RouterOS CHR 及上海电信云平台测试

- RouterOS CHR
- 电信云平台

MUM China 2018

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- 189CSP， 上海万联信息科技有限公司

万联
189CSP

老杨

Allied Business IT Consultants aka. 189CSP

- Founded 2002 by David，老杨
- ChinaTelecom Service Partner: 上海电信信网部的合作商
- Microsoft Golden Partner: 微软金牌（云能力）
- MikroTik Reseller: CHR mostly

RouterOS CHR

- RouterOS version tailored for running in virtual environments
- Runs on VMware Workstation and ESXi, VirtualBox, HyperV, KVM（H3C，ZTE）, XenServer, etc.
- Cloud services - Amazon, Azure and others

Install RouterOS CHR

How to Install CHR

提供4种不同虚拟磁盘镜像，可以在不同的虚拟化平台中使用

- RAW disk image (.img file)
- VMWare disk image (.vmdk file)
- Hyper-V disk image (.vhdx file)
- VirtualBox disk image (.vdi file)

- 安装步骤

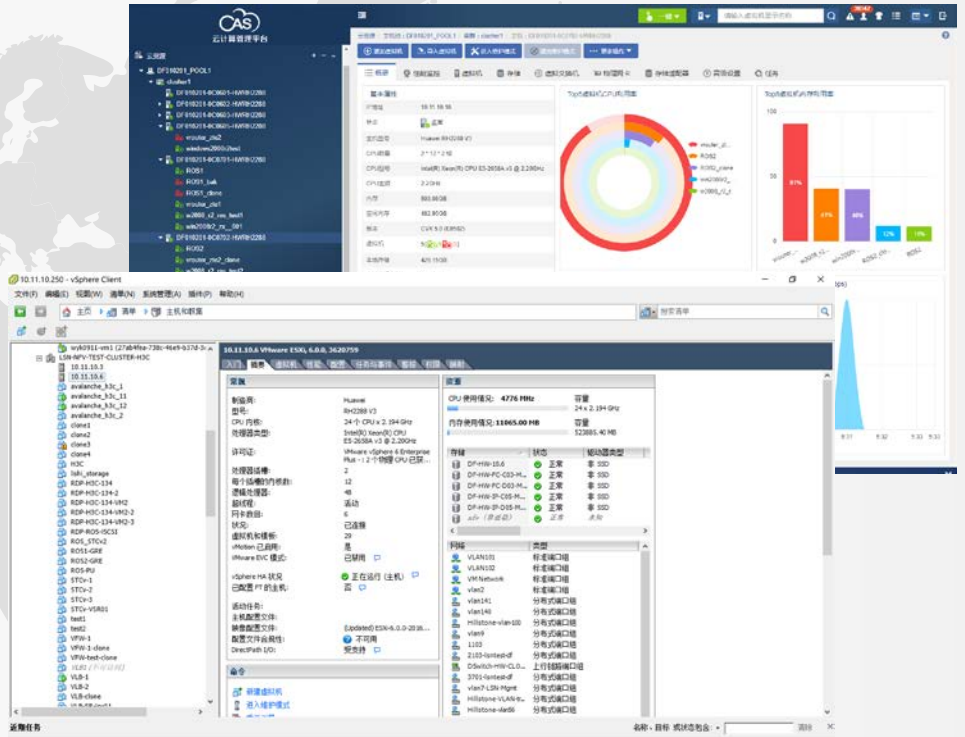
1. 下载镜像
2. 创建虚机
3. 使用镜像文件作为引导磁盘（必须IDE）
4. 启动虚机

Install RouterOS CHR

- ESX:
  - Network: vmxnet3, E1000
  - Disk: IDE, VMware paravirtual SCSI, LSI Logic SAS, LSI Logic Parallel
- Hyper-V:
  - Network: Network adapter, Legacy Network adapter
  - Disk: IDE, SCSI
- Qemu/KVM:
  - Network: Virtio, E1000, vmxnet3 (optional)
  - Disk: IDE, Sata, Virtio
- Xen Project:
  - Network: E1000, rtl8193, netfront
  - Disk: IDE, Sata
- VirtualBox
  - Network: E1000, rtl8193
  - Disk: IDE, Sata, SCSI, SAS

RouterOS CHR 测试
2017年8月开始云平台测试

- VMWare ESXi
- H3C CAS
- 中兴



RouterOS CHR 测试
2017年8月开始云平台测试

- VMWare ESXi
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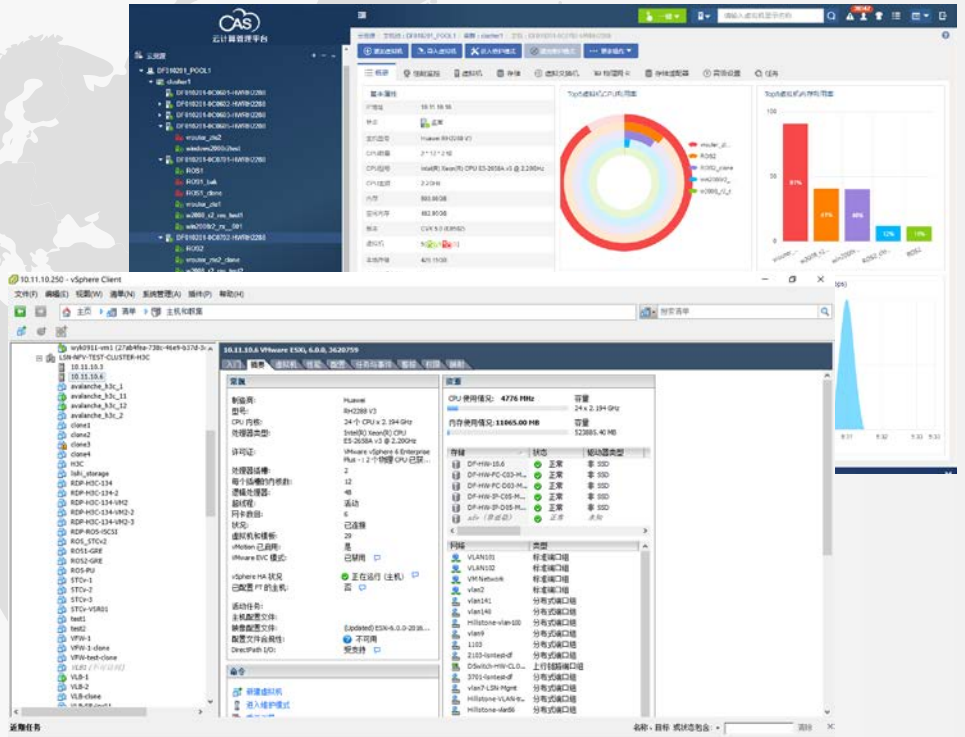
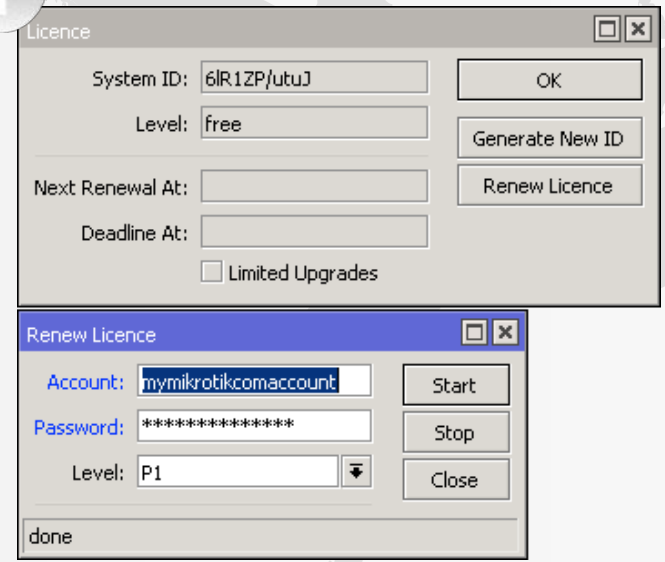


CHR License 注册获取60天试用

1



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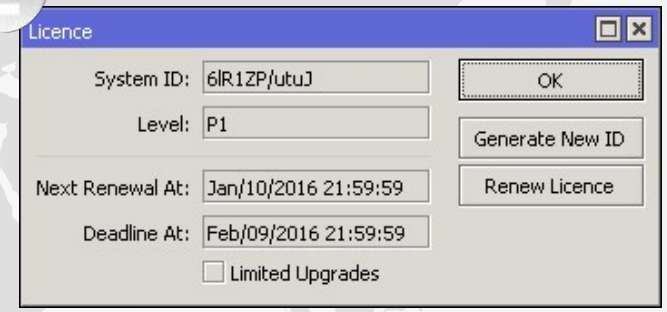

System ID 为RouterOS标识号码，与授权对应，请记录归档

- Winbox -> System -> License
- Renew License 输入用户名密码
- 此时获取60天试用授权，请登录网站后台正式激活

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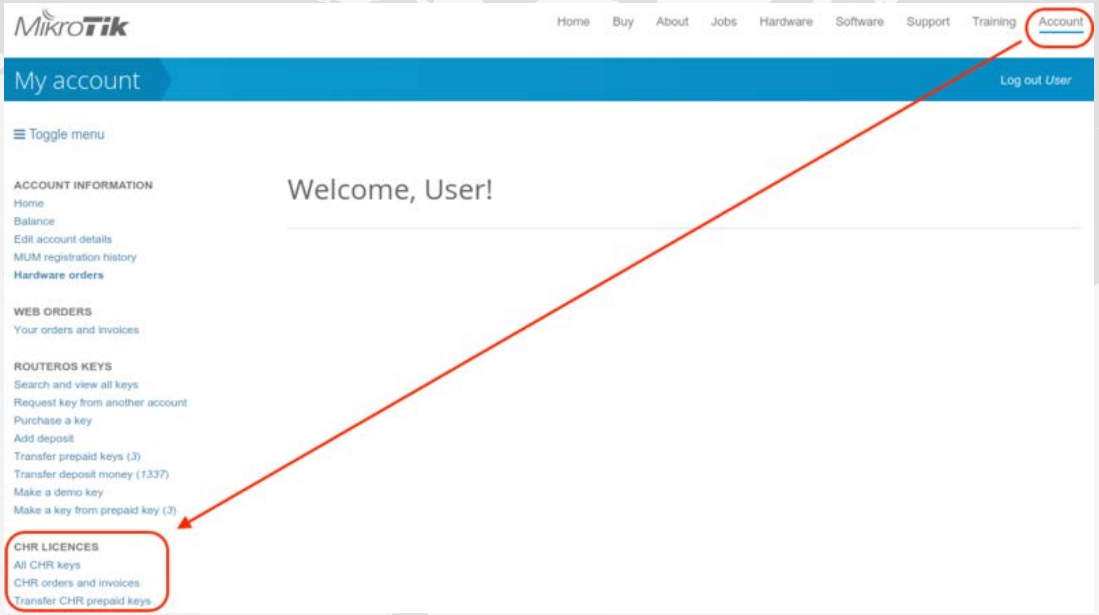
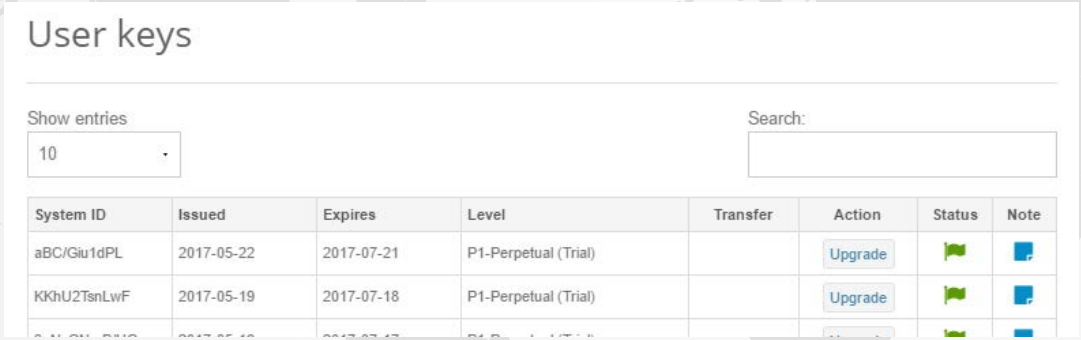
CHR License 正式激活永久使用



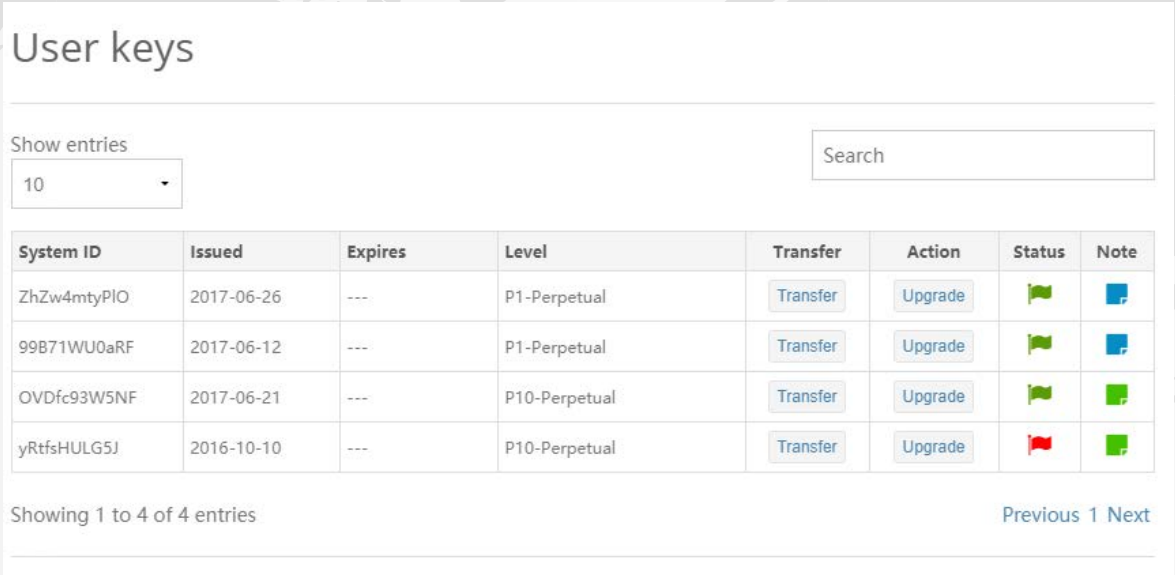
- https://www.mikrotik.com/client
- 登陆Account后查看CHR授权信息

CHR License 正式激活永久使用



- Level 中（Trial）表示目前是试用授权
- System ID 是RouterOS标识ID，根据此ID找到需要激活的RouterOS
- 点击Upgrade 将试用授权升级为永久授权
- Note中用于填写备注

CHR License 正式激活永久使用



- 激活后Level中显示 P*-Perpetual
- System ID 是RouterOS标识ID
- 点击Transfer可以将授权转移给其他RouterOS

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CHR License 正式激活永久使用

正式激活后下列情况会导致激活失效

- 正式激活后每30天自动联机更新一次License。
- 超过60天无法联机更新License，授权失效。
- 后台管理端将License 转移，授权失效。

授权失效的影响

- 所有功能正常使用，对业务生产没有任何影响。
- 禁止升级到最新版本的RouterOS
- 授权失效之后不能重新授权。

CHR 虚机克隆及迁移

- RouterOS CHR 克隆后产生新的 System ID，进入免费授权模式，需要另行激活。
- RouterOS CHR 进行存储或者宿主机迁移后System ID不变，不需要重新激活

测试目标

兼容性，功能性，性能。

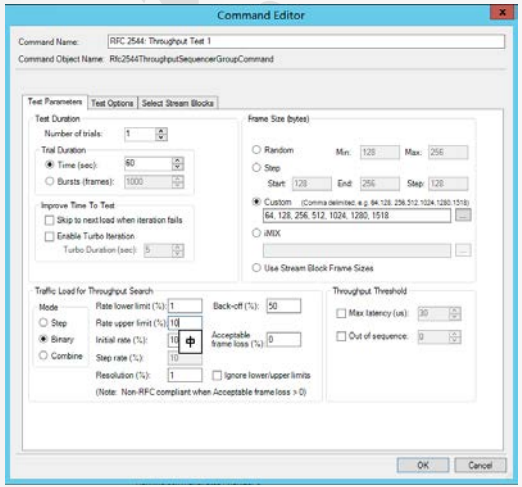
- 能否在各个虚拟化平台正常运行
- 能否实现电信要求功能
- 基本性能测试（RFC 2544）

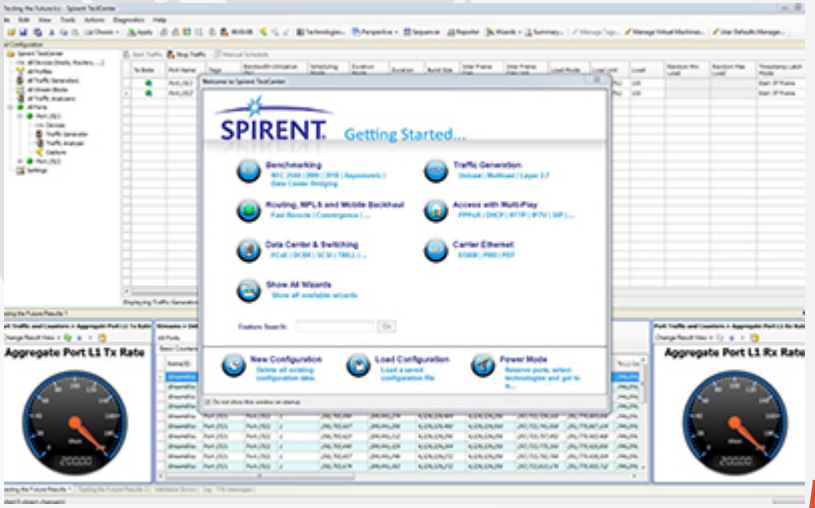
目　录

测试平台

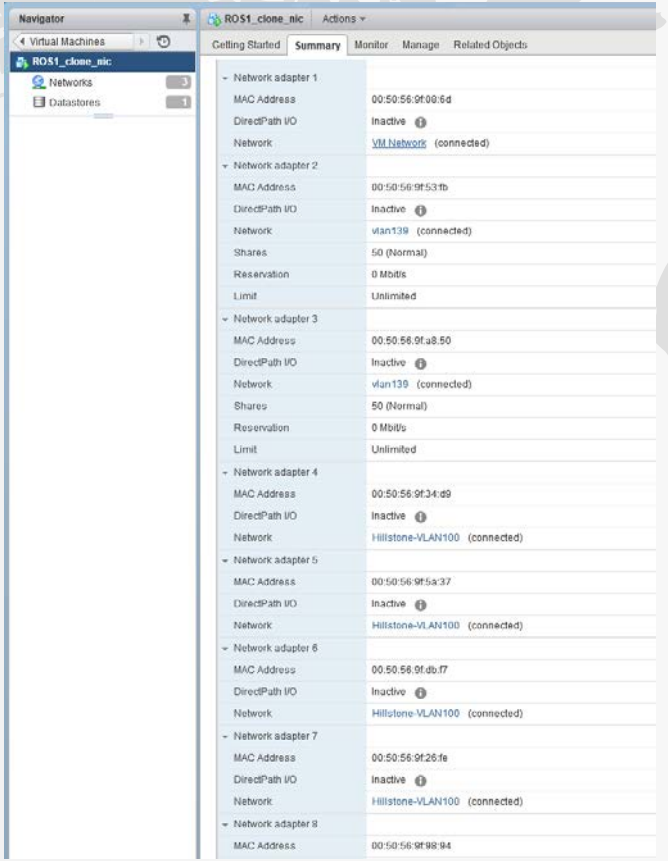
电信提供虚拟化平台

- Windows或Linux虚机
- 思博伦TestCenter （虚拟化版本）





测试中的问题 网卡乱序问题



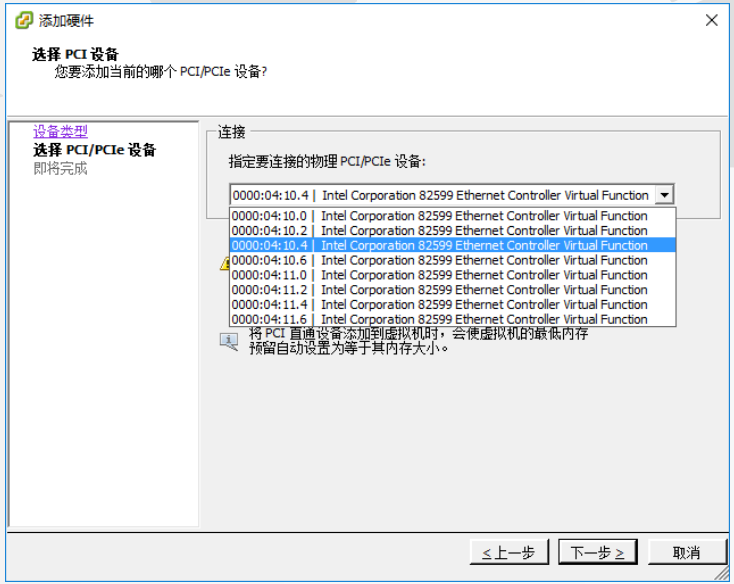

```
[admin@MikroTik] > /int ethernet print
Flags: X - disabled, R - running, S - slave
 #     NAME                                MTU MAC-ADDRESS       ARP
 0  R  ether1                             1500 00:50:56:9F:08:6D enabled
 1  R  ether2                             1500 00:50:56:9F:5A:37 enabled
 2  R  ether3                             1500 00:50:56:9F:32:F0 enabled
 3  R  ether4                             1500 00:50:56:9F:53:FB enabled
 4  R  ether5                             1500 00:50:56:9F:DB:F7 enabled
 5  R  ether6                             1500 00:50:56:9F:B2:F5 enabled
 6  R  ether7                             1500 00:50:56:9F:A8:50 enabled
 7  R  ether8                             1500 00:50:56:9F:26:FE enabled
 8  R  ether9                             1500 00:50:56:9F:34:D9 enabled
 9  R  ether10                            1500 00:50:56:9F:98:94 enabled
```

```
master@ubuntu:~$ ip add
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ens160: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:50:56:9f:08:6d brd ff:ff:ff:ff:ff:ff
    inet 10.2.2.9/24 brd 10.2.2.255 scope global ens160
       valid_lft forever preferred_lft forever
    inet6 fe80::250:56ff:fe9f:86d/64 scope link
       valid_lft forever preferred_lft forever
3: ens161: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 00:50:56:9f:5a:37 brd ff:ff:ff:ff:ff:ff
4: ens162: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 00:50:56:9f:32:f0 brd ff:ff:ff:ff:ff:ff
5: ens192: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 00:50:56:9f:53:fb brd ff:ff:ff:ff:ff:ff
6: ens193: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 00:50:56:9f:db:f7 brd ff:ff:ff:ff:ff:ff
7: ens194: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 00:50:56:9f:b2:f5 brd ff:ff:ff:ff:ff:ff
8: ens224: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 00:50:56:9f:a8:50 brd ff:ff:ff:ff:ff:ff
9: ens225: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 00:50:56:9f:26:fe brd ff:ff:ff:ff:ff:ff
10: ens256: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 00:50:56:9f:34:d9 brd ff:ff:ff:ff:ff:ff
11: ens257: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 00:50:56:9f:98:94 brd ff:ff:ff:ff:ff:ff
```

测试中的问题 不支持SR-IOV

RouterOS 当前版本不支持SR-IOV，识别为unknown device

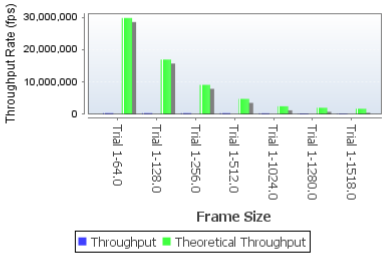
后续版本可能会提供支持。




```
# DEVICE   VENDOR                NAME                          IRQ
0 1b:00.0  Intel Corporation     unknown device (rev: 1)         0
1 13:00.0  VMware                VMXNET3 Ethernet Contro...      9
2 0b:00.0  VMware                VMXNET3 Ethernet Contro...     10
3 03:00.0  VMware                VMXNET3 Ethernet Contro...     11
4 00:18.7  VMware                PCI Express Root Port (...      0
5 00:18.6  VMware                PCI Express Root Port (...      0
6 00:18.5  VMware                PCI Express Root Port (...      0
7 00:18.4  VMware                PCI Express Root Port (...      0
8 00:18.3  VMware                PCI Express Root Port (...      0
9 00:18.2  VMware                PCI Express Root Port (...      0
10 00:18.1  VMware                PCI Express Root Port (...      0
11 00:18.0  VMware                PCI Express Root Port (...      0
12 00:17.7  VMware                PCI Express Root Port (...      0
13 00:17.6  VMware                PCI Express Root Port (...      0
14 00:17.5  VMware                PCI Express Root Port (...      0
15 00:17.4  VMware                PCI Express Root Port (...      0
16 00:17.3  VMware                PCI Express Root Port (...      0
17 00:17.2  VMware                PCI Express Root Port (...      0
18 00:17.1  VMware                PCI Express Root Port (...      0
19 00:17.0  VMware                PCI Express Root Port (...      0
20 00:16.7  VMware                PCI Express Root Port (...      0
21 00:16.6  VMware                PCI Express Root Port (...      0
22 00:16.5  VMware                PCI Express Root Port (...      0
-- [Q quit|D dump|down]
```

H3C

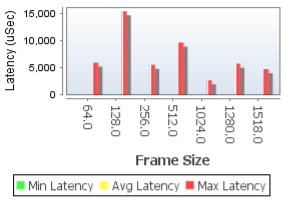
Throughput by Frame Size VS Theoretical Max



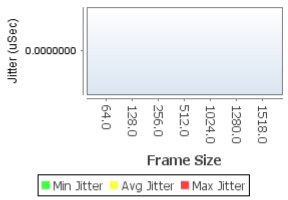
Total Trials	Number of Passed Trials	Frame Size (bytes)	Intended Load (%)	Offered Load (%)	Throughput (%)	Aggregated Throughput (fps)	Aggregated Theoretical Max (fps)	Aggregated Throughput (Mbps)	Aggregated Theoretical Max (Mbps)
1	1	64	0.951	0.95	0.95	282,691	29,761,904	189.969	20,000
1	1	128	1.57	1.569	1.569	265,113	16,891,891	313.895	20,000
1	1	256	2.962	2.962	2.962	268,307	9,057,971	592.423	20,000
1	1	512	5.591	5.592	5.592	262,760	4,699,248	1,118.309	20,000
1	1	1,024	10	10.003	10.003	239,537	2,394,636	2,000.616	20,000
1	1	1,280	10	10.003	10.003	192,372	1,923,076	2,000.674	20,000
1	1	1,518	10	9.996	9.996	162,482	1,625,487	1,999.187	20,000

Note: Jitter measurements are only available when the test is run in the "Jitter" mode or "Latency_Jitter" mode.

Latency by Frame size at Throughput

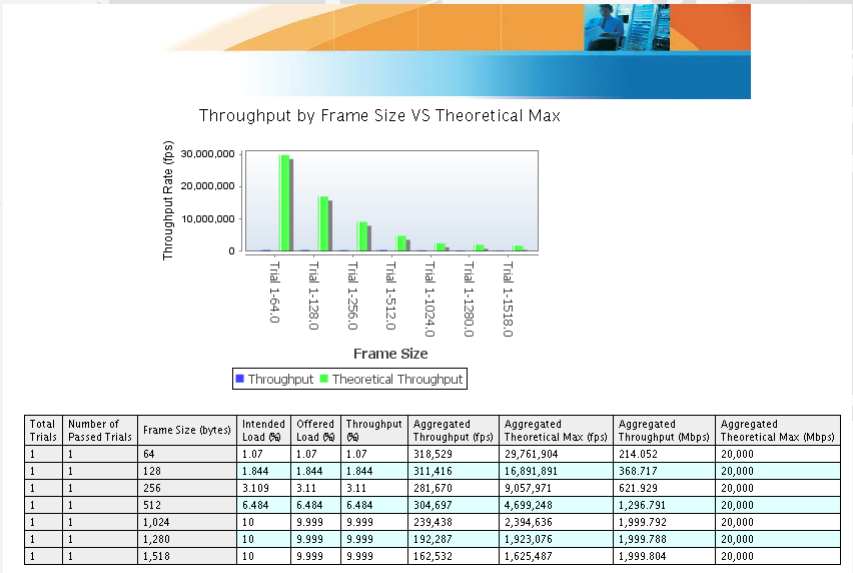


Jitter by Frame size at Throughput



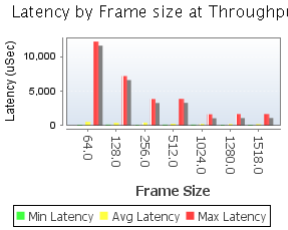
Frame Size (bytes)	Intended Load (%)	Offered Load (%)	Min Frame Loss (%)	Min Latency (uSec)	Avg Latency (uSec)	Max Latency (uSec)	Min Jitter (uSec)	Avg Jitter (uSec)	Max Jitter (uSec)
64	10	3.439	93.9722140310446	625.69	18,482.962	57,929.98	0	0	0
64	5.05	3.361	92.84866444411673	498.75	15,608.579	57,337.49	0	0	0
64	2.575	2.575	33.4791879458905	26.79	2,680.057	22,564,435.27	0	0	0
64	1.338	1.338	1.73680994708037	17.01	596.554	8,937.15	0	0	0
64	0.719	0.718	0.00465443110026931	13.55	48.812	5,521.69	0	0	0
64	1.028	1.028	0.353740489024635	16.02	173.205	6,468.38	0	0	0
64	0.873	0.873	0.00125686022848565	13.28	58.532	5,772.69	0	0	0
64	0.951	0.95	0.00288300075453259	14.72	92.314	5,925.08	0	0	0
128	10	5.869	89.2790381414325	464.55	11,924.863	45,250.18	0	0	0
128	5.05	5.052	50.9412354176173	240.18	4,047.329	15,477,684.83	0	0	0
128	2.575	2.574	4.26300267226961	16.09	887.173	2,550,709.09	0	0	0
128	1.338	1.338	0.0435316714849189	14.23	53.41	20,838.16	0	0	0
128	1.956	1.956	0.709494836105664	16.25	236.352	53,729.39	0	0	0
128	1.647	1.648	0.164268059607122	14.99	111.191	35,553.16	0	0	0
128	1.492	1.492	0.045952937976294 8	15.54	63.105	32,195.75	0	0	0
128	1.57	1.569	0.0472564063329242	16.12	71.909	15,395.12	0	0	0
256	10	10.005	71.6988781847798	596.53	6,885.777	23,391.38	0	0	0
256	5.05	5.05	8.48990785022142	19.25	1,310.762	15,462,152.71	0	0	0
256	2.575	2.574	0.0109792300986444	15.28	61.642	12,221.95	0	0	0
256	3.813	3.813	0.590559036529908	15.78	374.709	4,583.24	0	0	0
256	3.194	3.193	0.266497449497186	17.44	150.74	7,491.57	0	0	0
256	2.884	2.888	0.0154780158012126	14.56	106.231	6,157.34	0	0	0
256	3.039	3.042	0.12052987415135	16.15	140.634	5,484.58	0	0	0
256	2.962	2.962	0.0470107604201699	17.35	121.443	5,525.47	0	0	0
512	10	9.997	6.62458234302578	19.39	1,367.563	13,760.54	0	0	0
512	5.05	5.05	0.000147494096373204	15.28	62.533	4,542.24	0	0	0
512	7.525	7.534	1.91892688895756	16.28	733.085	28,222.16	0	0	0
512	6.288	6.289	0.800963445649046	16.27	291.414	32,539.98	0	0	0
512	5.669	5.672	0.262108576385977	15.28	175.931	16,323.64	0	0	0
512	5.359	5.364	0.0761019509604582	15.96	100.057	17,060.28	0	0	0
512	5.514	5.515	0.013362885158799	18.1	122.477	6,323.74	0	0	0
512	5.591	5.592	0.02139464409537	17.4	85.664	9,628.04	0	0	0
1,024	10	10.003	0	16.15	74.792	2,667.85	0	0	0
1,280	10	10.003	0.00237386667359766	16.42	54.503	5,745.08	0	0	0
1,518	10	9.996	0	17.03	52.685	4,721.06	0	0	0

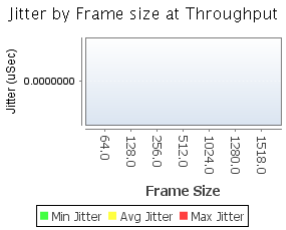
VMWare



Total Trials	Number of Passed Trials	Frame Size (bytes)	Intended Load (%)	Offered Load (%)	Throughput (%)	Aggregated Throughput (fps)	Aggregated Theoretical Max (fps)	Aggregated Throughput (Mbps)	Aggregated Theoretical Max (Mbps)
1	1	64	1.07	1.07	1.07	318,529	29,761,904	214.052	20,000
1	1	128	1.844	1.844	1.844	311,416	16,891,891	368.717	20,000
1	1	256	3.109	3.11	3.11	281,670	9,057,971	621.929	20,000
1	1	512	6.484	6.484	6.484	304,697	4,699,248	1,296.791	20,000
1	1	1,024	10	9.999	9.999	239,438	2,394,636	1,999.792	20,000
1	1	1,280	10	9.999	9.999	192,287	1,923,076	1,999.788	20,000
1	1	1,518	10	9.999	9.999	162,532	1,625,487	1,999.804	20,000

Note: Jitter measurements are only available when the test is run in the "Jitter" mode or "Latency_Jitter" mode.





Frame Size (bytes)	Intended Load (%)	Offered Load (%)	Min Frame Loss (%)	Min Latency (uSec)	Avg Latency (uSec)	Max Latency (uSec)	Min Jitter (uSec)	Avg Jitter (uSec)	Max Jitter (uSec)
64	10	2.709	60.1747991503691	1,125.57	8,534.724	4,963,271.08	0	0	0
64	5.5	2.726	59.9807486313785	700.88	8,555.094	4,082,791.22	0	0	0
64	3.25	2.738	60.1219229018917	383.87	8,514.467	1,809,224.12	0	0	0
64	2.125	2.125	49.3498128411776	566.39	7,052.54	2,822,835.82	0	0	0
64	1.563	1.562	31.0203100211511	125.38	6,809.172	4,146,527.76	0	0	0
64	1.281	1.282	15.3831942944419	111.54	6,649.248	9,325.61	0	0	0
64	1.141	1.141	5.87616075053972	100.04	6,608.792	4,359,562.44	0	0	0
64	1.07	1.07	0.0199929216371655	92.83	516.515	12,169.57	0	0	0
128	10	4.772	60.1128907814676	183.66	8,613.99	322,369.29	0	0	0
128	5.5	4.783	60.0489630650157	120.76	8,468.843	1,084,877.67	0	0	0
128	3.25	3.25	42.1310106428013	149.53	6,980.859	1,142,720.49	0	0	0
128	2.125	2.061	11.3515604572527	123.09	6,717.769	9,249.81	0	0	0
128	1.563	1.562	0.0786069586388587	-266,704.1	336.896	272,754.97	0	0	0
128	1.844	1.844	0	103.34	372.371	7,162	0	0	0
128	1.984	1.984	3.91760257821348	106.79	5,053.249	9,068.51	0	0	0
128	1.914	1.914	1.28905055047433	100.67	4,427.513	8,989.22	0	0	0
256	10	7.428	57.2688294224159	648.53	5,626.247	4,595,099.05	0	0	0
256	5.5	5.499	41.9064319243737	144.7	4,108.996	4,552,236.14	0	0	0
256	3.25	3.25	1.65332439148642	105.11	2,396.523	8,973.98	0	0	0
256	2.125	2.125	0	81.98	269.174	1,685.18	0	0	0
256	2.688	2.69	0	90.23	333.781	3,640.44	0	0	0
256	2.969	2.97	0	100.1	362.254	4,567.76	0	0	0
256	3.109	3.11	0	98.57	401.836	3,831.08	0	0	0
256	3.18	3.179	0.234367526268903	110.04	802.846	6,816.15	0	0	0
512	10	9.999	34.749649815172	173.44	3,777.069	2,219,254.71	0	0	0
512	5.5	5.505	0	97.24	206.741	3,680.76	0	0	0
512	7.75	7.75	15.705254746864	124	3,543.837	6,511.85	0	0	0
512	6.625	6.624	0.589389658381432	113.31	1,279.225	7,621.22	0	0	0
512	6.063	6.062	0.00557564269081803	98.81	229.267	5,589.69	0	0	0
512	6.344	6.35	0	100.96	222.589	3,560.39	0	0	0
512	6.484	6.484	0	99.6	235.401	3,851.1	0	0	0
512	6.555	6.554	0.131374231386612	111.23	500.975	7,216.65	0	0	0
1,024	10	9.999	0	106.42	210.803	1,611.75	0	0	0
1,280	10	9.999	0	92.35	197.915	1,636.94	0	0	0
1,518	10	9.999	0	86.09	189.502	1,647.07	0	0	0

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