

Open Ports and their Function

This document briefly explains how to check which ports are open on a SAGE RTU and how to check what process to which each port belongs. All 127.0.0.1 are local ports used for communications within the system.

Q: What command do I run to check what ports are open?

A: On a C3414 CPU: "cmd netstat -anP" (No quotes when typed into UIF console).

On a C3413 CPU: "inetstatShow"

On both CPU's use the following to check what tasks are running: "i"

Those two commands together will tell you what ports belong to what task. Several examples are shown below. Throughout the document "netstat -anP" is used, however substitute that with "inetstatShow" if checking out a C3413 based RTU.

Q: What TCP-IP and UDP-IP ports should I expect to see with all network services enabled on the GUI?

A: Below is the list of open ports looks like when all network services have been configured to run. The complete list of network services enabled in this example are:

HTTP

HTTPS

FTP Server

SSH (Shell, SFTP, TTE)

Telnet Server (Shell, TTE)

IPSec

PPP

```
COM12 - PuTTY

[vxWorks]# netstat -anP
INET sockets
Prot  Recv-Q  Send-Q  Local Address           Foreign Address         State       TID
TCP    0         0        0.0.0.0.23              0.0.0.0.*               LISTEN      2d51b50 Telnet listen
TCP    0         0        0.0.0.0.21              0.0.0.0.*               LISTEN      2d5e538 FTP listen
TCP    0         0        0.0.0.0.22              0.0.0.0.*               LISTEN      2d6e5c0 SSH listen
TCP    0         0        127.0.0.1.500           0.0.0.0.*               LISTEN      2d89378 IKE listen
TCP    0         0        127.0.0.1.50150        0.0.0.0.*               LISTEN      2d89378
TCP    0         0        0.0.0.0.443             0.0.0.0.*               LISTEN      9f8048 HTTPS listen
TCP    0         0        0.0.0.0.80              0.0.0.0.*               LISTEN      9f8048 HTTP listen
UDP    0         0        127.0.0.1.20005         127.0.0.1.20004         2d51b50 Telnet Internal
UDP    0         0        127.0.0.1.20059        127.0.0.1.20058         2d5e538 FTP Internal
UDP    0         0        0.0.0.0.1701            0.0.0.0.*               2d67068 L2TP listen
UDP    0         0        127.0.0.1.20015        127.0.0.1.20014         2d67068 L2TP Internal
UDP    0         0        127.0.0.1.57828        0.0.0.0.*               2d5d2b0 PPP listen
UDP    0         0        127.0.0.1.60667        127.0.0.1.57828         2d5d2b0 PPP Internal
UDP    0         0        127.0.0.1.20029        127.0.0.1.20028         2d6e5c0 SSH Internal
UDP    0         0        127.0.0.1.20021        127.0.0.1.20020         2d89378 IKE Internal
115    0         0        0.0.0.0.*               0.0.0.0.*               2d67068 L2TP listen

INET6 sockets
Prot  Recv-Q  Send-Q  Local Address           Foreign Address         State       TID

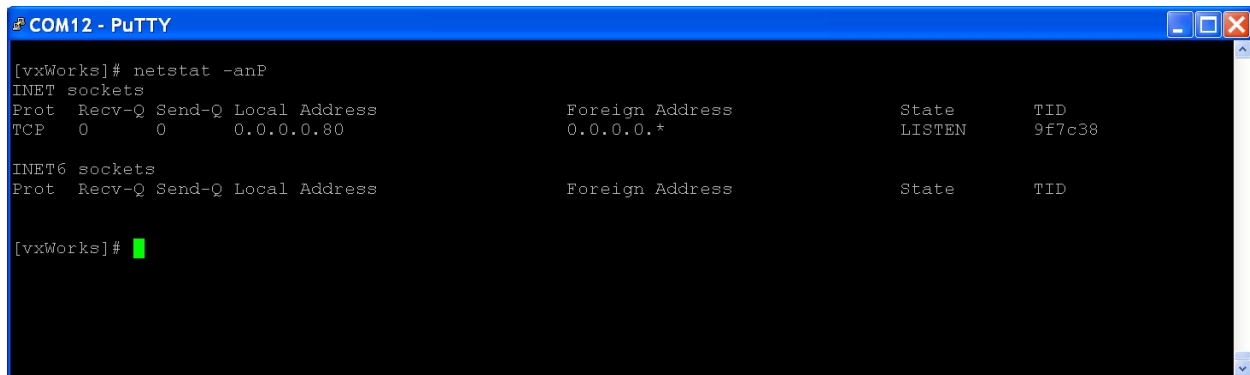
[vxWorks]#
```

NAME	ENTRY	TID	PRI	STATUS	PC	SP	ERRNO	DELAY
tIsr0	4449a0	a85cb0	0	PEND	78b951	a99f70	0	0
tJobTask	6d7440	a969f0	0	PEND	78b951	aa0f30	0	0
tExcTask	6d6c60	9eb480	0	PEND	78b951	9eb390	0	0
tLogTask	logTask	aa4a40	0	PEND	7899ae	aadec0	0	0
tShell0	shellTask	3508d68	1	READY	793be0	358b490	0	0
tHrfsCommi>	hrfsCommitT>	2cfac30	2	PEND+T	78b951	2d0bed0	3d0004	197
tErftTask	4616b0	a96c90	10	PEND	78c07d	aa6f30	0	0
ipcom_tick>	7b1950	bf8020	20	PEND	78b951	c02f10	0	0
tVxdbgTask	46ec60	2e0ff38	25	PEND	78b951	2e13f40	0	0
tNet0	ipcomNetTask	a4eb10	50	PEND	78b951	ab6f30	0	0
ipcom_sysl>	4855f0	be4bc8	50	PEND	78c07d	bf4e40	0	0
tNetConf	6317b0	2d3d1c8	50	PEND	78b951	2d40d40	0	0
ipcom_telne>	ipcom telne>	2d51b50	50	PEND	78b951	2d54db0	0	0
ipppp_work	410f00	2d58a18	50	PEND	78c07d	2d5bf20	0	0
ipftps	ipftps main	2d5e538	50	PEND	78b951	2d71dd0	0	0
l2tps	411880	2d67068	50	PEND+T	78b951	2d78df0	3d0004	1
ipsshd	ipssh	2d6e5c0	50	PEND	78b951	2d85e30	380009	0
ipiked	ipike_proc	2d89378	50	PEND+T	78b951	2d92b10	3d0004	11
t5Msec	clk_task_5ms	3461020	98	PEND	78b951	34b0f10	0	0
t50Msec	clk_task_50>	34612c0	99	PEND	78b951	34b8f40	0	0
vnSyncer	vn_sync_task	a6c648	200	DELAY	79273f	2ca4f80	0	60
DBC	ml_dbc	34c7a48	204	PEND+T	78b951	34d5f10	3d0004	190
SCHED	schdlr	34bf6d0	205	PEND	7899ae	34cbea0	0	0

Note: The IPSec and PPP services can utilize the L2TP protocol, so enabling either of these services will cause the L2TP server task to launch and open the various UPD and L2TP (Protocol 115) ports to be opened.

Q: What TCP and UDP ports should I expect to see with only HTTP service enabled on the GUI?

A: Below is the “netstat -anP” command when only the HTTP service is enabled on the GUI.
When more services are enabled, the list accordingly becomes longer.



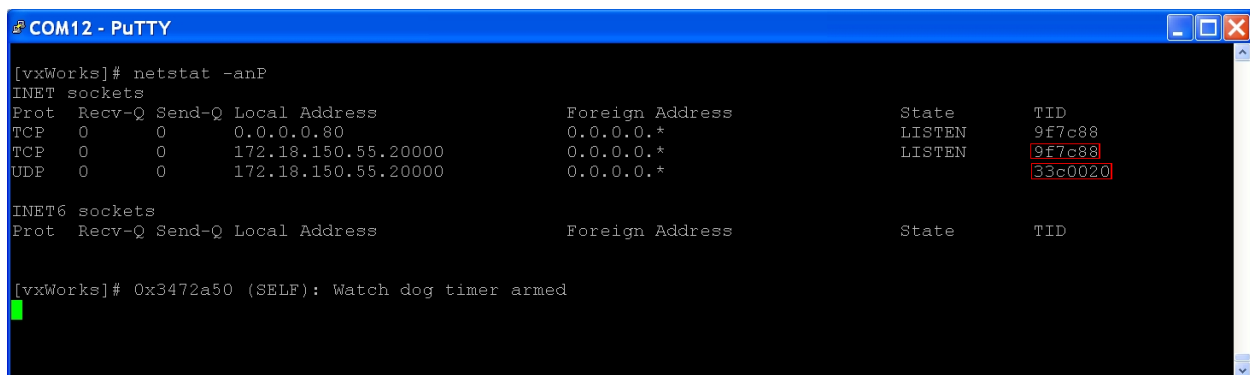
```
COM12 - PuTTY
[vxWorks]# netstat -anP
INET sockets
Prot  Recv-Q  Send-Q  Local Address           Foreign Address         State       TID
TCP    0          0      0.0.0.0.80              0.0.0.0.*              LISTEN      9f7c38

INET6 sockets
Prot  Recv-Q  Send-Q  Local Address           Foreign Address         State       TID

[vxWorks]#
```

Q: What TCP and UDP ports should I expect to see with a DNPR protocol socket enabled?

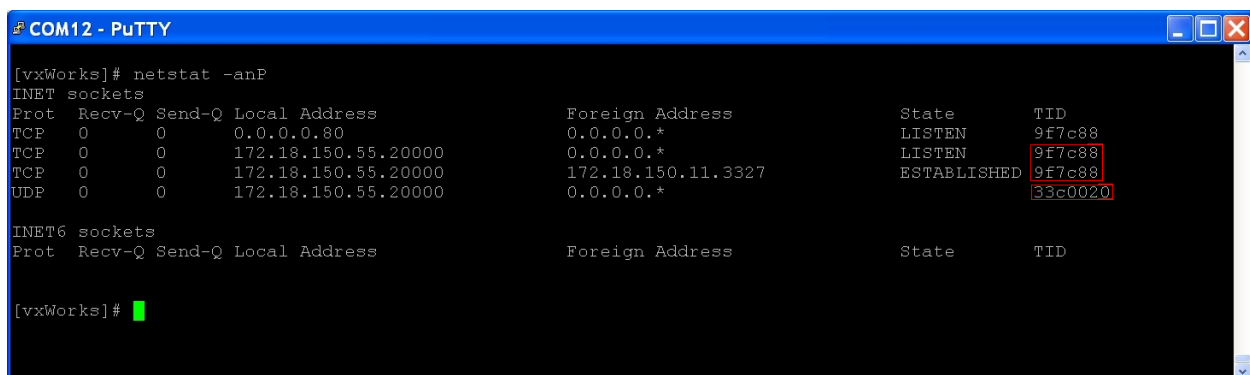
A: Below is the “netstat -anP” command when the HTTP service and a DNPR socket are enabled on the GUI, both before connected to a master station and during connection to a master station. The task list is also shown with the highlighted task ID’s (TID) listed in the netstat display.



```
COM12 - PuTTY
[vxWorks]# netstat -anP
INET sockets
Prot  Recv-Q  Send-Q  Local Address           Foreign Address         State       TID
TCP    0          0      0.0.0.0.80              0.0.0.0.*              LISTEN      9f7c88
TCP    0          0      172.18.150.55.20000    0.0.0.0.*              LISTEN      9f7c88
UDP    0          0      172.18.150.55.20000    0.0.0.0.*              LISTEN      33c0020

INET6 sockets
Prot  Recv-Q  Send-Q  Local Address           Foreign Address         State       TID

[vxWorks]# 0x3472a50 (SELF): Watch dog timer armed
```



```
COM12 - PuTTY
[vxWorks]# netstat -anP
INET sockets
Prot  Recv-Q  Send-Q  Local Address           Foreign Address         State       TID
TCP    0          0      0.0.0.0.80              0.0.0.0.*              LISTEN      9f7c88
TCP    0          0      172.18.150.55.20000    0.0.0.0.*              LISTEN      9f7c88
TCP    0          0      172.18.150.55.20000    172.18.150.11.3327     ESTABLISHED 9f7c88
UDP    0          0      172.18.150.55.20000    0.0.0.0.*              LISTEN      33c0020

INET6 sockets
Prot  Recv-Q  Send-Q  Local Address           Foreign Address         State       TID

[vxWorks]#
```

COM12 - PuTTY									
tNet0	ipcomNetTask	a4eb10	50	PEND	78b951	ab6f30	0	0	
ipcom_sys1>	4855f0	be4bc8	50	PEND	78c07d	bf4e40	0	0	
tNetConf	6317b0	2d282f0	50	PEND	78b951	2d2bd40	0	0	
t5Msec	clk_task_5ms	3403020	98	PEND	78b951	344ef10	0	0	
t50Msec	clk_task_50>	342d020	99	PEND	78b951	3456f40	0	0	
vnSyncer	vn_sync_task	a6c648	200	DELAY	79273f	2ca4f80	0	38	
dnTcpSrv17	dnptcpSrv	9f7c88	203	PEND	78b951	34a6cf0	0	0	
dnTcpWrk17	dnTcpWrk	345c340	203	DELAY	79273f	34eef50	46	2	
dnUdpSrv17	dnpuDp	33c0020	203	PEND	78b951	3546ca0	0	0	
DBC	ml_dbc	3466540	204	PEND+T	78b951	3476f10	3d0004	145	
SCHED	schdlr	345e678	205	PEND	7899ae	346aea0	0	0	
COS	ml_cos	34667e0	205	PEND+T	7899ae	3482e40	3d0004	174	
ANA	ml_ana	3472280	205	PEND	78b951	349aed0	0	0	

Q: What TCP ports should I expect to see with a DNPM protocol socket enabled over TCP?

A: Below is the “netstat -anP” command when the HTTP service and a DNPM socket are enabled on the GUI and the DNPM is connected to an IED using TCP. The task list is also shown with the highlighted task ID’s (TID) listed in the netstat display.

```
COM12 - PuTTY
[vxWorks]# netstat -anP
INET sockets
Prot Recv-Q Send-Q Local Address          Foreign Address         State       TID
TCP   0      0      0.0.0.0.80              0.0.0.0.*               LISTEN      9f7c00
TCP   0      0      172.18.150.55.59591    172.18.150.11.20000     ESTABLISHED 341a2c0

INET6 sockets
Prot Recv-Q Send-Q Local Address          Foreign Address         State       TID

[vxWorks]#
```

```
COM12 - PuTTY
tHrfsCommi> hrfsCommitT> 2cfaed0 2 PEND+T 78b951 2d0ced0 3d0004 202
tErfTask 4616b0 a96c90 10 PEND 78c07d aa6f30 0 0
ipcom_tick> 7b1950 bf8020 20 PEND 78b951 c02f10 0 0
tVxdbgTask 46ec60 2db5a90 25 PEND 78b951 2db8f40 0 0
tNet0 ipcomNetTask a4eb10 50 PEND 78b951 ab6f30 0 0
ipcom_sys1> 4855f0 be4bc8 50 PEND 78c07d bf4e40 0 0
tNetConf 6317b0 2d282f0 50 PEND 78b951 2d2bd40 0 0
t5Msec clk_task_5ms 3405020 98 PEND 78b951 3450f10 0 0
t50Msec clk_task_50> 342f020 99 PEND 78b951 3458f40 0 0
vnSyncer vn_sync task a6c648 200 DELAY 79273f 2ca4f80 0 54
dnTcpWrk17 dnpSendRcv 341a2c0 203 PEND+T 7899ae 34f2e70 0 18
DEC ml_dbc 346acc8 204 PEND+T 78b951 347af10 3d0004 156
SCHED schdlr 3462e10 205 PEND 7899ae 346eea0 0 0
COS ml_cos 34660c0 205 PEND+T 7899ae 3486e40 3d0004 207
ANA ml_ana 341a020 205 PEND 78b951 349eed0 0 0
GBLFRZ gblfrz_task 3444020 205 DELAY 79273f 34c2f40 0 1
```

Q: What UDP ports should I expect to see with a DNPM protocol socket enabled over UDP?

A: Below is the “netstat -anP” command when the HTTP service and a DNPM socket are enabled on the GUI and the DNPM is connected to an IED using UDP. The task list is also shown with the highlighted task ID’s (TID) listed in the netstat display.

```
COM12 - PuTTY
[vxWorks]# netstat -anP
INET sockets
Prot Recv-Q Send-Q Local Address          Foreign Address         State       TID
TCP   0      0      0.0.0.0.80              0.0.0.0.*               LISTEN      9f7d38
UDP   0      0      0.0.0.0.55044          0.0.0.0.*               34182c0

INET6 sockets
Prot Recv-Q Send-Q Local Address          Foreign Address         State       TID

[vxWorks]#
```

COM12 - PuTTY

tVxdbgTask	46ec60	2db5a90	25	PEND	78b951	2db8f40	0	0
tNet0	ipcomNetTask	a4eb10	50	PEND	78b951	ab6f30	0	0
ipcom_sys1>	4855f0	be4bc8	50	PEND	78c07d	bf4e40	0	0
tNetConf	6317b0	2d282c0	50	PEND	78b951	2d2bd40	0	0
t5Msec	clk_task_5ms	34030a0	98	PEND	78b951	344ef10	0	0
t50Msec	clk_task_50>	342d020	99	PEND	78b951	3456f40	0	0
vnSyncer	vn_sync_task	a6c648	200	DELAY	79273f	2ca4f80	0	30
dnTcpWrk17	dnpSendRcv	34182c0	203	DELAY	79273f	34f0f20	0	2
DBC	m1_dbc	3468cc8	204	PEND+T	78b951	3478f10	3d0004	120
SCHED	schdlr	3460e10	205	PEND	7899ae	346cea0	0	0
COS	m1_cos	34640c0	205	PEND+T	7899ae	3484e40	3d0004	62
ANA	m1_ana	3418020	205	PEND	78b951	349ced0	0	0
GBLFRZ	gblfrz_task	3442020	205	DELAY	79273f	34c0f40	0	7
ISaGRAF_IF	isagraf	3442360	205	DELAY	79273f	34ccb30	380003	39
DNPMCOM_17	dnp_dl_task	3474520	205	PEND+T	78b951	3514e60	0	31
USERLOG	usrlog_task	33eeb10	206	PEND	7899ae	3446e60	3d0002	0

Q: What TCP ports should I expect to see with a Modbus(R)TCP protocol socket enabled?

A: Below is the “netstat -anP” command when the HTTP service and a Modbus(R)TCP socket enabled on the GUI, both before connected to a master station and during connection to a master station. The task list is also shown with the highlighted task ID’s (TID) listed in the netstat display.

COM12 - PuTTY

```
[vxWorks]# netstat -anP
```

INET sockets							
Prot	Recv-Q	Send-Q	Local Address	Foreign Address	State	TID	
TCP	0	0	0.0.0.0.80	0.0.0.0.*	LISTEN	303e018	
TCP	0	0	172.18.150.55.502	0.0.0.0.*	LISTEN	34f86c0	

INET6 sockets							
Prot	Recv-Q	Send-Q	Local Address	Foreign Address	State	TID	

[vxWorks]# █

COM12 - PuTTY

```
[vxWorks]# netstat -anP
```

INET sockets							
Prot	Recv-Q	Send-Q	Local Address	Foreign Address	State	TID	
TCP	0	0	0.0.0.0.80	0.0.0.0.*	LISTEN	303e018	
TCP	0	0	172.18.150.55.502	0.0.0.0.*	LISTEN	34f86c0	
TCP	0	0	172.18.150.55.502	172.18.150.11.3529	ESTABLISHED	34f86c0	

INET6 sockets							
Prot	Recv-Q	Send-Q	Local Address	Foreign Address	State	TID	

[vxWorks]# █

COM12 - PuTTY							
tVxdbgTask	46ec60	2db5a90	25	PEND	78b951	2db8f40	0
tNet0	ipcomNetTask	a4eb10	50	PEND	78b951	ab6f30	0
ipcom_sys1>	4855f0	be4bc8	50	PEND	78c07d	bf4e40	0
tNetConf	6317b0	2d282c0	50	PEND	78b951	2d2bd40	0
t5Msec	clk_task_5ms	33f0c10	98	PEND	78b951	3450f10	0
t50Msec	clk_task_50>	3405660	99	PEND	78b951	3458f40	0
vnSyncer	vn_sync_task	a6c648	200	DELAY	79273f	2ca4f80	0
mbTcpSrv17	mbTcpServ	34f86c0	203	PEND	78b951	3010ca0	0
DEC	m1_dbc	3468400	204	PEND+T	78b951	3478f10	3d0004
SCHED	schdlr	34604b0	205	PEND	7899ae	346cea0	0
COS	m1_cos	34686a0	205	PEND+T	7899ae	3484e40	3d0004
ANA	m1_ana	3474280	205	PEND	78b951	349ced0	0
GBLFRZ	gblfrz_task	3474cf0	205	DELAY	79273f	34c0f40	0
ISaGRAF_IF	isagraf	34803c8	205	DELAY	79273f	34ccb30	380003
MB_COM_17	mb_task	3498280	205	PEND+T	7899ae	3514cc0	46
USERLOG	usrlog_task	33f07d0	206	PEND	7899ae	3448e60	3d0002

Q: What TCP ports should I expect to see with a Modbus(M)TCP protocol socket enabled?

A: Below is the “netstat -anP” command when the HTTP service and a Modbus(M)TCP socket enabled on the GUI, and the DNPM is connected to an IED using TCP. The task list is also shown with the highlighted task ID’s (TID) listed in the netstat display.

```
COM12 - PuTTY
[vxWorks]# netstat -anP
INET sockets
Prot Recv-Q Send-Q Local Address          Foreign Address         State       TID
TCP   0         0 0.0.0.0.80             0.0.0.0.*              LISTEN      9f79e8
TCP   0         0 172.18.150.55.56721    172.18.150.11.502      ESTABLISHED 348f5a0

INET6 sockets
Prot Recv-Q Send-Q Local Address          Foreign Address         State       TID

[vxWorks]#
```

```
COM12 - PuTTY
tvxdbgTask 46ec60 2db5a90 25 PEND 78b951 2db8f40 0 0
tNet0 ipcomNetTask a4eb10 50 PEND 78b951 ab6f30 0 0
ipcom_sys1> 4855f0 be4bc8 50 PEND 78c07d bf4e40 0 0
tNetConf 6317b0 2d282c0 50 PEND 78b951 2d2bd40 0 0
t5Msec clk_task_5ms 3405a30 98 PEND 78b951 3450f10 0 0
t50Msec clk_task_50> 341a660 99 PEND 78b951 3458f40 0 0
vnSyncer vn_sync_task a6c648 200 DELAY 79273f 2ca4f80 0 41
mbTcpWrk17 mbmSendRcv 348f5a0 203 PEND+T 79273f 34abf30 44 1
DEC ml_dbc 3444700 204 PEND+T 78b951 347bf10 3d0004 16
SCHED schdlr 3454c50 205 PEND 7899ae 346fea0 0 0
COS ml_cos 3454020 205 PEND+T 7899ae 3487e40 3d0004 57
ANA ml_ana 3454600 205 PEND 78b951 349fed0 0 0
GBLFRZ gblfrz_task 3477af0 205 DELAY 79273f 34c3f40 0 2
ISaGRAF_IF isagraf 3483280 205 DELAY 79273f 34cfb30 380003 41
USERLOG usrlog_task 3405448 206 PEND 7899ae 3448e60 3d0002 0
MBM COM 17 mbm_task 348fc48 206 PEND+T 7899ae 3517dc0 3d0004 10
```

