

Simple Network Management Protocol

SNMP

The *Simple Network Management Protocol* was standardized by the [IETF](#) and is mostly used by operators to monitor various types of network equipment, as well as other types of network-connected equipment.

One common use of SNMP is to periodically measure interface loads and other operational parameters of routers. These measurements can be visualized using tools such as [MRTG](#) or [Cricket](#), or used as input to threshold-based alerting systems. For a list of SNMP-based measurement and analysis tools, see the [SnmpBasedTools](#) topic.

Terminology

- **Agent:** An entity that gives access to management instrumentation via SNMP. An agent responds to management requests (get/set/...) and/or sends *notifications*. An Agent runs on a managed device such as a router, usually as a long-running background process ("daemon").
- **Manager:** An entity that accesses remote management instrumentation via SNMP. A manager issues management requests (get/set/...) and processes responses, and/or receives (unsolicited) notifications. Managers can range from simple scripts that retrieve specific management information to integrated systems that monitor and control many aspects of the operation of large networks.
- **Notification:** A message about an asynchronous event. Notifications are sent from an *agent* to a *manager*. SNMP has two different kinds of notifications: *Traps* and *Informs*. The difference is that an Inform is acknowledged by the manager, and the agents will retransmit an Inform until such an acknowledgement is received. Therefore, Informs are more reliable than Traps.
- **Trap:** See "Notification".
- **Management Information Base (MIB):** The set of management "instrumentation" accessible via network management protocols such as SNMP. See the [ManagementInformationBase](#) for more information.

Caveats with SNMP

There are a few common pitfalls when using SNMP for measurement. They are briefly described in these topics:

- [SNMP Update Lag](#) - Variables monitored via SNMP may not be updated continuously. One possible effect is that if you look at counter-change rates (e.g. interface utilization) over short timescales, you may experience drastic measurement artifacts
- [SNMP Low Priority](#) - Managed devices such as routers often handle SNMP requests at low priority relative to other tasks such as packet forwarding or running routing protocols. This can lead to timeouts in high-load situations - possibly exactly the situation where one would be most interested in measurements!
- [SNMP Counter Wrap](#) - Many SNMP counters wrap at 2

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. If you don't poll them frequently enough, high rates cannot be measured reliably.

References

Books

- *Essential SNMP*, Douglas R. Mauro, Kevin J. Schmidt, July 2001, O'Reilly & Associates, ISBN: 0-59600020-0
- *SNMP, SNMPv2, SNMPv3, and RMON 1 and 2*, William Stallings, January 1999 (3rd edition), Addison-Wesley, ISBN: 0-20148534-6
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- *Managing Internetworks With SNMP*, P. E. Miller, Mark A. Miller, November 1999 (3rd edition), IDG Books Worldwide, ISBN: 0-76457518-X
- *A Practical Guide to SNMPv3 and Network Management*, David Zeltserman, May 1999, Prentice Hall, ISBN: 0-13021453-1
- *SNMP Network Management*, Paul Simoneau, May 1999, Computing McGraw-Hill, ISBN: 0-07913075-5
- *Total SNMP : Exploring the Simple Network Management Protocol*, Sean J. Harnedy, August 1997 (2nd edition), Prentice Hall, ISBN: 0-13646994-9
- *SNMP Application Developer's Guide*, Robert L. Townsend, December 1997, John Wiley & Sons, ISBN: 0-47128640-0
- *Windows NT SNMP*, James D. Murray, Debby Russell (Ed.), February 1998, O'Reilly & Associates, ISBN: 1-56592338-3
- *SNMP++: An Object-Oriented Approach to Developing Network Management Applications*, Peter Erik Mellquist, September 1997, Prentice Hall, ISBN: 0-13264607-2
- *SNMP: A Guide to Network Management*, Dr. Sidnie M. Feit, March 1993, McGraw Hill, ISBN: 0-07020359-8
- *The Simple Book: An Introduction to Internet Management, Revised Second Edition*, Marshall T. Rose, March 1996, Prentice Hall, ISBN: 0-13451659-1
- *Network Management: A Practical Perspective*, Allan Leinwand, Karen Fang-Conroy, November 1995 (2nd edition), Addison-Wesley, ISBN: 0-20160999-1
- *Network Management Standards: SNMP, CMIP, TMN, MIBs and Object Libraries*, Uyless D. Black, December 1994 (2nd edition), McGraw Hill, ISBN: 0-07005570-X

Web Sites

- the *SimpleWeb* at University of Twente, <http://wwwsnmp.cs.utwente.nl/>

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