Chapter 8

RMON

RMON Components

- RMON Probe
  - Data gatherer - a physical device
- Data analyzer
  - Processor that analyzes data

Network with RMONs

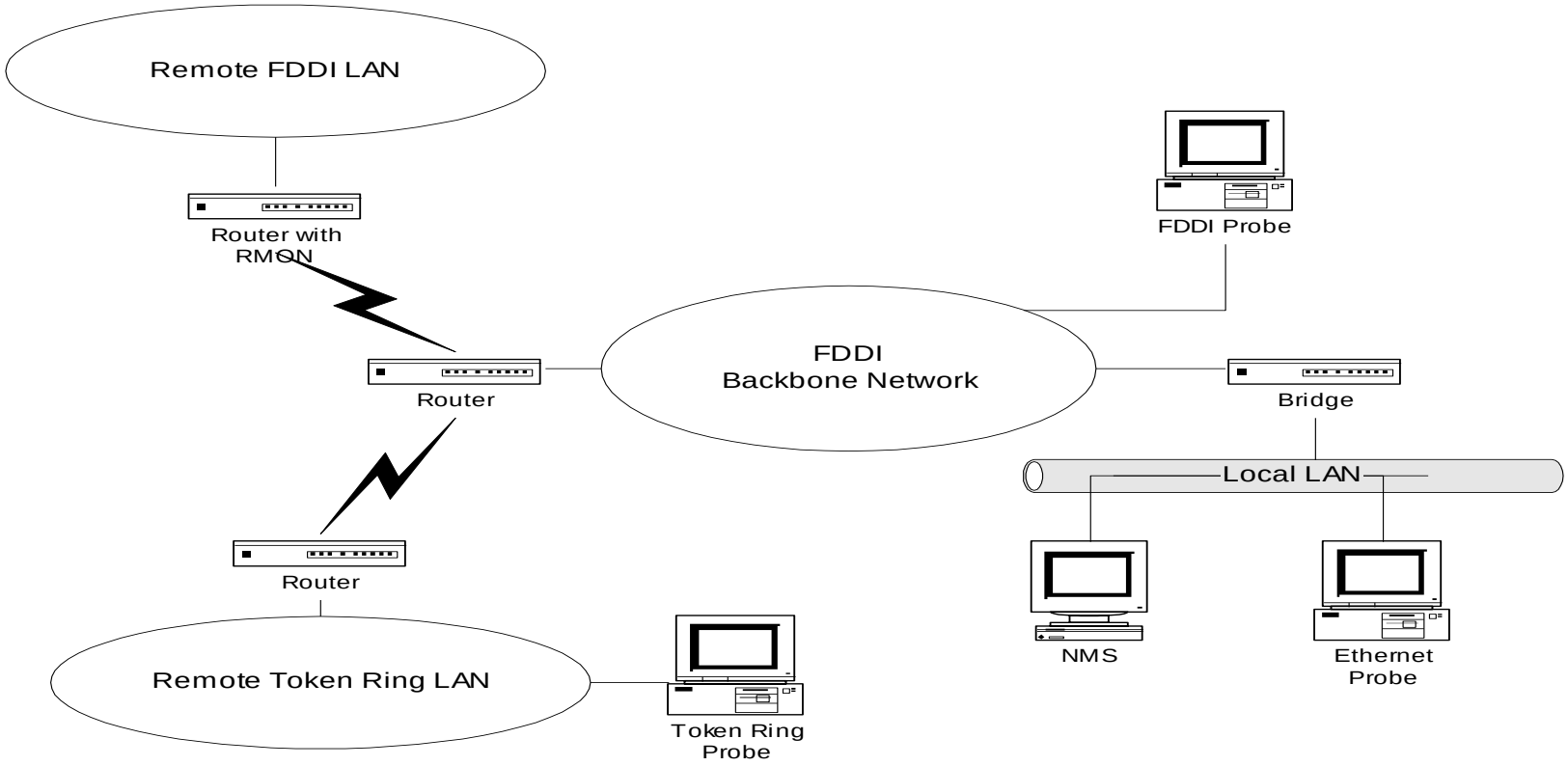


Figure 8.1 Network Configuration with RMONs

RMON Benefits

- Monitors and analyzes locally and relays data; Less load on the network
- Needs no direct visibility by NMS
- More reliable information
- Permits monitoring on a more frequent basis and hence faster fault diagnosis
- Increases productivity for administrators

RMON MIB

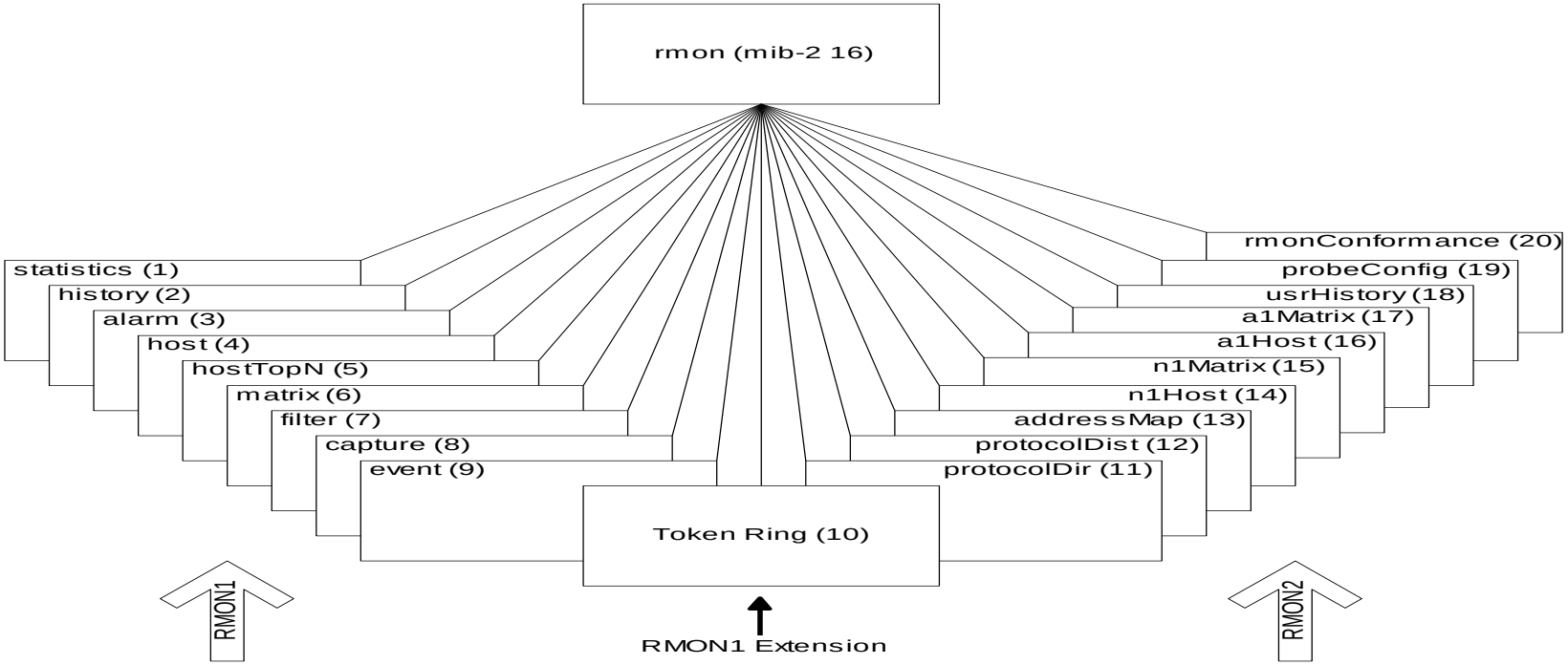


Figure 8.2 RMON Group

- RMON1: Ethernet RMON groups (rmon 1 - rmon 9)
- RMON1: Extension: Token ring extension (rmon 10)
- RMON2: Higher layers (3-7) groups (rmon 11 - rmon 20)

Row Creation & Deletion

State	Enume-ration	Description
valid	1	Row exists and is active. It is fully configured and operational
createRequest	2	Create a new row by creating this object
underCreation	3	Row is not fully active
invalid	4	Delete the row by disassociating the mapping of this entry

- EntryStatus data type introduced in RMON
- EntryStatus (similar to RowStatus in SNMPv2) used to create and delete conceptual row.
- Only 4 states in RMON compared to 6 in SNMPv2

RMON Groups and Functions

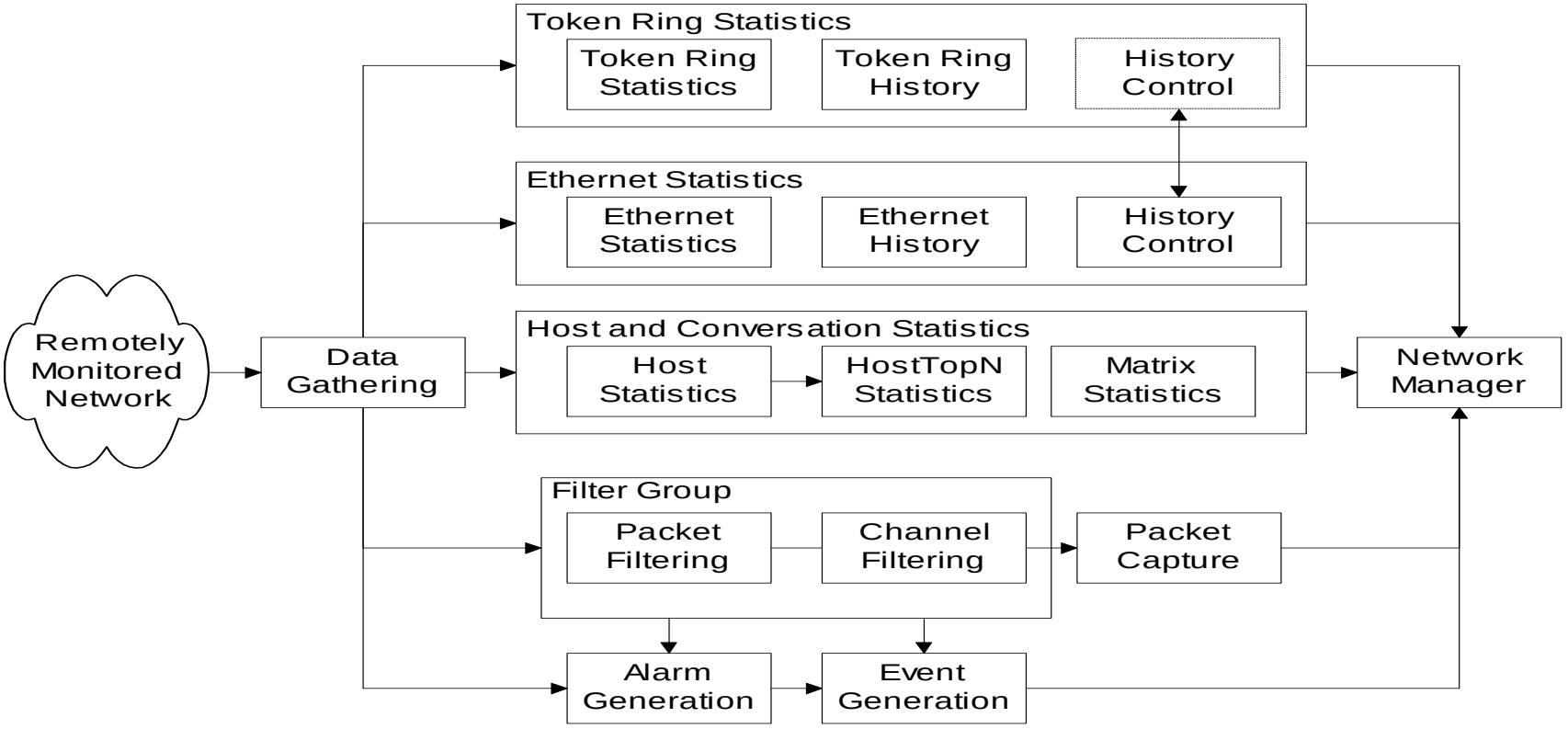


Figure 8.3 RMON1 Groups and Functions

RMON1 MIB Groups & Tables

Group	OID	Function	Tables
Statistics	rmon 1	Link level statistics	-etherStatsTable -etherStats2Table
History	rmon 2	Periodic statistical data collection and storage for later retrieval	-historyControlTable -etherHistoryTable -historyControl2Table -etherHistory2Table
Alarm	rmon 3	Generates events when the data sample gathered crosses pre-established thresholds	-alarmTable
Host	rmon 4	Gathers statistical data on hosts	-hostControlTable -hostTable -hostTimeTable -hostControl2Table
HostTopN	rmon 5	Computes the top N hosts on the respective categories of statistics gathered	-hostTopNcontrolTable
Matrix	rmon 6	Statistics on traffic between pair of hosts	-matrixControlTable -matrixSDTable -matrixDSTable -matrixControl2Table
Filter	rmon 7	Filter function that enables capture of desired parameters	-filterTable -channelTable -filter2Table -channel2Table
Packet Capture	rmon 8	Packet capture capability to gather packets after they flow through a channel	-buffercontrolTable -captureBufferTable
Event	rmon 9	Controls the generation of events and notifications	-eventTable
Token Ring	rmon 10	See Table 8.3	See Table 8.3

Textual Convention:
LastCreateTime and TimeFilter

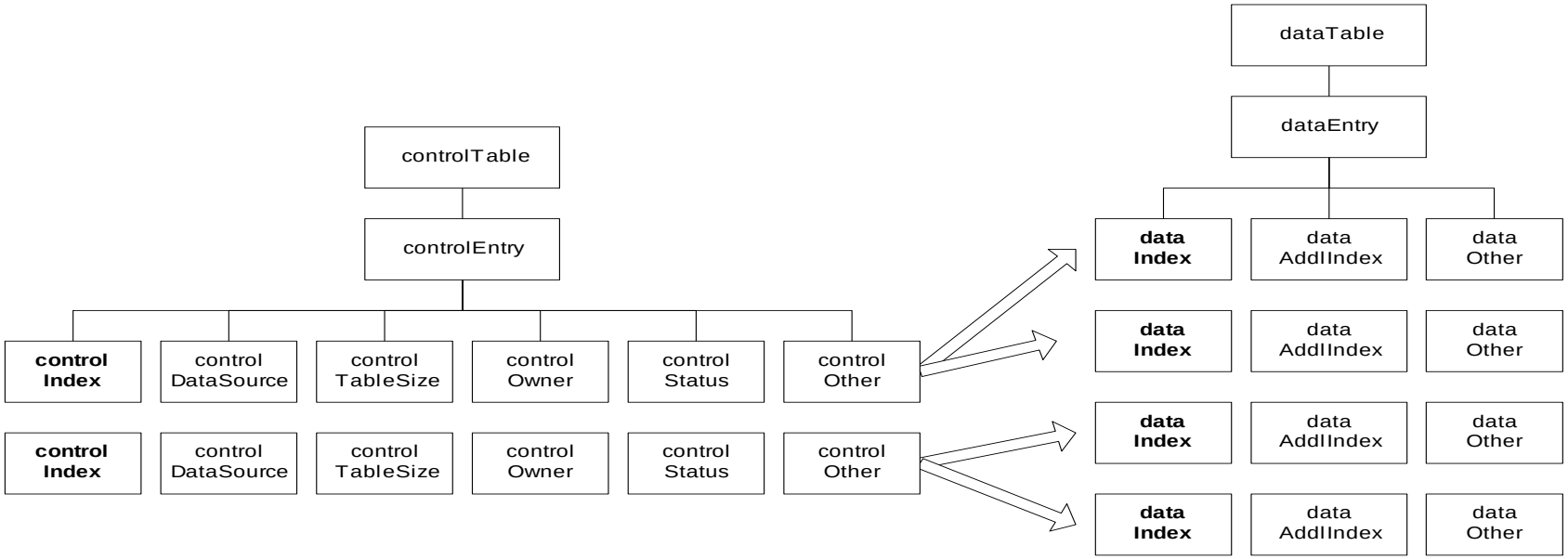
- LastCreateTime tracks change of data with the changes in control in the control tables
- Timefilter used to download only those rows that changed after a particular time

FooTable (bold indicating the indices):

fooTimeMark ***fooIndex*** *fooCounts*

```
fooCounts.0.1    5
fooCounts.0.2    9
fooCounts.1.1    5
fooCounts.1.2    9
fooCounts.2.1    5
fooCounts.1.2    9
fooCounts.3.1    5
fooCounts.3.2    9
fooCounts.4.2    9   -- (Note that row #1 does not exist for times 4 & 5
                        since the last update occurred at time-mark 3.)
fooCounts.5.2    9
(Both rows #1 and #2 do not exist for time-mark greater than 5.)
```

Control and Data Tables



Note on Indices:
Indices marked in bold letter
Value of dataIndex same as value of controlIndex

Figure 8.4 Relationship between Control and Data Tables

Matrix Control and SD Tables

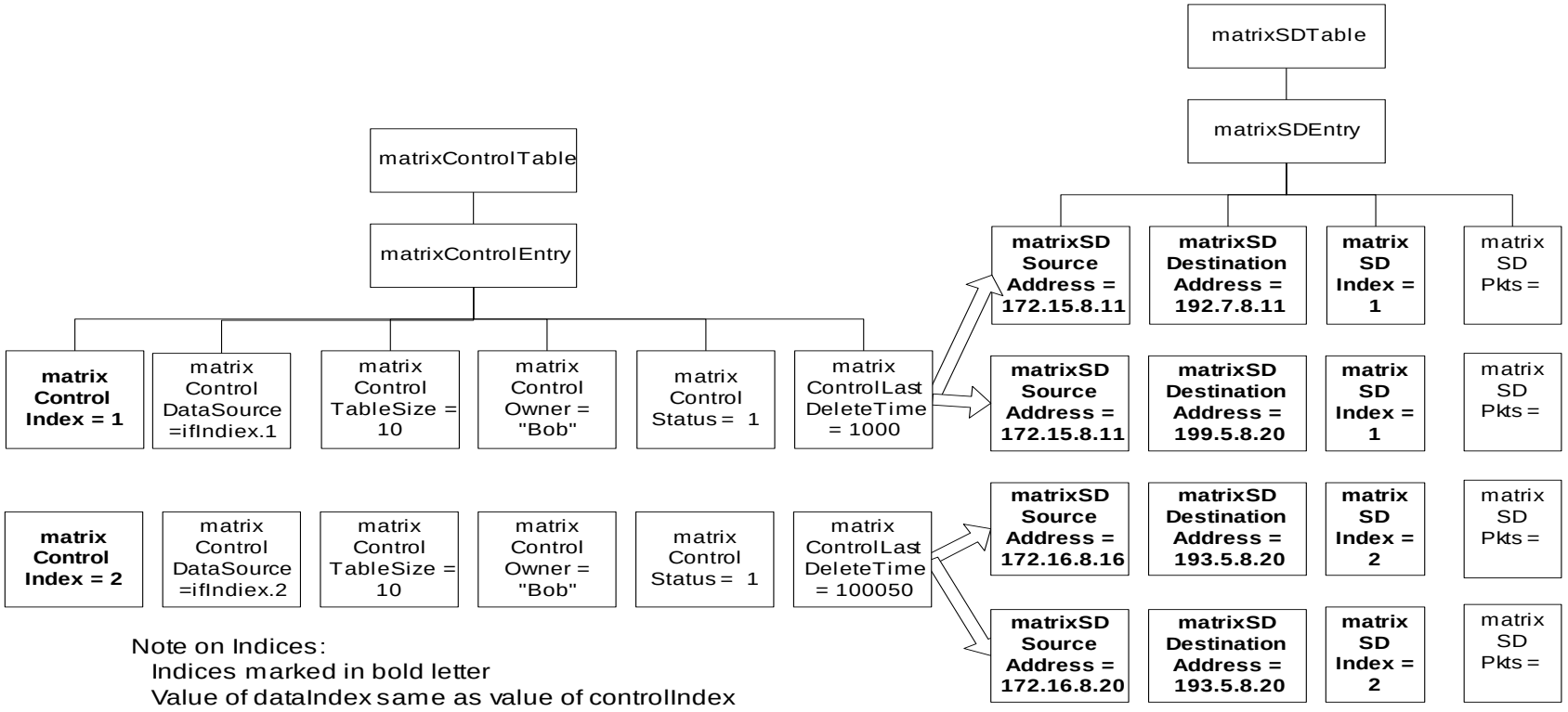


Figure 8.4 Relationship between Control and Data Tables

Host Top *N* Group Example

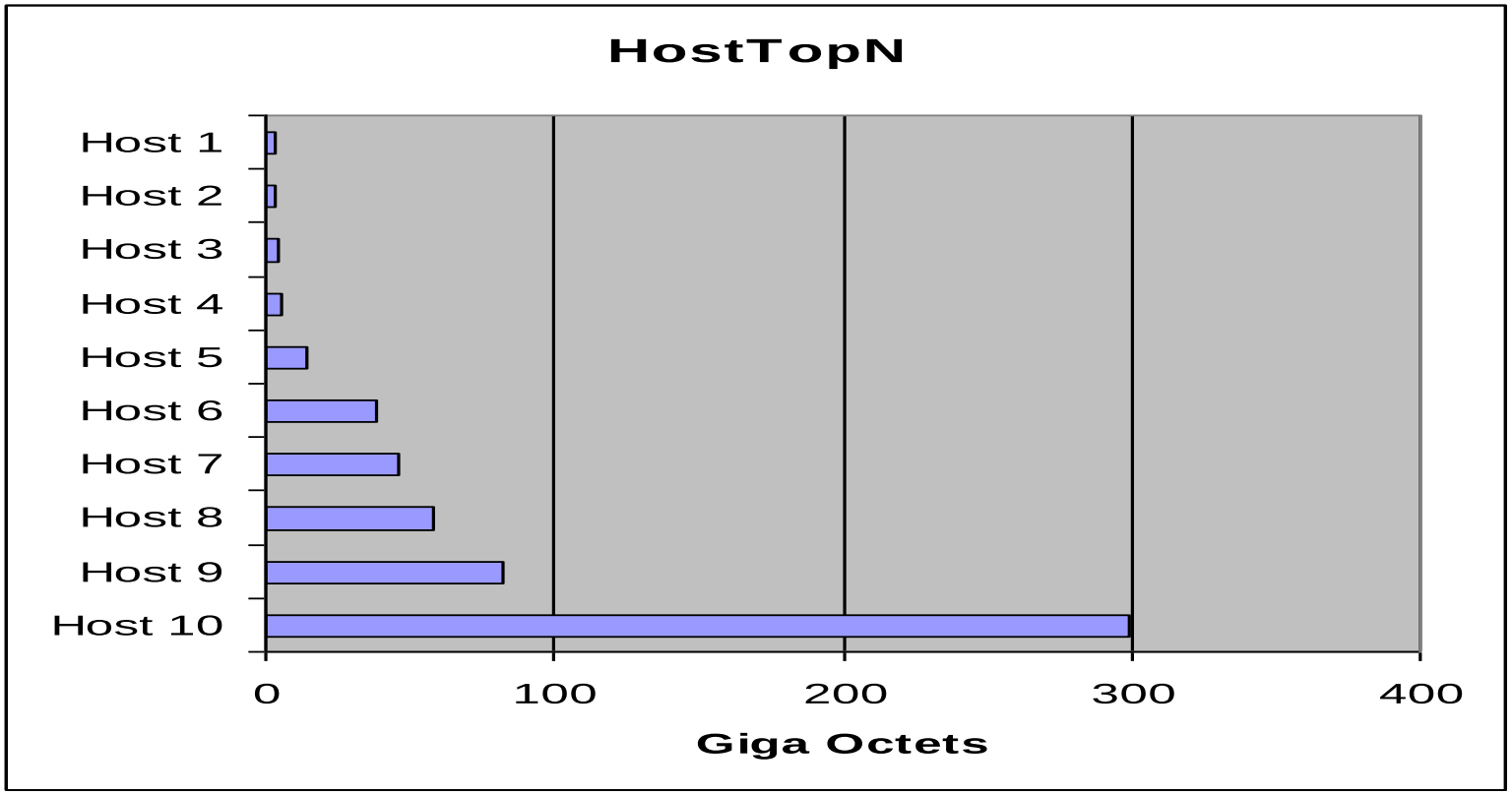
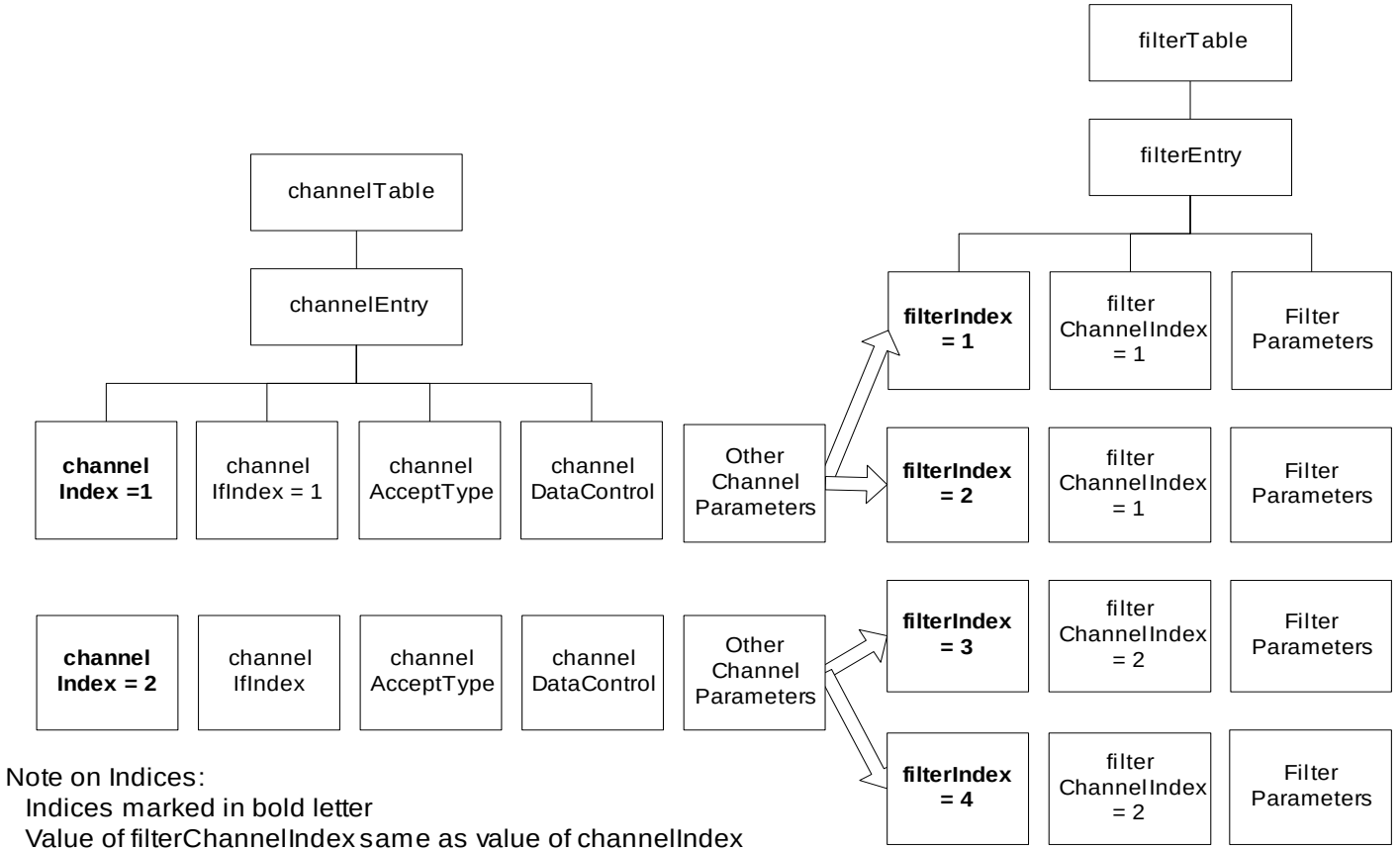


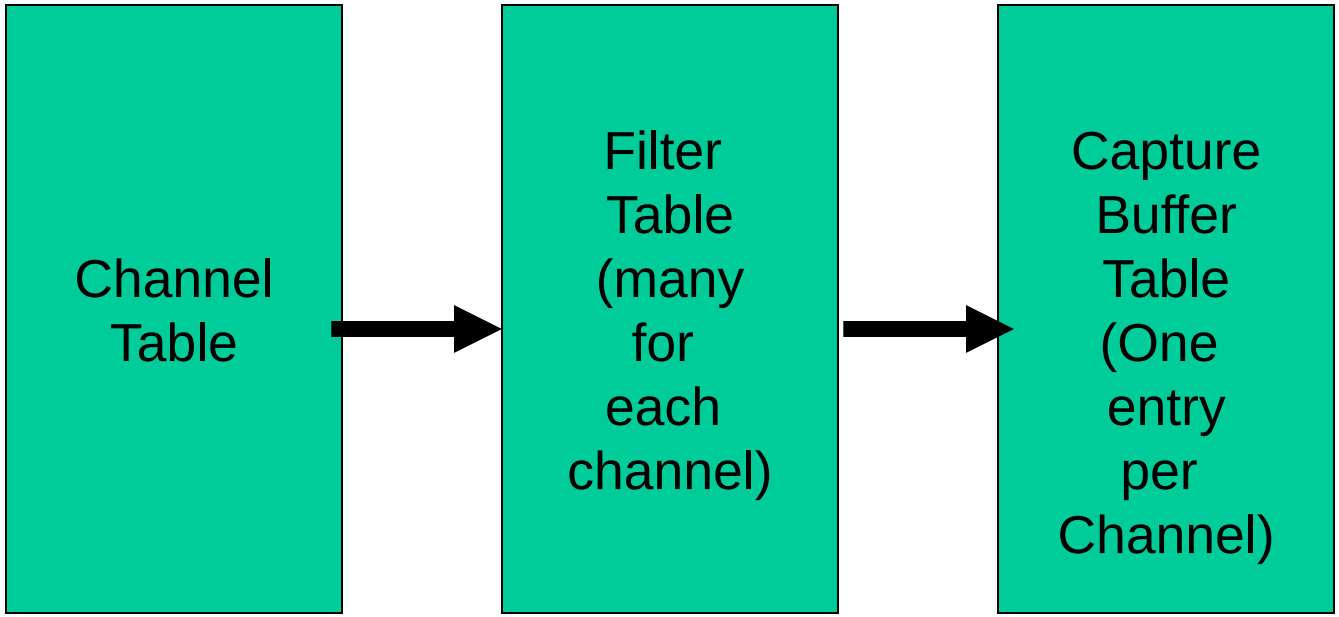
Figure 8.5 HostTop-10 Output Octets

Filter Group



Note on Indices:
Indices marked in bold letter
Value of filterChannelIndex same as value of channelIndex

Packet Capture Group



RMON TR Extension Groups

Token Ring Group	Function	Tables
Statistics	Current utilization and error statistics of Mac Layer	tokenRingMLStatsTable tokenRingMLStats2Table
Promiscuous Statistics	Current utilization and error statistics of promiscuous data	tokenRingPStatsTable tokenRingPStats2Table
Mac-Layer History	Historical utilization and error statistics of Mac Layer	tokenRingMLHistoryTable
Promiscuous History	Historical utilization and error statistics of promiscuous data	tokenRingPHistoryTable
Ring Station	Station statistics	ringStationControlTable ringStationTable ringStationControl2Table
Ring Station Order	Order of the stations	ringStationOrderTable
Ring Station Configuration	Active configuration of ring stations	ringStationConfigControlTable ringStationConfigTable
Source Routing	Utilization statistics of source routing information	sourceRoutingStatsTable sourceRoutingStats2Table

RMON2

- Applicable to Layers 3 and above
- Functions similar to RMON1
- Enhancement to RMON1
- Defined conformance and compliance

RMON2 MIB

Table 8.4 RMON2 MIB Groups and Tables

Group	OID	Function	Tables
Protocol Directory	rmon 11	Inventory of protocols	protocolDirTable
Protocol Distribution	rmon 12	Relative statistics on octets and packets	protocolDistControlTable protocolDistStatsTable
Address Map	rmon 13	Mac address to network address on the interfaces	addressMapControlTable addressMapTable
Network Layer Host	rmon 14	Traffic data from and to each host	n1HostControlTable n1HostTable
Network Layer Matrix	rmon 15	Traffic data from each pair of hosts	n1MatrixControlTable n1MatrixSDTable n1MatrixDSTable n1MatrixTopNControlTable n1MatrixTopNTable
Application Layer Host	rmon 16	Traffic data by protocol from and to each host	a1HostTable
Application Layer Matrix	rmon 17	Traffic data by protocol between pairs of hosts	a1MatrixSDTable a1MatrixDSTable a1MatrixTopNControlTable a1MatrixTopNTable
User History Collection	rmon 18	User-specified historical data on alarms and statistics	usrHistoryControlTable usrHistoryObjectTable usrHistoryTable
Probe Configuration	rmon 19	Configuration of probe parameters	serialConfigTable netConfigTable trapDestTable serialConnectionTable
RMON Conformance	rmon 20	RMON2 MIB Compliances and Compliance Groups	See Section 8.4.2

ATM RMON

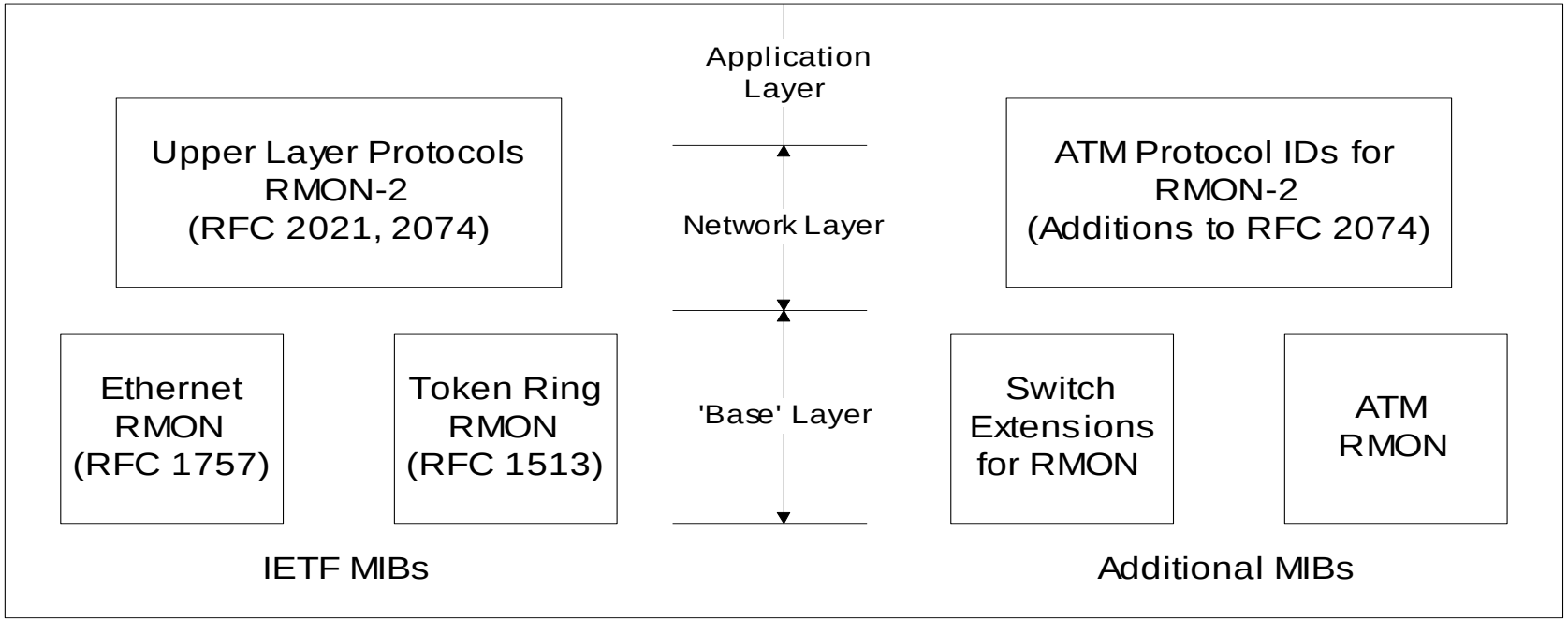


Figure 8.7 RMON MIB Framework (©1995 ATM Forum)