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Retriever™ Platform Architecture Overview

Executive Overview

The Retriever™ OSS solution from Scientific Atlanta, a Cisco company, protects consumer privacy while enabling cable operators to access a wide range of valuable data from deployed digital set-tops. Scientific Atlanta's Retriever solution meets the growing demand from cable operators for improved insight into consumers' viewership habits and for proactive monitoring of set-top and network performance at the subscriber's TV set.

Powerful, valuable capabilities for cable operators

- Retriever Diagnostics – Performance data can be collected from the set-top to proactively identify network and set-top problems before they occur or in response to previously reported quality of service issues. For example, digital video quality, upstream connectivity health, memory fragmenation, and reboot rates within the cable plant can be monitored on a true "end-of-line" basis.
- Retriever Viewership – Data can be collected based on the consumer's "clicks" of the set-top remote - every time a new channel is selected, the activity is logged at the set-top and relayed to a headend data collection server.

The Retriever solution is designed to allow data to be reported in two ways. First, data can be pulled on-demand through the network for troubleshooting real-time problems. Second, data can be pushed to a storage server on a configurable, parameter-driven schedule.

Innovation

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Retriever System Overview

There are three primary components of the Scientific Atlanta Retriever software platform:

- Set-Top Client
- Collection Server Software
- Data Warehouse Software
  (and associated web-based applications)

High level system overview

Retriever Client 1.1.1:

The Retriever Client is a set-top application that loads in RAM and runs on top of the PowerTV® operating system. The Retriever Client is an efficient data collection agent for obtaining set-top data in a Scientific Atlanta DBDS (Digital Broadband Delivery System). Current Retriever Client features include*:

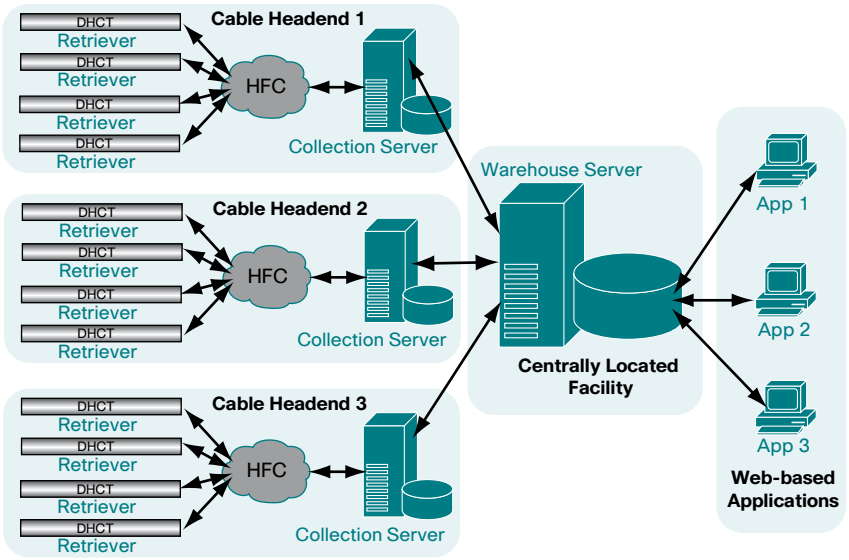
- Load-on-boot client application (.ptv file) – remains resident in the set-top at all times
- Total Memory footprint - <150kB at run-time (this includes both executable and buffer allocations at run-time)
- Configurable through Retriever Collector 1.2.0
- High configurability allows for up to four different data sets (one viewership and three diagnostic) to be collected at different times and from different groups of set-tops called profiles
- Sample, temporarily store, and forward design for efficient use of UDP packet
- Connection-less (UDP) communication, but delivery at the application level
- Randomization of client's communication for efficient use of out-of-band network
- Can be enabled for: diagnostic only, viewership only or both
- Alternate routing capability to multiple Collector Servers for redundancy
- Redundant buffering for up to three transmit intervals for protection against temporarily loss in two-way communication
- Privacy design based on requirements of U.S. Cable Privacy Act of 1984 (In conjunction with Retriever Collector 1.2.0)
- SARA (Scientific Atlanta Resident Application) and MDN (Mystro Digital Navigator) compliant
- Deployable to all domestic DAVIC (Digital Audio Visual Council) Explorer® set-tops
- Verification through Subscriber System Verification Testing (SVT)

Note: Data is not meant to be stored on the Collector Server for long periods of time, and data cannot be processed on the Collector Server as the machine must be dedicated to processing transactions from the Retriever Clients.

Retriever Collector Server Software 1.2.0*:

The Retriever Collection Server software manages the Retriever Clients and houses the platform's privacy design.

- Installation CDs provided to load the platform on customer-provided Collector Server (contact Scientific Atlanta for more details on minimum requirements):
  - RedHat Linux Enterprise 4.0 – Customer must provide RedHat license
  - Retriever Collector 1.2.0 server software
- Transaction rate exceeds 100 packets/second
- Web-based configuration UI (User Interface) through Retriever Warehouse 1.2.0 allows check-box selection of data parameters to sample on which time intervals
- Privacy design based on requirements of U.S. Cable Privacy Act of 1984 for collected viewership data
- Ability to append certain data sets to collected viewership data (i.e. postal code)
- Alternate server routing: Allows for redundant Collector Servers



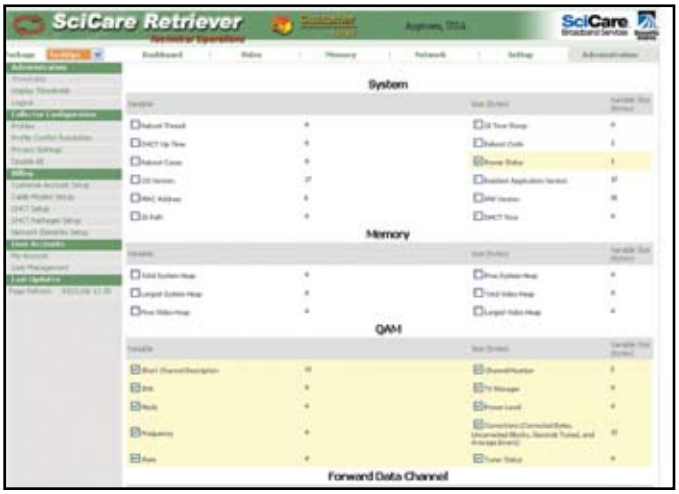
System Overview of Retriever Software Platform

- Opt deployment strategies – provide flexibility for management of collected viewership data by customer account:
  - Opt in – store viewership data in the clear
  - Opt stealth – store viewership data, but hash all personally identifiable information
  - Opt out – do not store viewership data
- Provides configuration messaging to individual Retriever Clients
  - Can enable clients for: either diagnostic only, viewership only, or both
  - Can define up to four different data sets to be collected at different times and from different groups of set-tops called profiles
  - Can start/stop Retriever Client 1.1.1 from communicating onto the network
  - Can make Retriever Client 1.1.1 exit the set-top without requiring reboot
- Provides ability to forward collected set-top data to any third party data warehouse
- Verification through Subscriber System Verification Testing (SVT)

In most cases, multiple collector servers from multiple cable head-ends will feed a single, centrally located data warehouse. The Collector Server offloads data into the data warehouse in a defined, open schema. The data can then be analyzed by any number of report writing tools.

Since the operator owns the data collected, the data warehouse is typically owned and managed by the operator. This allows the operator the flexibility to define the rules for how long data is stored. Business requirements defined by the operator will dictate the Warehouse Server storage and performance requirements.

Note: Data is meant to be stored on the Warehouse Server for long periods of time, and this is the location where the data should be processed.



Retriever Collector Server Software 1.2.0

The data storage requirements can add up very quickly which creates the need to summarize the data and then discard the actual raw data. In summarizing the data, certain business decisions must be made as some detail will be lost.

The Retriever solution comes with a basic reporting set of warehouse applications. These are optional reports. The operator does not have to install these because, in some cases, the operator will choose to outsource data warehousing and associated reporting to a third party.

Retriever Warehouse Applications

Retriever Marketing 1.2.0*:

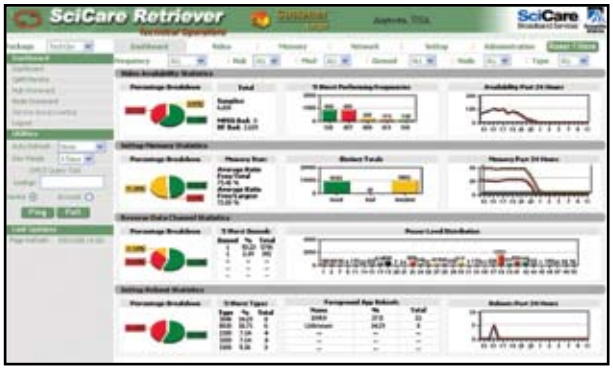
- Installation CDs and Installation Documentation provided to load the platform on customer-provided Warehouse Server (contact Scientific Atlanta for more details on minimum requirements):
  - RedHat Linux Enterprise 4.0 – Customer-provided RedHat license
  - Oracle Database 10g – Customer-provided Oracle license
  - Retriever Marketing Warehouse 1.2.0 server software
- Web browser-based application
- User interface guide
- Administrative/login
- Interfaces via flat file exchange with operator's billing system for account level detail (i.e. postal code)
- RAID 5 redundancy partitioning for collected data

Retriever Warehouse Application

- Privacy design based on requirements of U.S. Cable Privacy Act of 1984 for collected viewership data
- Report set includes:
  - Channel Rankings by aggregate viewing minutes
  - Distinct viewers by channel by minute
  - Percent viewership by channel by minute
- Report set allows for custom configuration:
  - User-defined date and time periods
  - User drill down by Hub or by Postal Code

Retriever Tech Ops 1.2.0*:

- Installation CDs and Installation Documentation provided to load the platform on customer-provided Warehouse Server (contact Scientific Atlanta for more details on minimum requirements):
  - RedHat Linux Enterprise 4.0 – Customer-provided RedHat license
  - Oracle Database 10g – Customer -provided Oracle license
  - Retriever Tech Ops Warehouse 1.2.0 server software
- Web browser-based application
- User interface guide
- Administrative/login
- Interfaces via flat file exchange with operator's billing system for account level detail (i.e. postal code)
- RAID 5 redundancy partitioning for collected data
- Hub and Node scorecards ranking HFC plant performance as received by set-tops
- Four dashboards summarizing Digital Video Availability, Memory Fragmentation, RDC Transmit Levels, and Reboot Rates
- Configurable thresholds
- SNMP alarms northbound
- Set-top query tool to query diagnostic values on-demand
- API for third party applications to request transactional diagnostics



Retriever TechOps 1.2.0

* Product features subject to change without notice.

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