way delay: 20.63 micro sec
#flow ('Vigo', 'Madrid'): one way delay: 40.26 micro sec
#flow ('Madrid', 'Badajoz'): one way delay: 20.42 micro sec
#flow ('Vigo', 'Corunha'): one way delay: 9.27 micro sec
#flow ('Badajoz', 'Braganca'): one way delay: 20.57 micro sec
#flow ('Sevilha', 'Barcelona'): one way delay: 28.24 micro sec
#flow ('Andorra', 'Lisboa'): one way delay: 38.87 micro sec
#flow ('Madrid', 'Barcelona'): one way delay: 9.39 micro sec
#flow ('Bilbao', 'Braganca'): one way delay: 9.66 micro sec
#flow ('Sevilha', 'Valencia'): one way delay: 19.35 micro sec
#flow ('Sevilha', 'Badajoz'): one way delay: 9.39 micro sec
#flow ('Madrid', 'Braganca'): one way delay: 20.39 micro sec
```

```

#flow ('Braganca', 'Aveiro'): one way delay: 20.31 micro sec
#flow ('Braganca', 'Corunha'): one way delay: 28.73 micro sec
#flow ('Portimao', 'Corunha'): one way delay: 49.72 micro sec
#flow ('Corunha', 'Palma'): one way delay: 49.11 micro sec
#flow ('Palma', 'Madrid'): one way delay: 37.07 micro sec
#flow ('Bilbau', 'Granada'): one way delay: 30.20 micro sec
#flow ('Gijon', 'Granada'): one way delay: 40.20 micro sec
#flow ('Barcelona', 'Palma'): one way delay: 9.27 micro sec
#flow ('Corunha', 'Valencia'): one way delay: 50.80 micro sec
#flow ('Valencia', 'Vilar.Formoso'): one way delay: 20.39 micro sec
#flow ('Corunha', 'Vigo'): one way delay: 9.42 micro sec
#flow ('Porto', 'Bilbau'): one way delay: 19.63 micro sec
#flow ('Porto', 'Corunha'): one way delay: 19.07 micro sec
#flow ('Braganca', 'Porto'): one way delay: 9.67 micro sec
#flow ('Vilar.Formoso', 'Corunha'): one way delay: 29.99 micro sec
#flow ('Aveiro', 'Madrid'): one way delay: 19.63 micro sec
#flow ('Valencia', 'Badajoz'): one way delay: 9.81 micro sec
#flow ('Badajoz', 'Lisboa'): one way delay: 9.81 micro sec
#flow ('Vilar.Formoso', 'Bilbau'): one way delay: 20.25 micro sec
#flow ('Badajoz', 'Gijon'): one way delay: 29.81 micro sec
#flow ('Aveiro', 'Porto'): one way delay: 10.64 micro sec
#flow ('Lisboa', 'Corunha'): one way delay: 40.18 micro sec
#flow ('Badajoz', 'Andorra'): one way delay: 29.34 micro sec
#flow ('Valencia', 'Bilbau'): one way delay: 21.07 micro sec
#flow ('Aveiro', 'Portimao'): one way delay: 20.12 micro sec
#flow ('Granada', 'Corunha'): one way delay: 51.37 micro sec
#flow ('Lisboa', 'Bilbau'): one way delay: 40.41 micro sec
#flow ('Bilbau', 'Lisboa'): one way delay: 40.75 micro sec
#flow ('Valencia', 'Corunha'): one way delay: 41.84 micro sec
#flow ('Porto', 'Badajoz'): one way delay: 31.11 micro sec
#flow ('Palma', 'Lisboa'): one way delay: 28.24 micro sec
#flow ('Palma', 'Braganca'): one way delay: 39.11 micro sec
#flow ('Bilbau', 'Vilar.Formoso'): one way delay: 20.48 micro sec
#flow ('Sevilha', 'Porto'): one way delay: 39.86 micro sec
#flow ('Porto', 'Barcelona'): one way delay: 39.50 micro sec
#flow ('Madrid', 'Vilar.Formoso'): one way delay: 9.96 micro sec
#flow ('Sevilha', 'Corunha'): one way delay: 58.92 micro sec
#flow ('Valencia', 'Andorra'): one way delay: 19.41 micro sec
#flow ('Valencia', 'Aveiro'): one way delay: 30.10 micro sec
#flow ('Braganca', 'Andorra'): one way delay: 19.36 micro sec
#flow ('Andorra', 'Valencia'): one way delay: 19.26 micro sec
#flow ('Sevilha', 'Vilar.Formoso'): one way delay: 19.52 micro sec
#flow ('Badajoz', 'Aveiro'): one way delay: 20.29 micro sec
#flow ('Bilbau', 'Portimao'): one way delay: 49.53 micro sec
#flow ('Gijon', 'Barcelona'): one way delay: 29.68 micro sec
#flow ('Vigo', 'Vilar.Formoso'): one way delay: 30.62 micro sec
#flow ('Aveiro', 'Lisboa'): one way delay: 10.46 micro sec
#flow ('Portimao', 'Bilbau'): one way delay: 57.94 micro sec
#flow ('Badajoz', 'Porto'): one way delay: 30.24 micro sec
#flow ('Vilar.Formoso', 'Madrid'): one way delay: 9.96 micro sec
#flow ('Porto', 'Braganca'): one way delay: 9.82 micro sec
#flow ('Madrid', 'Bilbau'): one way delay: 10.63 micro sec
#flow ('Braganca', 'Vilar.Formoso'): one way delay: 10.82 micro sec
#flow ('Barcelona', 'Sevilha'): one way delay: 27.97 micro sec
#flow ('Andorra', 'Corunha'): one way delay: 30.48 micro sec
#flow ('Corunha', 'Madrid'): one way delay: 30.63 micro sec
#flow ('Andorra', 'Vigo'): one way delay: 39.89 micro sec
#flow ('Palma', 'Sevilha'): one way delay: 18.70 micro sec
#flow ('Vigo', 'Barcelona'): one way delay: 49.10 micro sec
#flow ('Granada', 'Madrid'): one way delay: 19.97 micro sec
#flow ('Andorra', 'Palma'): one way delay: 19.41 micro sec
#flow ('Sevilha', 'Aveiro'): one way delay: 29.55 micro sec
#flow ('Andorra', 'Barcelona'): one way delay: 10.14 micro sec
#flow ('Gijon', 'Corunha'): one way delay: 10.31 micro sec
#flow ('Madrid', 'Corunha'): one way delay: 31.40 micro sec
#flow ('Lisboa', 'Palma'): one way delay: 28.33 micro sec
#flow ('Aveiro', 'Granada'): one way delay: 39.60 micro sec
#flow ('Barcelona', 'Andorra'): one way delay: 10.29 micro sec
#flow ('Braganca', 'Bilbau'): one way delay: 9.82 micro sec
#flow ('Granada', 'Andorra'): one way delay: 28.71 micro sec
#flow ('Lisboa', 'Aveiro'): one way delay: 10.48 micro sec
#flow ('Gijon', 'Palma'): one way delay: 39.56 micro sec
#flow ('Barcelona', 'Vigo'): one way delay: 50.19 micro sec
#flow ('Gijon', 'Lisboa'): one way delay: 40.52 micro sec
#flow ('Granada', 'Vigo'): one way delay: 59.67 micro sec
#flow ('Aveiro', 'Bilbau'): one way delay: 29.92 micro sec
#flow ('Gijon', 'Braganca'): one way delay: 9.54 micro sec
#flow ('Badajoz', 'Bilbau'): one way delay: 30.72 micro sec
#flow ('Gijon', 'Aveiro'): one way delay: 30.07 micro sec
#flow ('Sevilha', 'Andorra'): one way delay: 38.74 micro sec
#flow ('Vilar.Formoso', 'Barcelona'): one way delay: 19.35 micro sec
#flow ('Palma', 'Granada'): one way delay: 9.02 micro sec
#flow ('Andorra', 'Bilbau'): one way delay: 9.71 micro sec

```

```

#flow ('Barcelona', 'Madrid'): one way delay: 9.41 micro sec
#flow ('Vilar.Formoso', 'Badajoz'): one way delay: 10.46 micro sec
#flow ('Barcelona', 'Corunha'): one way delay: 40.77 micro sec
#flow ('Granada', 'Badajoz'): one way delay: 19.34 micro sec
#flow ('Bilbao', 'Barcelona'): one way delay: 19.87 micro sec
#flow ('Corunha', 'Sevilha'): one way delay: 50.38 micro sec
#flow ('Valencia', 'Gijon'): one way delay: 31.53 micro sec
#flow ('Badajoz', 'Portimao'): one way delay: 19.47 micro sec
#flow ('Palma', 'Bilbao'): one way delay: 29.42 micro sec
#flow ('Bilbao', 'Aveiro'): one way delay: 29.97 micro sec
#flow ('Vilar.Formoso', 'Aveiro'): one way delay: 9.70 micro sec
#flow ('Lisboa', 'Granada'): one way delay: 28.97 micro sec
#flow ('Palma', 'Corunha'): one way delay: 50.46 micro sec
#flow ('Portimao', 'Sevilha'): one way delay: 9.66 micro sec
#flow ('Badajoz', 'Granada'): one way delay: 19.21 micro sec
#flow ('Portimao', 'Vilar.Formoso'): one way delay: 29.69 micro sec
#flow ('Granada', 'Bilbao'): one way delay: 30.60 micro sec
#flow ('Vigo', 'Palma'): one way delay: 59.17 micro sec
#flow ('Vigo', 'Bilbao'): one way delay: 29.42 micro sec
#flow ('Vilar.Formoso', 'Vigo'): one way delay: 30.13 micro sec
#flow ('Corunha', 'Portimao'): one way delay: 59.91 micro sec
#flow ('Sevilha', 'Gijon'): one way delay: 39.20 micro sec
#flow ('Sevilha', 'Bilbao'): one way delay: 40.42 micro sec
#flow ('Madrid', 'Porto'): one way delay: 30.29 micro sec
#flow ('Vilar.Formoso', 'Andorra'): one way delay: 29.64 micro sec
#flow ('Andorra', 'Madrid'): one way delay: 19.54 micro sec
#flow ('Bilbao', 'Porto'): one way delay: 19.32 micro sec
#flow ('Lisboa', 'Vilar.Formoso'): one way delay: 19.77 micro sec
#flow ('Gijon', 'Porto'): one way delay: 29.71 micro sec
#flow ('Barcelona', 'Lisboa'): one way delay: 28.74 micro sec
#flow ('Andorra', 'Porto'): one way delay: 29.03 micro sec
#flow ('Bilbao', 'Madrid'): one way delay: 10.48 micro sec
#flow ('Gijon', 'Portimao'): one way delay: 49.98 micro sec
#flow ('Sevilha', 'Granada'): one way delay: 9.82 micro sec
#flow ('Vilar.Formoso', 'Lisboa'): one way delay: 20.15 micro sec
#flow ('Gijon', 'Andorra'): one way delay: 19.55 micro sec
#flow ('Andorra', 'Badajoz'): one way delay: 29.06 micro sec
#flow ('Palma', 'Barcelona'): one way delay: 9.42 micro sec
#flow ('Porto', 'Palma'): one way delay: 48.59 micro sec
#flow ('Granada', 'Braganca'): one way delay: 40.36 micro sec
#flow ('Braganca', 'Vigo'): one way delay: 28.97 micro sec
#flow ('Badajoz', 'Palma'): one way delay: 28.34 micro sec
#flow ('Corunha', 'Vilar.Formoso'): one way delay: 30.52 micro sec
#flow ('Vigo', 'Granada'): one way delay: 60.23 micro sec
#flow ('Portimao', 'Vigo'): one way delay: 40.46 micro sec
#flow ('Lisboa', 'Valencia'): one way delay: 19.58 micro sec
#flow ('Gijon', 'Sevilha'): one way delay: 40.23 micro sec
#flow ('Vilar.Formoso', 'Gijon'): one way delay: 19.68 micro sec
#flow ('Valencia', 'Porto'): one way delay: 40.39 micro sec
#flow ('Valencia', 'Palma'): one way delay: 8.75 micro sec
#flow ('Lisboa', 'Porto'): one way delay: 21.12 micro sec
#flow ('Madrid', 'Granada'): one way delay: 27.68 micro sec
#flow ('Portimao', 'Valencia'): one way delay: 28.99 micro sec
#flow ('Vilar.Formoso', 'Valencia'): one way delay: 20.28 micro sec
#flow ('Porto', 'Vilar.Formoso'): one way delay: 20.32 micro sec
#flow ('Vilar.Formoso', 'Palma'): one way delay: 29.04 micro sec
#flow ('Lisboa', 'Gijon'): one way delay: 39.45 micro sec
#flow ('Lisboa', 'Madrid'): one way delay: 30.11 micro sec
#flow ('Aveiro', 'Braganca'): one way delay: 20.45 micro sec
#flow ('Corunha', 'Granada'): one way delay: 50.35 micro sec
#flow ('Palma', 'Vigo'): one way delay: 59.64 micro sec
#flow ('Aveiro', 'Gijon'): one way delay: 29.35 micro sec
#flow ('Aveiro', 'Valencia'): one way delay: 30.04 micro sec
#flow ('Aveiro', 'Corunha'): one way delay: 29.70 micro sec
#flow ('Granada', 'Portimao'): one way delay: 19.21 micro sec
#flow ('Sevilha', 'Lisboa'): one way delay: 19.20 micro sec
#flow ('Porto', 'Granada'): one way delay: 50.25 micro sec
#flow ('Aveiro', 'Palma'): one way delay: 38.79 micro sec
#flow ('Aveiro', 'Badajoz'): one way delay: 20.10 micro sec
#flow ('Barcelona', 'Bilbao'): one way delay: 20.00 micro sec
#flow ('Aveiro', 'Sevilha'): one way delay: 29.53 micro sec
#flow ('Valencia', 'Barcelona'): one way delay: 9.11 micro sec
#flow ('Bilbao', 'Badajoz'): one way delay: 30.61 micro sec
#flow ('Aveiro', 'Vigo'): one way delay: 20.44 micro sec
#flow ('Braganca', 'Gijon'): one way delay: 9.24 micro sec
#flow ('Portimao', 'Gijon'): one way delay: 48.99 micro sec
#flow ('Braganca', 'Valencia'): one way delay: 38.81 micro sec
#flow ('Bilbao', 'Palma'): one way delay: 29.14 micro sec
#flow ('Sevilha', 'Braganca'): one way delay: 29.96 micro sec
#flow ('Badajoz', 'Barcelona'): one way delay: 19.05 micro sec
#flow ('Madrid', 'Palma'): one way delay: 19.08 micro sec
#flow ('Gijon', 'Bilbao'): one way delay: 10.00 micro sec
#flow ('Valencia', 'Granada'): one way delay: 9.40 micro sec

```

```

#flow ('Valencia', 'Lisboa'): one way delay: 19.62 micro sec
#flow ('Bilbau', 'Corunha'): one way delay: 20.77 micro sec
#flow ('Vigo', 'Valencia'): one way delay: 58.77 micro sec
#flow ('Vigo', 'Portimao'): one way delay: 40.75 micro sec
#flow ('Corunha', 'Barcelona'): one way delay: 39.84 micro sec
#flow ('Gijon', 'Badajoz'): one way delay: 30.83 micro sec
#flow ('Vigo', 'Porto'): one way delay: 9.98 micro sec
#flow ('Vigo', 'Gijon'): one way delay: 19.42 micro sec
#flow ('Corunha', 'Porto'): one way delay: 19.40 micro sec
#flow ('Corunha', 'Badajoz'): one way delay: 40.99 micro sec
#flow ('Portimao', 'Aveiro'): one way delay: 20.02 micro sec
#flow ('Vilar.Formoso', 'Sevilha'): one way delay: 19.86 micro sec
#flow ('Braganca', 'Portimao'): one way delay: 40.21 micro sec
#flow ('Granada', 'Aveiro'): one way delay: 39.62 micro sec
#flow ('Andorra', 'Portimao'): one way delay: 47.63 micro sec
#flow ('Madrid', 'Portimao'): one way delay: 39.05 micro sec
#flow ('Sevilha', 'Palma'): one way delay: 18.82 micro sec
#flow ('Bilbau', 'Valencia'): one way delay: 20.80 micro sec
#flow ('Porto', 'Lisboa'): one way delay: 21.11 micro sec
#flow ('Badajoz', 'Vilar.Formoso'): one way delay: 10.13 micro sec
#flow ('Gijon', 'Valencia'): one way delay: 30.80 micro sec
#flow ('Lisboa', 'Sevilha'): one way delay: 19.32 micro sec
#flow ('Corunha', 'Aveiro'): one way delay: 30.05 micro sec
#flow ('Palma', 'Aveiro'): one way delay: 38.72 micro sec
#flow ('Barcelona', 'Gijon'): one way delay: 30.50 micro sec
#flow ('Andorra', 'Vilar.Formoso'): one way delay: 29.50 micro sec
#flow ('Granada', 'Barcelona'): one way delay: 18.42 micro sec
#flow ('Barcelona', 'Badajoz'): one way delay: 18.93 micro sec
#flow ('Palma', 'Vilar.Formoso'): one way delay: 29.02 micro sec
#flow ('Porto', 'Portimao'): one way delay: 30.77 micro sec
#flow ('Andorra', 'Braganca'): one way delay: 19.36 micro sec
#flow ('Vilar.Formoso', 'Portimao'): one way delay: 29.93 micro sec
#flow ('Sevilha', 'Madrid'): one way delay: 29.77 micro sec
#flow ('Barcelona', 'Porto'): one way delay: 39.32 micro sec
#flow ('Vilar.Formoso', 'Braganca'): one way delay: 10.44 micro sec
#flow ('Porto', 'Gijon'): one way delay: 19.06 micro sec
#flow ('Madrid', 'Sevilha'): one way delay: 29.40 micro sec
#flow ('Barcelona', 'Aveiro'): one way delay: 29.06 micro sec
#flow ('Vigo', 'Andorra'): one way delay: 38.97 micro sec
#flow ('Palma', 'Badajoz'): one way delay: 18.43 micro sec
#flow ('Corunha', 'Andorra'): one way delay: 29.70 micro sec
#flow ('Sevilha', 'Vigo'): one way delay: 49.99 micro sec
#flow ('Lisboa', 'Portimao'): one way delay: 9.66 micro sec
#flow ('Vigo', 'Lisboa'): one way delay: 31.09 micro sec
#flow ('Aveiro', 'Vilar.Formoso'): one way delay: 9.67 micro sec
#flow ('Portimao', 'Lisboa'): one way delay: 9.54 micro sec
#flow ('Gijon', 'Vigo'): one way delay: 19.73 micro sec
#flow ('Valencia', 'Portimao'): one way delay: 29.28 micro sec
#flow ('Lisboa', 'Barcelona'): one way delay: 28.69 micro sec
#flow ('Granada', 'Gijon'): one way delay: 41.06 micro sec
#flow ('Portimao', 'Granada'): one way delay: 19.48 micro sec
#flow ('Badajoz', 'Valencia'): one way delay: 9.94 micro sec
#flow ('Vigo', 'Badajoz'): one way delay: 41.09 micro sec
#flow ('Bilbau', 'Andorra'): one way delay: 9.55 micro sec
#flow ('Porto', 'Sevilha'): one way delay: 40.43 micro sec
#flow ('Andorra', 'Aveiro'): one way delay: 39.19 micro sec
#flow ('Granada', 'Vilar.Formoso'): one way delay: 37.78 micro sec
#flow ('Barcelona', 'Braganca'): one way delay: 29.66 micro sec
#flow ('Braganca', 'Barcelona'): one way delay: 29.50 micro sec
#flow ('Bilbau', 'Vigo'): one way delay: 29.12 micro sec
#flow ('Portimao', 'Braganca'): one way delay: 40.48 micro sec
#flow ('Andorra', 'Granada'): one way delay: 28.42 micro sec
#flow ('Porto', 'Valencia'): one way delay: 40.72 micro sec
#flow ('Barcelona', 'Granada'): one way delay: 18.52 micro sec
#flow ('Lisboa', 'Braganca'): one way delay: 30.93 micro sec
#flow ('Porto', 'Andorra'): one way delay: 29.18 micro sec
#flow ('Sevilha', 'Portimao'): one way delay: 9.53 micro sec
#flow ('Granada', 'Lisboa'): one way delay: 28.75 micro sec
#flow ('Valencia', 'Sevilha'): one way delay: 19.08 micro sec
#flow ('Corunha', 'Gijon'): one way delay: 10.15 micro sec
#flow ('Madrid', 'Lisboa'): one way delay: 30.23 micro sec
#flow ('Corunha', 'Bilbau'): one way delay: 20.15 micro sec
#flow ('Gijon', 'Madrid'): one way delay: 20.48 micro sec
#flow ('Vigo', 'Braganca'): one way delay: 19.80 micro sec
#flow ('Badajoz', 'Corunha'): one way delay: 40.12 micro sec
#flow ('Portimao', 'Madrid'): one way delay: 39.45 micro sec
#flow ('Badajoz', 'Madrid'): one way delay: 20.09 micro sec
#flow ('Madrid', 'Valencia'): one way delay: 10.32 micro sec
#flow ('Aveiro', 'Barcelona'): one way delay: 29.02 micro sec

```


9.8 Lambda, link-load e one way delay para cada link (Exercícios 11 e 12)

```
#link Gijon-Bilbau: 25007 pkts/sec -- link-load: 20.01% -- one_way_delay: 10.00 micro
sec
#link Bilbao-Gijon: 29382 pkts/sec -- link-load: 23.51% -- one_way_delay: 10.46 micro
sec
#link Granada-Sevilha: 21680 pkts/sec -- link-load: 17.34% -- one_way_delay: 9.68 micro
sec
#link Sevilha-Granada: 23152 pkts/sec -- link-load: 18.52% -- one_way_delay: 9.82 micro
sec
#link Badajoz-Lisboa: 23055 pkts/sec -- link-load: 18.44% -- one_way_delay: 9.81 micro
sec
#link Lisboa-Badajoz: 21268 pkts/sec -- link-load: 17.01% -- one_way_delay: 9.64 micro
sec
#link Badajoz-Sevilha: 18546 pkts/sec -- link-load: 14.84% -- one_way_delay: 9.39 micro
sec
#link Sevilha-Badajoz: 18557 pkts/sec -- link-load: 14.85% -- one_way_delay: 9.39 micro
sec
#link Aveiro-Porto: 30979 pkts/sec -- link-load: 24.78% -- one_way_delay: 10.64 micro
sec
#link Porto-Aveiro: 31082 pkts/sec -- link-load: 24.87% -- one_way_delay: 10.65 micro
sec
#link Badajoz-Vilar.Formoso: 26278 pkts/sec -- link-load: 21.02% -- one_way_delay: 10.13
micro sec
#link Vilar.Formoso-Badajoz: 29435 pkts/sec -- link-load: 23.55% -- one_way_delay: 10.46
micro sec
#link Porto-Braganca: 23132 pkts/sec -- link-load: 18.51% -- one_way_delay: 9.82 micro
sec
#link Braganca-Porto: 21558 pkts/sec -- link-load: 17.25% -- one_way_delay: 9.67 micro
sec
#link Braganca-Gijon: 16794 pkts/sec -- link-load: 13.44% -- one_way_delay: 9.24 micro
sec
#link Gijon-Braganca: 20233 pkts/sec -- link-load: 16.19% -- one_way_delay: 9.54 micro
sec
#link Palma-Valencia: 9066 pkts/sec -- link-load: 7.25% -- one_way_delay: 8.63 micro sec
#link Valencia-Palma: 10778 pkts/sec -- link-load: 8.62% -- one_way_delay: 8.75 micro
sec
#link Barcelona-Andorra: 27830 pkts/sec -- link-load: 22.26% -- one_way_delay: 10.29
micro sec
#link Andorra-Barcelona: 26339 pkts/sec -- link-load: 21.07% -- one_way_delay: 10.14
micro sec
#link Bilbao-Madrid: 29561 pkts/sec -- link-load: 23.65% -- one_way_delay: 10.48 micro
sec
#link Madrid-Bilbao: 30935 pkts/sec -- link-load: 24.75% -- one_way_delay: 10.63 micro
sec
#link Barcelona-Valencia: 15366 pkts/sec -- link-load: 12.29% -- one_way_delay: 9.12
micro sec
#link Valencia-Barcelona: 15281 pkts/sec -- link-load: 12.22% -- one_way_delay: 9.11
micro sec
#link Portimao-Sevilha: 21497 pkts/sec -- link-load: 17.20% -- one_way_delay: 9.66 micro
sec
#link Sevilha-Portimao: 20070 pkts/sec -- link-load: 16.06% -- one_way_delay: 9.53 micro
sec
#link Madrid-Vilar.Formoso: 24549 pkts/sec -- link-load: 19.64% -- one_way_delay: 9.96
micro sec
#link Vilar.Formoso-Madrid: 24596 pkts/sec -- link-load: 19.68% -- one_way_delay: 9.96
micro sec
#link Granada-Valencia: 20072 pkts/sec -- link-load: 16.06% -- one_way_delay: 9.53 micro
sec
#link Valencia-Granada: 18584 pkts/sec -- link-load: 14.87% -- one_way_delay: 9.40 micro
sec
#link Aveiro-Lisboa: 29384 pkts/sec -- link-load: 23.51% -- one_way_delay: 10.46 micro
sec
#link Lisboa-Aveiro: 29583 pkts/sec -- link-load: 23.67% -- one_way_delay: 10.48 micro
sec
#link Badajoz-Valencia: 24367 pkts/sec -- link-load: 19.49% -- one_way_delay: 9.94 micro
sec
#link Valencia-Badajoz: 23037 pkts/sec -- link-load: 18.43% -- one_way_delay: 9.81 micro
sec
#link Braganca-Vilar.Formoso: 32620 pkts/sec -- link-load: 26.10% -- one_way_delay:
10.82 micro sec
#link Vilar.Formoso-Braganca: 29205 pkts/sec -- link-load: 23.36% -- one_way_delay:
10.44 micro sec
#link Aveiro-Vilar.Formoso: 21590 pkts/sec -- link-load: 17.27% -- one_way_delay: 9.67
micro sec
#link Vilar.Formoso-Aveiro: 21869 pkts/sec -- link-load: 17.50% -- one_way_delay: 9.70
micro sec
#link Portimao-Lisboa: 20202 pkts/sec -- link-load: 16.16% -- one_way_delay: 9.54 micro
sec
```

```
#link Lisboa-Portimao: 21469 pkts/sec -- link-load: 17.18% -- one_way_delay: 9.66 micro
sec
#link Granada-Palma: 13930 pkts/sec -- link-load: 11.14% -- one_way_delay: 9.00 micro
sec
#link Palma-Granada: 14098 pkts/sec -- link-load: 11.28% -- one_way_delay: 9.02 micro
sec
#link Bilbao-Andorra: 20268 pkts/sec -- link-load: 16.21% -- one_way_delay: 9.55 micro
sec
#link Andorra-Bilbao: 21994 pkts/sec -- link-load: 17.60% -- one_way_delay: 9.71 micro
sec
#link Vigo-Corunha: 17070 pkts/sec -- link-load: 13.66% -- one_way_delay: 9.27 micro sec
#link Corunha-Vigo: 18835 pkts/sec -- link-load: 15.07% -- one_way_delay: 9.42 micro sec
#link Madrid-Barcelona: 18527 pkts/sec -- link-load: 14.82% -- one_way_delay: 9.39 micro
sec
#link Barcelona-Madrid: 18696 pkts/sec -- link-load: 14.96% -- one_way_delay: 9.41 micro
sec
#link Braganca-Bilbao: 23121 pkts/sec -- link-load: 18.50% -- one_way_delay: 9.82 micro
sec
#link Bilbao-Braganca: 21441 pkts/sec -- link-load: 17.15% -- one_way_delay: 9.66 micro
sec
#link Madrid-Valencia: 28122 pkts/sec -- link-load: 22.50% -- one_way_delay: 10.32 micro
sec
#link Valencia-Madrid: 29208 pkts/sec -- link-load: 23.37% -- one_way_delay: 10.44 micro
sec
#link Corunha-Gijon: 26494 pkts/sec -- link-load: 21.20% -- one_way_delay: 10.15 micro
sec
#link Gijon-Corunha: 27994 pkts/sec -- link-load: 22.40% -- one_way_delay: 10.31 micro
sec
#link Barcelona-Palma: 17148 pkts/sec -- link-load: 13.72% -- one_way_delay: 9.27 micro
sec
#link Palma-Barcelona: 18824 pkts/sec -- link-load: 15.06% -- one_way_delay: 9.42 micro
sec
#link Porto-Vigo: 22958 pkts/sec -- link-load: 18.37% -- one_way_delay: 9.80 micro sec
#link Vigo-Porto: 24834 pkts/sec -- link-load: 19.87% -- one_way_delay: 9.98 micro sec
```

9.9 One way delay de cada fluxo (Exercícios 13 e 14)

```
#flow ('Portimao', 'Palma'): one way delay: 28.32 micro sec
#flow ('Vilar.Formoso', 'Granada'): one way delay: 29.71 micro sec
#flow ('Portimao', 'Barcelona'): one way delay: 37.72 micro sec
#flow ('Aveiro', 'Barcelona'): one way delay: 28.89 micro sec
#flow ('Madrid', 'Gijon'): one way delay: 20.61 micro sec
#flow ('Braganca', 'Lisboa'): one way delay: 30.77 micro sec
#flow ('Portimao', 'Badajoz'): one way delay: 19.21 micro sec
#flow ('Porto', 'Barcelona'): one way delay: 39.36 micro sec
#flow ('Granada', 'Sevilha'): one way delay: 9.84 micro sec
#flow ('Badajoz', 'Vigo'): one way delay: 40.66 micro sec
#flow ('Bilbao', 'Gijon'): one way delay: 10.13 micro sec
#flow ('Porto', 'Granada'): one way delay: 49.85 micro sec
#flow ('Lisboa', 'Vigo'): one way delay: 30.90 micro sec
#flow ('Portimao', 'Andorra'): one way delay: 48.10 micro sec
#flow ('Palma', 'Gijon'): one way delay: 39.80 micro sec
#flow ('Bilbao', 'Palma'): one way delay: 29.36 micro sec
#flow ('Bilbao', 'Sevilha'): one way delay: 40.21 micro sec
#flow ('Valencia', 'Madrid'): one way delay: 10.44 micro sec
#flow ('Valencia', 'Aveiro'): one way delay: 29.92 micro sec
#flow ('Palma', 'Andorra'): one way delay: 19.69 micro sec
#flow ('Porto', 'Braganca'): one way delay: 9.66 micro sec
#flow ('Braganca', 'Palma'): one way delay: 39.54 micro sec
#flow ('Palma', 'Valencia'): one way delay: 8.75 micro sec
#flow ('Porto', 'Vigo'): one way delay: 9.94 micro sec
#flow ('Gijon', 'Lisboa'): one way delay: 40.03 micro sec
#flow ('Badajoz', 'Sevilha'): one way delay: 9.52 micro sec
#flow ('Portimao', 'Porto'): one way delay: 30.37 micro sec
#flow ('Barcelona', 'Portimao'): one way delay: 37.85 micro sec
#flow ('Portimao', 'Sevilha'): one way delay: 9.66 micro sec
#flow ('Vigo', 'Sevilha'): one way delay: 50.14 micro sec
#flow ('Gijon', 'Granada'): one way delay: 40.53 micro sec
#flow ('Gijon', 'Corunha'): one way delay: 10.00 micro sec
#flow ('Sevilha', 'Granada'): one way delay: 9.79 micro sec
#flow ('Vilar.Formoso', 'Porto'): one way delay: 20.31 micro sec
#flow ('Granada', 'Braganca'): one way delay: 40.21 micro sec
#flow ('Porto', 'Aveiro'): one way delay: 10.66 micro sec
#flow ('Valencia', 'Braganca'): one way delay: 30.73 micro sec
#flow ('Barcelona', 'Vilar.Formoso'): one way delay: 19.20 micro sec
#flow ('Braganca', 'Sevilha'): one way delay: 30.61 micro sec
#flow ('Aveiro', 'Valencia'): one way delay: 29.78 micro sec
#flow ('Madrid', 'Vigo'): one way delay: 39.63 micro sec
#flow ('Andorra', 'Sevilha'): one way delay: 38.38 micro sec
#flow ('Badajoz', 'Braganca'): one way delay: 21.06 micro sec
```

```

#flow ('Portimao', 'Gijon'): one way delay: 49.41 micro sec
#flow ('Vilar.Formoso', 'Aveiro'): one way delay: 9.68 micro sec
#flow ('Lisboa', 'Andorra'): one way delay: 38.76 micro sec
#flow ('Sevilha', 'Barcelona'): one way delay: 28.06 micro sec
#flow ('Vigo', 'Badajoz'): one way delay: 40.62 micro sec
#flow ('Valencia', 'Vigo'): one way delay: 50.07 micro sec
#flow ('Vilar.Formoso', 'Palma'): one way delay: 28.78 micro sec
#flow ('Braganca', 'Madrid'): one way delay: 20.46 micro sec
#flow ('Granada', 'Palma'): one way delay: 8.87 micro sec
#flow ('Corunha', 'Braganca'): one way delay: 19.39 micro sec
#flow ('Braganca', 'Granada'): one way delay: 40.18 micro sec
#flow ('Andorra', 'Gijon'): one way delay: 19.69 micro sec
#flow ('Andorra', 'Vilar.Formoso'): one way delay: 29.48 micro sec
#flow ('Granada', 'Porto'): one way delay: 49.87 micro sec
#flow ('Braganca', 'Badajoz'): one way delay: 21.09 micro sec
#flow ('Vigo', 'Aveiro'): one way delay: 20.65 micro sec
#flow ('Vigo', 'Madrid'): one way delay: 40.14 micro sec
#flow ('Madrid', 'Badajoz'): one way delay: 20.25 micro sec
#flow ('Vigo', 'Corunha'): one way delay: 9.00 micro sec
#flow ('Gijon', 'Andorra'): one way delay: 19.69 micro sec
#flow ('Barcelona', 'Madrid'): one way delay: 9.40 micro sec
#flow ('Andorra', 'Lisboa'): one way delay: 38.63 micro sec
#flow ('Madrid', 'Barcelona'): one way delay: 9.40 micro sec
#flow ('Bilbau', 'Braganca'): one way delay: 9.81 micro sec
#flow ('Sevilha', 'Porto'): one way delay: 40.04 micro sec
#flow ('Sevilha', 'Badajoz'): one way delay: 9.55 micro sec
#flow ('Madrid', 'Braganca'): one way delay: 20.40 micro sec
#flow ('Braganca', 'Aveiro'): one way delay: 20.32 micro sec
#flow ('Braganca', 'Corunha'): one way delay: 19.38 micro sec
#flow ('Aveiro', 'Bilbau'): one way delay: 30.07 micro sec
#flow ('Portimao', 'Granada'): one way delay: 19.45 micro sec
#flow ('Portimao', 'Corunha'): one way delay: 49.31 micro sec
#flow ('Corunha', 'Palma'): one way delay: 49.50 micro sec
#flow ('Madrid', 'Andorra'): one way delay: 19.69 micro sec
#flow ('Palma', 'Madrid'): one way delay: 19.20 micro sec
#flow ('Bilbau', 'Granada'): one way delay: 30.38 micro sec
#flow ('Aveiro', 'Andorra'): one way delay: 39.18 micro sec
#flow ('Portimao', 'Aveiro'): one way delay: 19.73 micro sec
#flow ('Barcelona', 'Palma'): one way delay: 9.55 micro sec
#flow ('Corunha', 'Valencia'): one way delay: 41.12 micro sec
#flow ('Valencia', 'Vilar.Formoso'): one way delay: 20.24 micro sec
#flow ('Corunha', 'Vigo'): one way delay: 9.03 micro sec
#flow ('Porto', 'Bilbau'): one way delay: 19.47 micro sec
#flow ('Portimao', 'Vigo'): one way delay: 40.31 micro sec
#flow ('Porto', 'Corunha'): one way delay: 18.94 micro sec
#flow ('Braganca', 'Porto'): one way delay: 9.66 micro sec
#flow ('Vilar.Formoso', 'Corunha'): one way delay: 29.98 micro sec
#flow ('Aveiro', 'Madrid'): one way delay: 19.49 micro sec
#flow ('Valencia', 'Badajoz'): one way delay: 9.80 micro sec
#flow ('Badajoz', 'Lisboa'): one way delay: 9.68 micro sec
#flow ('Aveiro', 'Braganca'): one way delay: 20.26 micro sec
#flow ('Badajoz', 'Gijon'): one way delay: 30.44 micro sec
#flow ('Valencia', 'Barcelona'): one way delay: 8.99 micro sec
#flow ('Barcelona', 'Braganca'): one way delay: 29.66 micro sec
#flow ('Badajoz', 'Andorra'): one way delay: 29.09 micro sec
#flow ('Valencia', 'Bilbau'): one way delay: 20.92 micro sec
#flow ('Aveiro', 'Portimao'): one way delay: 19.69 micro sec
#flow ('Granada', 'Corunha'): one way delay: 58.25 micro sec
#flow ('Lisboa', 'Bilbau'): one way delay: 40.39 micro sec
#flow ('Porto', 'Madrid'): one way delay: 29.96 micro sec
#flow ('Bilbau', 'Lisboa'): one way delay: 40.58 micro sec
#flow ('Valencia', 'Corunha'): one way delay: 41.04 micro sec
#flow ('Porto', 'Badajoz'): one way delay: 30.63 micro sec
#flow ('Palma', 'Lisboa'): one way delay: 28.24 micro sec
#flow ('Palma', 'Braganca'): one way delay: 39.09 micro sec
#flow ('Bilbau', 'Vilar.Formoso'): one way delay: 20.45 micro sec
#flow ('Palma', 'Porto'): one way delay: 48.91 micro sec
#flow ('Madrid', 'Vilar.Formoso'): one way delay: 9.80 micro sec
#flow ('Sevilha', 'Corunha'): one way delay: 49.99 micro sec
#flow ('Palma', 'Portimao'): one way delay: 28.40 micro sec
#flow ('Braganca', 'Andorra'): one way delay: 19.34 micro sec
#flow ('Madrid', 'Bilbau'): one way delay: 10.48 micro sec
#flow ('Andorra', 'Valencia'): one way delay: 19.15 micro sec
#flow ('Sevilha', 'Vilar.Formoso'): one way delay: 20.01 micro sec
#flow ('Aveiro', 'Sevilha'): one way delay: 29.49 micro sec
#flow ('Bilbau', 'Portimao'): one way delay: 49.93 micro sec
#flow ('Braganca', 'Vilar.Formoso'): one way delay: 10.64 micro sec
#flow ('Vigo', 'Vilar.Formoso'): one way delay: 30.32 micro sec
#flow ('Aveiro', 'Lisboa'): one way delay: 10.31 micro sec
#flow ('Portimao', 'Bilbau'): one way delay: 57.60 micro sec
#flow ('Badajoz', 'Porto'): one way delay: 30.77 micro sec
#flow ('Granada', 'Madrid'): one way delay: 19.81 micro sec
#flow ('Badajoz', 'Valencia'): one way delay: 9.81 micro sec

```

```

#flow ('Badajoz', 'Portimao'): one way delay: 19.19 micro sec
#flow ('Barcelona', 'Sevilha'): one way delay: 28.28 micro sec
#flow ('Andorra', 'Corunha'): one way delay: 29.69 micro sec
#flow ('Corunha', 'Madrid'): one way delay: 30.63 micro sec
#flow ('Andorra', 'Vigo'): one way delay: 38.97 micro sec
#flow ('Palma', 'Sevilha'): one way delay: 18.73 micro sec
#flow ('Vigo', 'Barcelona'): one way delay: 49.03 micro sec
#flow ('Porto', 'Sevilha'): one way delay: 40.01 micro sec
#flow ('Lisboa', 'Badajoz'): one way delay: 9.66 micro sec
#flow ('Sevilha', 'Aveiro'): one way delay: 29.40 micro sec
#flow ('Andorra', 'Barcelona'): one way delay: 10.28 micro sec
#flow ('Badajoz', 'Palma'): one way delay: 18.45 micro sec
#flow ('Madrid', 'Corunha'): one way delay: 30.60 micro sec
#flow ('Lisboa', 'Corunha'): one way delay: 39.90 micro sec
#flow ('Lisboa', 'Palma'): one way delay: 28.12 micro sec
#flow ('Aveiro', 'Granada'): one way delay: 39.15 micro sec
#flow ('Braganca', 'Bilbau'): one way delay: 9.81 micro sec
#flow ('Granada', 'Andorra'): one way delay: 28.56 micro sec
#flow ('Lisboa', 'Aveiro'): one way delay: 10.32 micro sec
#flow ('Barcelona', 'Vigo'): one way delay: 49.01 micro sec
#flow ('Vilar.Formoso', 'Braganca'): one way delay: 10.60 micro sec
#flow ('Gijon', 'Braganca'): one way delay: 9.40 micro sec
#flow ('Aveiro', 'Gijon'): one way delay: 29.67 micro sec
#flow ('Sevilha', 'Andorra'): one way delay: 38.45 micro sec
#flow ('Vilar.Formoso', 'Barcelona'): one way delay: 19.23 micro sec
#flow ('Palma', 'Granada'): one way delay: 8.89 micro sec
#flow ('Barcelona', 'Gijon'): one way delay: 29.98 micro sec
#flow ('Granada', 'Vilar.Formoso'): one way delay: 29.61 micro sec
#flow ('Vilar.Formoso', 'Badajoz'): one way delay: 10.45 micro sec
#flow ('Lisboa', 'Braganca'): one way delay: 30.58 micro sec
#flow ('Corunha', 'Sevilha'): one way delay: 49.99 micro sec
#flow ('Bilbau', 'Barcelona'): one way delay: 19.82 micro sec
#flow ('Bilbau', 'Andorra'): one way delay: 9.53 micro sec
#flow ('Palma', 'Bilbau'): one way delay: 29.25 micro sec
#flow ('Bilbau', 'Aveiro'): one way delay: 30.13 micro sec
#flow ('Gijon', 'Palma'): one way delay: 39.52 micro sec
#flow ('Lisboa', 'Granada'): one way delay: 28.84 micro sec
#flow ('Palma', 'Vilar.Formoso'): one way delay: 28.60 micro sec
#flow ('Badajoz', 'Granada'): one way delay: 19.31 micro sec
#flow ('Portimao', 'Vilar.Formoso'): one way delay: 29.40 micro sec
#flow ('Granada', 'Bilbau'): one way delay: 30.29 micro sec
#flow ('Vigo', 'Palma'): one way delay: 58.50 micro sec
#flow ('Vigo', 'Bilbau'): one way delay: 29.14 micro sec
#flow ('Vilar.Formoso', 'Vigo'): one way delay: 30.25 micro sec
#flow ('Corunha', 'Portimao'): one way delay: 49.38 micro sec
#flow ('Badajoz', 'Barcelona'): one way delay: 18.80 micro sec
#flow ('Sevilha', 'Gijon'): one way delay: 39.99 micro sec
#flow ('Sevilha', 'Bilbau'): one way delay: 40.28 micro sec
#flow ('Barcelona', 'Andorra'): one way delay: 10.29 micro sec
#flow ('Vilar.Formoso', 'Andorra'): one way delay: 29.52 micro sec
#flow ('Andorra', 'Madrid'): one way delay: 19.68 micro sec
#flow ('Bilbau', 'Porto'): one way delay: 19.47 micro sec
#flow ('Lisboa', 'Vilar.Formoso'): one way delay: 20.12 micro sec
#flow ('Gijon', 'Porto'): one way delay: 19.06 micro sec
#flow ('Barcelona', 'Lisboa'): one way delay: 28.35 micro sec
#flow ('Barcelona', 'Badajoz'): one way delay: 18.67 micro sec
#flow ('Andorra', 'Porto'): one way delay: 29.03 micro sec
#flow ('Bilbau', 'Madrid'): one way delay: 10.49 micro sec
#flow ('Gijon', 'Portimao'): one way delay: 49.41 micro sec
#flow ('Gijon', 'Vilar.Formoso'): one way delay: 20.04 micro sec
#flow ('Andorra', 'Badajoz'): one way delay: 28.95 micro sec
#flow ('Palma', 'Barcelona'): one way delay: 9.40 micro sec
#flow ('Porto', 'Palma'): one way delay: 48.91 micro sec
#flow ('Sevilha', 'Lisboa'): one way delay: 19.08 micro sec
#flow ('Braganca', 'Vigo'): one way delay: 19.60 micro sec
#flow ('Barcelona', 'Valencia'): one way delay: 8.87 micro sec
#flow ('Andorra', 'Bilbau'): one way delay: 9.56 micro sec
#flow ('Corunha', 'Vilar.Formoso'): one way delay: 30.02 micro sec
#flow ('Vigo', 'Granada'): one way delay: 59.80 micro sec
#flow ('Madrid', 'Portimao'): one way delay: 39.39 micro sec
#flow ('Andorra', 'Aveiro'): one way delay: 39.16 micro sec
#flow ('Lisboa', 'Valencia'): one way delay: 19.47 micro sec
#flow ('Gijon', 'Sevilha'): one way delay: 40.01 micro sec
#flow ('Vilar.Formoso', 'Gijon'): one way delay: 19.98 micro sec
#flow ('Valencia', 'Porto'): one way delay: 40.39 micro sec
#flow ('Valencia', 'Palma'): one way delay: 8.64 micro sec
#flow ('Lisboa', 'Porto'): one way delay: 20.95 micro sec
#flow ('Madrid', 'Granada'): one way delay: 19.89 micro sec
#flow ('Portimao', 'Valencia'): one way delay: 29.02 micro sec
#flow ('Vilar.Formoso', 'Valencia'): one way delay: 20.32 micro sec
#flow ('Andorra', 'Palma'): one way delay: 19.83 micro sec
#flow ('Lisboa', 'Gijon'): one way delay: 40.10 micro sec
#flow ('Lisboa', 'Madrid'): one way delay: 29.95 micro sec

```

```

#flow ('Vilar.Formoso', 'Bilbau'): one way delay: 20.41 micro sec
#flow ('Corunha', 'Granada'): one way delay: 50.51 micro sec
#flow ('Palma', 'Vigo'): one way delay: 59.13 micro sec
#flow ('Corunha', 'Lisboa'): one way delay: 39.99 micro sec
#flow ('Aveiro', 'Corunha'): one way delay: 29.57 micro sec
#flow ('Granada', 'Portimao'): one way delay: 19.51 micro sec
#flow ('Vilar.Formoso', 'Madrid'): one way delay: 9.83 micro sec
#flow ('Granada', 'Vigo'): one way delay: 59.88 micro sec
#flow ('Aveiro', 'Palma'): one way delay: 38.62 micro sec
#flow ('Barcelona', 'Bilbau'): one way delay: 19.85 micro sec
#flow ('Aveiro', 'Porto'): one way delay: 10.63 micro sec
#flow ('Bilbau', 'Badajoz'): one way delay: 30.78 micro sec
#flow ('Aveiro', 'Vigo'): one way delay: 20.57 micro sec
#flow ('Badajoz', 'Bilbau'): one way delay: 30.87 micro sec
#flow ('Braganca', 'Valencia'): one way delay: 30.90 micro sec
#flow ('Palma', 'Corunha'): one way delay: 49.38 micro sec
#flow ('Sevilha', 'Braganca'): one way delay: 30.61 micro sec
#flow ('Granada', 'Badajoz'): one way delay: 19.39 micro sec
#flow ('Porto', 'Vilar.Formoso'): one way delay: 20.32 micro sec
#flow ('Madrid', 'Palma'): one way delay: 19.13 micro sec
#flow ('Gijon', 'Bilbau'): one way delay: 10.15 micro sec
#flow ('Valencia', 'Granada'): one way delay: 9.40 micro sec
#flow ('Valencia', 'Lisboa'): one way delay: 19.48 micro sec
#flow ('Bilbau', 'Corunha'): one way delay: 20.12 micro sec
#flow ('Vigo', 'Valencia'): one way delay: 50.44 micro sec
#flow ('Vigo', 'Portimao'): one way delay: 40.35 micro sec
#flow ('Valencia', 'Andorra'): one way delay: 19.28 micro sec
#flow ('Corunha', 'Barcelona'): one way delay: 39.96 micro sec
#flow ('Gijon', 'Badajoz'): one way delay: 30.49 micro sec
#flow ('Vigo', 'Porto'): one way delay: 9.99 micro sec
#flow ('Vigo', 'Gijon'): one way delay: 18.99 micro sec
#flow ('Corunha', 'Porto'): one way delay: 19.02 micro sec
#flow ('Corunha', 'Badajoz'): one way delay: 40.48 micro sec
#flow ('Vilar.Formoso', 'Sevilha'): one way delay: 19.97 micro sec
#flow ('Badajoz', 'Vilar.Formoso'): one way delay: 10.46 micro sec
#flow ('Granada', 'Aveiro'): one way delay: 39.52 micro sec
#flow ('Andorra', 'Portimao'): one way delay: 48.23 micro sec
#flow ('Sevilha', 'Madrid'): one way delay: 29.61 micro sec
#flow ('Sevilha', 'Palma'): one way delay: 18.66 micro sec
#flow ('Bilbau', 'Valencia'): one way delay: 20.98 micro sec
#flow ('Porto', 'Lisboa'): one way delay: 20.97 micro sec
#flow ('Braganca', 'Portimao'): one way delay: 40.16 micro sec
#flow ('Gijon', 'Valencia'): one way delay: 31.13 micro sec
#flow ('Lisboa', 'Sevilha'): one way delay: 19.18 micro sec
#flow ('Corunha', 'Aveiro'): one way delay: 29.68 micro sec
#flow ('Sevilha', 'Vigo'): one way delay: 50.13 micro sec
#flow ('Granada', 'Barcelona'): one way delay: 18.36 micro sec
#flow ('Granada', 'Valencia'): one way delay: 9.37 micro sec
#flow ('Corunha', 'Bilbau'): one way delay: 20.14 micro sec
#flow ('Porto', 'Portimao'): one way delay: 30.36 micro sec
#flow ('Andorra', 'Braganca'): one way delay: 19.37 micro sec
#flow ('Vilar.Formoso', 'Portimao'): one way delay: 29.64 micro sec
#flow ('Vilar.Formoso', 'Lisboa'): one way delay: 20.13 micro sec
#flow ('Barcelona', 'Porto'): one way delay: 39.34 micro sec
#flow ('Porto', 'Gijon'): one way delay: 19.04 micro sec
#flow ('Madrid', 'Sevilha'): one way delay: 37.68 micro sec
#flow ('Barcelona', 'Aveiro'): one way delay: 28.88 micro sec
#flow ('Vigo', 'Andorra'): one way delay: 38.99 micro sec
#flow ('Palma', 'Badajoz'): one way delay: 18.56 micro sec
#flow ('Corunha', 'Andorra'): one way delay: 29.67 micro sec
#flow ('Lisboa', 'Portimao'): one way delay: 9.39 micro sec
#flow ('Madrid', 'Porto'): one way delay: 29.95 micro sec
#flow ('Vigo', 'Lisboa'): one way delay: 30.96 micro sec
#flow ('Aveiro', 'Vilar.Formoso'): one way delay: 9.66 micro sec
#flow ('Portimao', 'Lisboa'): one way delay: 9.41 micro sec
#flow ('Braganca', 'Gijon'): one way delay: 9.38 micro sec
#flow ('Valencia', 'Portimao'): one way delay: 28.87 micro sec
#flow ('Lisboa', 'Barcelona'): one way delay: 28.47 micro sec
#flow ('Granada', 'Gijon'): one way delay: 40.42 micro sec
#flow ('Gijon', 'Aveiro'): one way delay: 29.72 micro sec
#flow ('Madrid', 'Aveiro'): one way delay: 19.48 micro sec
#flow ('Valencia', 'Gijon'): one way delay: 31.05 micro sec
#flow ('Valencia', 'Sevilha'): one way delay: 19.23 micro sec
#flow ('Aveiro', 'Badajoz'): one way delay: 20.11 micro sec
#flow ('Andorra', 'Granada'): one way delay: 28.72 micro sec
#flow ('Braganca', 'Barcelona'): one way delay: 29.87 micro sec
#flow ('Bilbau', 'Vigo'): one way delay: 29.41 micro sec
#flow ('Portimao', 'Braganca'): one way delay: 40.27 micro sec
#flow ('Gijon', 'Vigo'): one way delay: 19.03 micro sec
#flow ('Porto', 'Valencia'): one way delay: 40.56 micro sec
#flow ('Barcelona', 'Granada'): one way delay: 18.44 micro sec
#flow ('Barcelona', 'Corunha'): one way delay: 40.00 micro sec
#flow ('Porto', 'Andorra'): one way delay: 29.00 micro sec

```

```
#flow ('Sevilha', 'Portimao'): one way delay: 9.67 micro sec
#flow ('Granada', 'Lisboa'): one way delay: 28.92 micro sec
#flow ('Sevilha', 'Valencia'): one way delay: 19.16 micro sec
#flow ('Corunha', 'Gijon'): one way delay: 9.99 micro sec
#flow ('Gijon', 'Barcelona'): one way delay: 29.97 micro sec
#flow ('Madrid', 'Lisboa'): one way delay: 29.97 micro sec
#flow ('Palma', 'Aveiro'): one way delay: 38.69 micro sec
#flow ('Gijon', 'Madrid'): one way delay: 20.64 micro sec
#flow ('Vigo', 'Braganca'): one way delay: 19.65 micro sec
#flow ('Badajoz', 'Corunha'): one way delay: 40.44 micro sec
#flow ('Badajoz', 'Aveiro'): one way delay: 20.00 micro sec
#flow ('Badajoz', 'Madrid'): one way delay: 20.25 micro sec
#flow ('Madrid', 'Valencia'): one way delay: 10.49 micro sec
#flow ('Portimao', 'Madrid'): one way delay: 39.49 micro sec
```

9.10 Lambda, link-load e one way delay para cada link (Exercícios 13 e 14)

```
#link Gijon-Bilbau: 26509 pkts/sec -- link-load: 21.21% -- one_way_delay: 10.15 micro
sec
#link Bilbao-Gijon: 26273 pkts/sec -- link-load: 21.02% -- one_way_delay: 10.13 micro
sec
#link Granada-Sevilha: 23329 pkts/sec -- link-load: 18.66% -- one_way_delay: 9.84 micro
sec
#link Sevilha-Granada: 22890 pkts/sec -- link-load: 18.31% -- one_way_delay: 9.79 micro
sec
#link Badajoz-Lisboa: 21693 pkts/sec -- link-load: 17.35% -- one_way_delay: 9.68 micro
sec
#link Lisboa-Badajoz: 21532 pkts/sec -- link-load: 17.23% -- one_way_delay: 9.66 micro
sec
#link Badajoz-Sevilha: 19926 pkts/sec -- link-load: 15.94% -- one_way_delay: 9.52 micro
sec
#link Sevilha-Badajoz: 20289 pkts/sec -- link-load: 16.23% -- one_way_delay: 9.55 micro
sec
#link Aveiro-Porto: 30930 pkts/sec -- link-load: 24.74% -- one_way_delay: 10.63 micro
sec
#link Porto-Aveiro: 31194 pkts/sec -- link-load: 24.96% -- one_way_delay: 10.66 micro
sec
#link Badajoz-Vilar.Formoso: 29388 pkts/sec -- link-load: 23.51% -- one_way_delay: 10.46
micro sec
#link Vilar.Formoso-Badajoz: 29325 pkts/sec -- link-load: 23.46% -- one_way_delay: 10.45
micro sec
#link Porto-Braganca: 21484 pkts/sec -- link-load: 17.19% -- one_way_delay: 9.66 micro
sec
#link Braganca-Porto: 21468 pkts/sec -- link-load: 17.17% -- one_way_delay: 9.66 micro
sec
#link Braganca-Gijon: 18418 pkts/sec -- link-load: 14.73% -- one_way_delay: 9.38 micro
sec
#link Gijon-Braganca: 18643 pkts/sec -- link-load: 14.91% -- one_way_delay: 9.40 micro
sec
#link Palma-Valencia: 10778 pkts/sec -- link-load: 8.62% -- one_way_delay: 8.75 micro
sec
#link Valencia-Palma: 9294 pkts/sec -- link-load: 7.44% -- one_way_delay: 8.64 micro sec
#link Barcelona-Andorra: 27821 pkts/sec -- link-load: 22.26% -- one_way_delay: 10.29
micro sec
#link Andorra-Barcelona: 27757 pkts/sec -- link-load: 22.21% -- one_way_delay: 10.28
micro sec
#link Bilbao-Madrid: 29672 pkts/sec -- link-load: 23.74% -- one_way_delay: 10.49 micro
sec
#link Madrid-Bilbau: 29550 pkts/sec -- link-load: 23.64% -- one_way_delay: 10.48 micro
sec
#link Barcelona-Valencia: 12209 pkts/sec -- link-load: 9.77% -- one_way_delay: 8.87
micro sec
#link Valencia-Barcelona: 13809 pkts/sec -- link-load: 11.05% -- one_way_delay: 8.99
micro sec
#link Portimao-Sevilha: 21455 pkts/sec -- link-load: 17.16% -- one_way_delay: 9.66 micro
sec
#link Sevilha-Portimao: 21587 pkts/sec -- link-load: 17.27% -- one_way_delay: 9.67 micro
sec
#link Madrid-Vilar.Formoso: 22954 pkts/sec -- link-load: 18.36% -- one_way_delay: 9.80
micro sec
#link Vilar.Formoso-Madrid: 23231 pkts/sec -- link-load: 18.58% -- one_way_delay: 9.83
micro sec
#link Granada-Valencia: 18262 pkts/sec -- link-load: 14.61% -- one_way_delay: 9.37 micro
sec
#link Valencia-Granada: 18561 pkts/sec -- link-load: 14.85% -- one_way_delay: 9.40 micro
sec
#link Aveiro-Lisboa: 27979 pkts/sec -- link-load: 22.38% -- one_way_delay: 10.31 micro
sec
```

```

#link Lisboa-Aveiro: 28111 pkts/sec -- link-load: 22.49% -- one_way_delay: 10.32 micro
sec
#link Badajoz-Valencia: 23051 pkts/sec -- link-load: 18.44% -- one_way_delay: 9.81 micro
sec
#link Valencia-Badajoz: 22963 pkts/sec -- link-load: 18.37% -- one_way_delay: 9.80 micro
sec
#link Braganca-Vilar.Formoso: 30979 pkts/sec -- link-load: 24.78% -- one_way_delay:
10.64 micro sec
#link Vilar.Formoso-Braganca: 30648 pkts/sec -- link-load: 24.52% -- one_way_delay:
10.60 micro sec
#link Aveiro-Vilar.Formoso: 21508 pkts/sec -- link-load: 17.21% -- one_way_delay: 9.66
micro sec
#link Vilar.Formoso-Aveiro: 21693 pkts/sec -- link-load: 17.35% -- one_way_delay: 9.68
micro sec
#link Portimao-Lisboa: 18771 pkts/sec -- link-load: 15.02% -- one_way_delay: 9.41 micro
sec
#link Lisboa-Portimao: 18479 pkts/sec -- link-load: 14.78% -- one_way_delay: 9.39 micro
sec
#link Granada-Palma: 12264 pkts/sec -- link-load: 9.81% -- one_way_delay: 8.87 micro sec
#link Palma-Granada: 12556 pkts/sec -- link-load: 10.04% -- one_way_delay: 8.89 micro
sec
#link Bilbao-Andorra: 20103 pkts/sec -- link-load: 16.08% -- one_way_delay: 9.53 micro
sec
#link Andorra-Bilbao: 20402 pkts/sec -- link-load: 16.32% -- one_way_delay: 9.56 micro
sec
#link Vigo-Corunha: 13886 pkts/sec -- link-load: 11.11% -- one_way_delay: 9.00 micro sec
#link Corunha-Vigo: 14254 pkts/sec -- link-load: 11.40% -- one_way_delay: 9.03 micro sec
#link Madrid-Barcelona: 18652 pkts/sec -- link-load: 14.92% -- one_way_delay: 9.40 micro
sec
#link Barcelona-Madrid: 18613 pkts/sec -- link-load: 14.89% -- one_way_delay: 9.40 micro
sec
#link Braganca-Bilbao: 23053 pkts/sec -- link-load: 18.44% -- one_way_delay: 9.81 micro
sec
#link Bilbao-Braganca: 23061 pkts/sec -- link-load: 18.45% -- one_way_delay: 9.81 micro
sec
#link Madrid-Valencia: 29677 pkts/sec -- link-load: 23.74% -- one_way_delay: 10.49 micro
sec
#link Valencia-Madrid: 29245 pkts/sec -- link-load: 23.40% -- one_way_delay: 10.44 micro
sec
#link Corunha-Gijon: 24857 pkts/sec -- link-load: 19.89% -- one_way_delay: 9.99 micro
sec
#link Gijon-Corunha: 24960 pkts/sec -- link-load: 19.97% -- one_way_delay: 10.00 micro
sec
#link Barcelona-Palma: 20265 pkts/sec -- link-load: 16.21% -- one_way_delay: 9.55 micro
sec
#link Palma-Barcelona: 18621 pkts/sec -- link-load: 14.90% -- one_way_delay: 9.40 micro
sec
#link Porto-Vigo: 24443 pkts/sec -- link-load: 19.55% -- one_way_delay: 9.94 micro sec
#link Vigo-Porto: 24922 pkts/sec -- link-load: 19.94% -- one_way_delay: 9.99 micro sec

```