CISCO SERVICE CONTROL APPLICATION FOR BROADBAND—USAGE ANALYSIS AND REPORTING

OVERVIEW

For several years the service provider industry has been espousing the benefits of "application-based" or "content-based" services as a way of establishing sustained differentiation and reaching a high level of intimacy with subscribers. But significant challenges, both financial and technical, impede progress in deploying these services. Without a clear understanding of how network resources are used and the preferences and behavior of its broadband subscribers, a service provider has a greatly impaired ability to find opportunities for cost savings or revenue generation.

This paper provides an overview of the reporting and profiling capabilities of the Cisco® Service Control solution, and the manner in which service providers can use this solution as one means of addressing the issues of cost control and revenue generation.

THE NEED FOR NETWORK VISIBILITY

Regardless of network size or complexity, geography, or services offered, providers of broadband services need to go beyond raw network statistics and obtain a clear understanding of the type of applications and activities in their network. This includes detailed, ongoing monitoring of the following:

- *Bandwidth use by application*—A growing challenge in managing a successful broadband network is efficiently reducing operating and capital expenses. Service providers need a clear understanding of what type of applications, services, and network activities are consuming network resources, at what times, and in what percentages. By understanding usage in peak and off-peak hours, popular applications, and popular destinations, operators can develop ways to optimize network traffic, reduce cost, and improve network performance.

- *Subscriber usage demographics*—With the growth in broadband subscribers, the types of usage and requirements of the broadband community have grown more diverse. Whereas some subscribers are heavy bandwidth consumers, others are more casual and require less network capacity and bandwidth. Some use a wide range of applications such as gaming, voice, video, and file-sharing, whereas others use the network only for occasional browsing and e-mail. Some subscribers use their broadband connection for business, others for leisure and entertainment. Service providers need to categorize their subscriber base according to the actual use of their network in order to analyze ongoing trends and devise new service bundles.

- *Peer-to-peer traffic*—Peer-to-peer traffic now accounts for between 65 and 80 percent of the world's service provider traffic. Managing this traffic is a significant issue for operators, manifesting itself in poor overall broadband service and in increased costs due to increased help-desk calls, subscriber turnover, and skyrocketing peering costs for international traffic. Although U.S. service providers struggle with peer-to-peer traffic, they rarely face the financial issues encountered by providers outside of the U.S. that are mass "importers" of content. When most of the peer-to-peer content resides outside of their network boundaries, service providers quickly find themselves losing money when their subscribers download content across international lines.

- *The presence of malicious traffic*—There are now approximately 180,000 digital attacks worldwide each year, causing both service disruptions and financial outlays. Attacks have increased in number—by an order of magnitude over the past three years—and in speed of proliferation. It now takes less than 10 percent of the time to infect 1 million machines than it did only two years ago. Along with worms and viruses, e-mail spam has become a significant component of malicious traffic, now accounting for between 65 and 75 percent of all

e-mail traffic. As with viruses and worms, spam carries with it a significant financial cost. According to the Gartner Group, spam is directly responsible for 7 percent of service provider turnover.

- *Lack of visibility into services and revenue opportunities*—Without visibility into subscriber traffic patterns, estimating the potential demand for new services becomes a challenge. For example, broadband voice may be an appealing service for subscribers, but how can you accurately gauge demand, and growth in this demand, if you have no insight into existing broadband voice service usage? Existing broadband voice activity data on your network could not only provide insight into the growth in demand for these services over time, but could also open the door to new revenue-sharing opportunities for these types of services. Having no visibility into network traffic makes it difficult to understand existing subscribers, let alone decide which new services to launch.

THE CISCO SERVICE CONTROL SOLUTION

The goal of usage analysis or network profiling is simple: to identify how network resources are being used in order to generate revenue streams commensurate with the business model. The Cisco Service Control solution gives service providers an effective way to gain true visibility into subscriber activity and usage patterns of even the most complex network environments. Figure 1 shows a schematic of the service control ecosystem.

Figure 1
Schematic of Cisco Service Control Solution
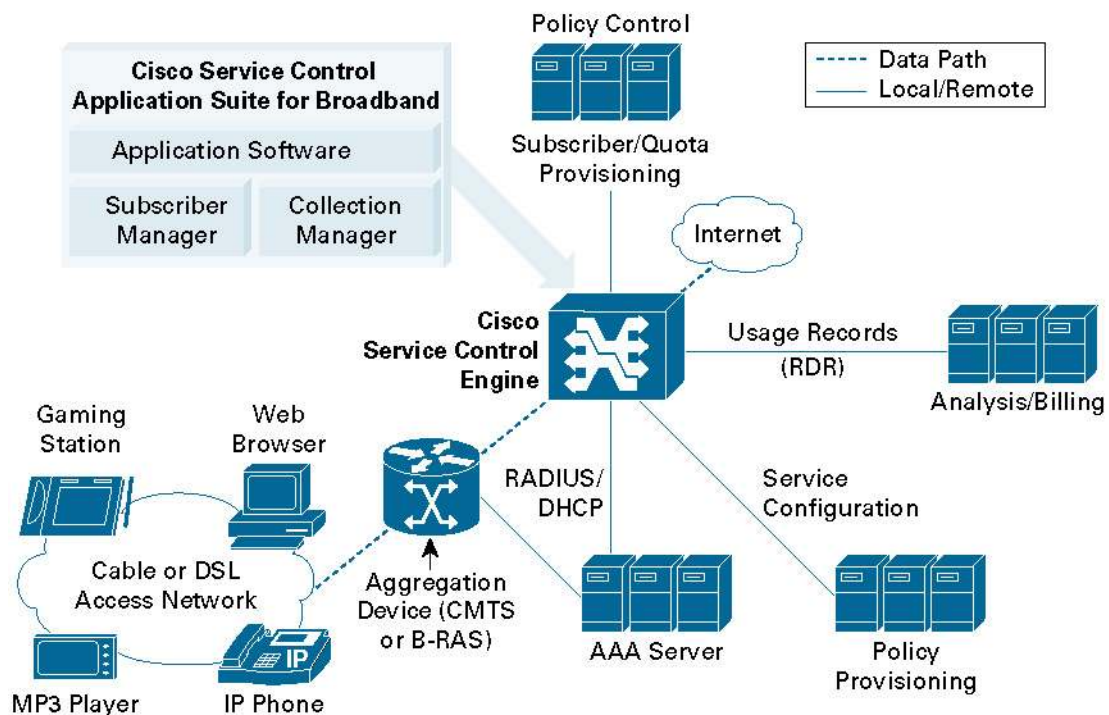
Going beyond the collection of Layer 3 and Layer 4 statistics, the Cisco Service Control solution provides the following advantages:

- Deep-packet inspection reconstructs traffic semantics up to Layer 7 protocol information, and classifies traffic to end application (peer-to-peer, browsing, voice over IP [VoIP], gaming, and so on) even for port-hopping or multiflow applications.

- Subscriber-aware traffic processing monitors traffic at the subscriber, group, or global level.

- Usage statistics are actionable and meaningful.

- Traffic inspection and usage data is exported for both billing and reporting purposes without any impact on existing network performance.

- Deployment is transparent in both Cisco and third-party networks. The Cisco Service Control solution can be installed inline or receive-only.

The Cisco Service Control solution allows not only for identification of network activity but also for subscriber and application traffic control, traffic management, and service creation purposes. Through network bandwidth management, traffic marking, or integrating with Cisco routing and aggregation platforms, the Cisco Service Control solution is a classification and control engine that yields important, actionable data on network activities to help improve existing services, create compelling application-based and content-based services, and increase overall revenue.

NETWORK USAGE ANALYSIS WITH THE CISCO SERVICE CONTROL SOLUTION

The Cisco Service Control solution provides a comprehensive view into all application- and subscriber-based network traffic. Effective use of the solution can help you overcome challenges in understanding network traffic, allowing you to enhance your model as required to meet the evolving needs of your subscribers. This section describes five specific categories of reports that address critical service provider issues.

NETWORK BANDWIDTH AND VOLUME REPORTS

Problem

Less than half of the world's service providers have a detailed understanding of the traffic flowing across their networks, and even fewer are aware of the usage patterns of their subscribers. These providers have little understanding of the cost components of their networks, let alone the revenue potential that may be exploited.

Solution

By collecting traffic information at application and subscriber levels, the Cisco Service Control solution provides detailed reports on bandwidth consumption by protocol and subscriber (Figure 2). Using these reports, operators can understand:

- Application activity during peak and congestion time

- Total volume of traffic and application, using transit, peering connections, and on-net traffic

- Service popularity, including popular Websites, news groups, and the relative bandwidth costs of delivering these services

Figure 2
Typical Bandwidth and Volume Reports
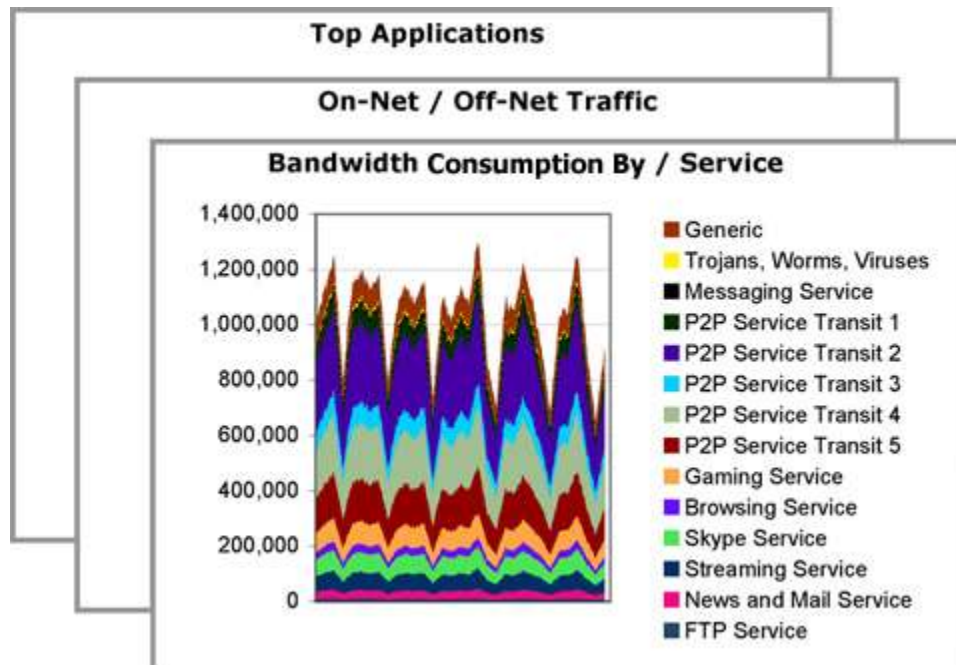
Value

Cisco Service Control bandwidth and volume reports allow you to:

- Determine traffic optimization mechanisms required to reduce congestion and peak usage

- Identify successful peering and local hosting opportunities to reduce cost and improve performance

SUBSCRIBER DEMOGRAPHICS REPORTS

Problem

Service providers need to track how subscribers are using their broadband connection so as to clearly understand the value of the service they are offering as well as the natural segmentation of their subscriber base. By gaining intimate knowledge of their subscribers, service providers can introduce compelling new service bundles designed to increase customer loyalty and service penetration.

Solution

Cisco Service Control subscriber demographics reports collect information about subscriber activity (Figure 3) and help provide visibility into issues such as:

- Identification of "bandwidth hogs" who consume a disproportionate amount of network resources

- Identification of "light" subscribers who use their service for Web and e-mail traffic

- Subscribers using a specific service, such as gaming, streaming, or voice

- Increasing usage of certain applications and services

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Figure 3

Typical Subscriber Demographics Reports
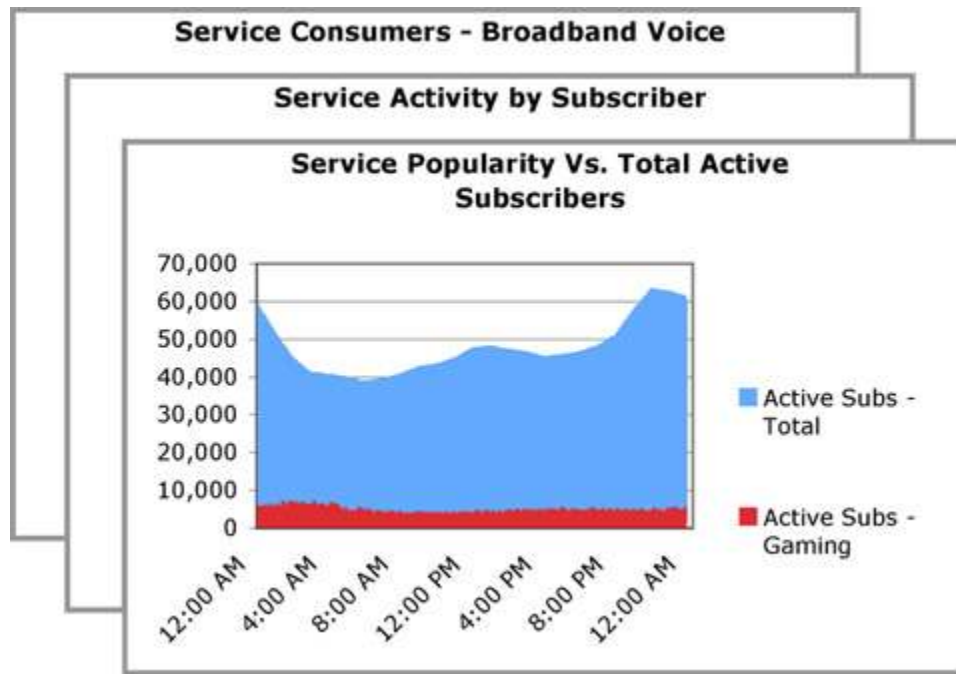
Value

Cisco Service Control subscriber demographics reports allow you to:

- Identify the most popular protocols and services

- Evaluate enhanced service offerings that can be differentiated on the basis of service quality, such as broadband voice and gaming

- Evaluate opportunities for revenue sharing through joint service creation with online service partners, such as multimedia and content vendors that require high network quality for their service delivery

- Explore service bundles tailored for certain users, such as telecommuters or members which have subscribed to gaming services.

- Identify bandwidth hogs and devise ways to moderate their activity without affecting their overall satisfaction with the service.

PEER-TO-PEER FILE SHARING REPORTS

Problem

Peer-to-peer traffic now accounts for the majority of service provider traffic. This issue manifests itself not only in poor overall broadband service but also in rising provider costs for help-desk calls, turnover, and peering for international traffic.

Solution

The Cisco Service Control solution provides a series of reports that clearly identify peer-to-peer file-sharing activity on the network, including specific protocols and participating subscribers (Figure 4). These reports include:

- Bandwidth consumed by peer-to-peer applications

- Total volume of peer-to-peer traffic over time

- Peer-to-peer applications prioritized by popularity

- Peer-to-peer protocol popularity

Figure 4

Typical Peer-to-Peer File-Sharing Reports
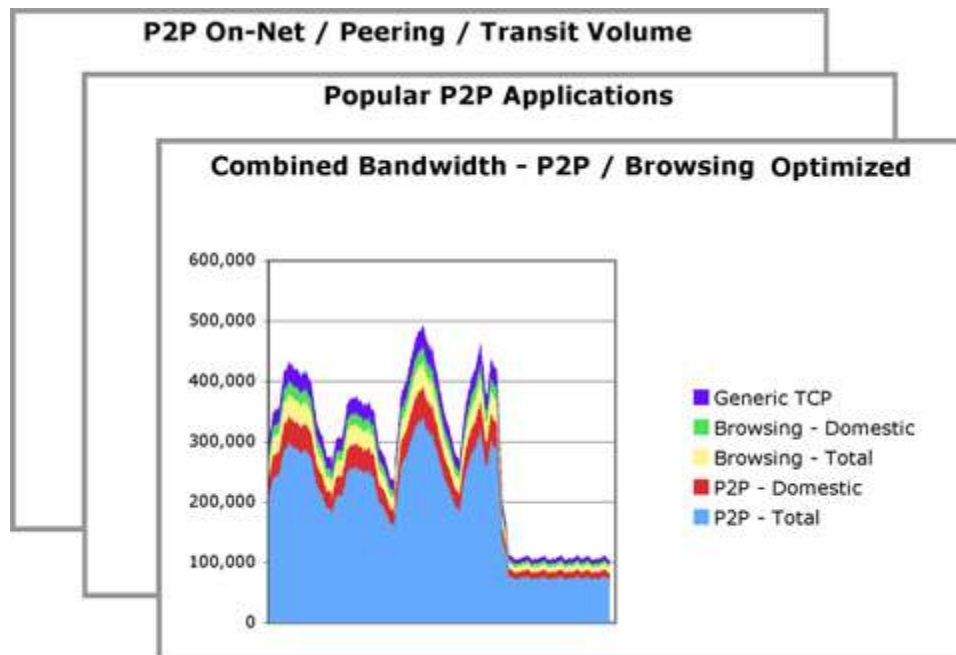
Value

Cisco Service Control peer-to-peer file-sharing reports provide you with the information required to:

- Protect high-margin services that may be affected by the uncontrolled volume of peer-to-peer traffic, such as broadband voice gaming and other latency-sensitive applications

- Determine the traffic optimization model required to reduce congestion and peak usage, helping reduce help-desk calls and subscriber churn

- Introduce a more predictable method of capacity planning based on mechanisms within your control

- Proactively control the significant expense associated with international peering charges by managing traffic within required peak bandwidth level

MALICIOUS NETWORK TRAFFIC REPORTS

Problem

Digital attacks cause service disruptions and even irreparable damage to the information on the personal computers of your subscribers. Disruptions from worms and viruses represent significant financial outlay in terms of clean-up costs, help-desk calls, and subscriber reimbursements.

Solution

Cisco Service Control malicious traffic reports identify subscriber abnormal traffic patterns, thereby allowing you to isolate suspected worm traffic (Figure 5). These reports include:

- Infected subscribers, identified by generating abnormal traffic patterns or traffic patterns containing specific signatures

- Attack source, reported by the identified source IP address of the attack traffic

- Subscriber detail reports, indicating subscribers affected by specific types of malicious traffic, such as worms

Figure 5

Typical Malicious Traffic Reports
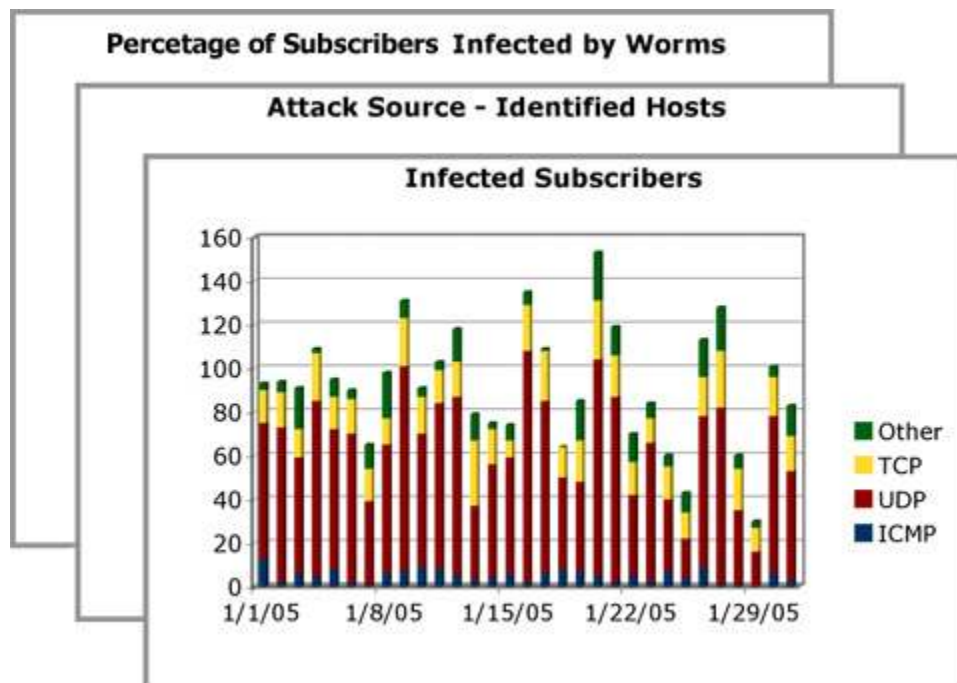
Value

Cisco Service Control malicious traffic reports provide you with the information required to:

- Help ensure customer satisfaction by protecting subscribers from the threat of malicious traffic or assisting them with the "corrective action" needed to minimize the impact of an infection

- Quickly identify the worm outbreak and its source, allowing you to rapidly respond to mitigate its effect

- Minimize subscriber churn by maintaining a trustworthy environment for your online subscribers

BROADBAND VOICE REPORTS

Problem

Most service providers are rolling out their own broadband voice services. Not only do they have to ensure appropriate administration of their own voice traffic, but they also typically have to ensure call quality to differentiate their service offering from others running on the network.

Solution

The Cisco Service Control solution provides a series of reports that not only provide visibility into service popularity, call statistics, and usage trends, but also identify the prevalence of competitive services (Figure 6). These reports include:

- Call minutes per broadband voice service for the selected subscriber base, showing the total minutes spent using voice service over time

- Concurrent sessions per voice service for the selected subscriber base, showing the number of concurrent voice calls

- Popular voice services based on Session Initiation Protocol (SIP) domain

Figure 6
Typical Broadband Voice Reports
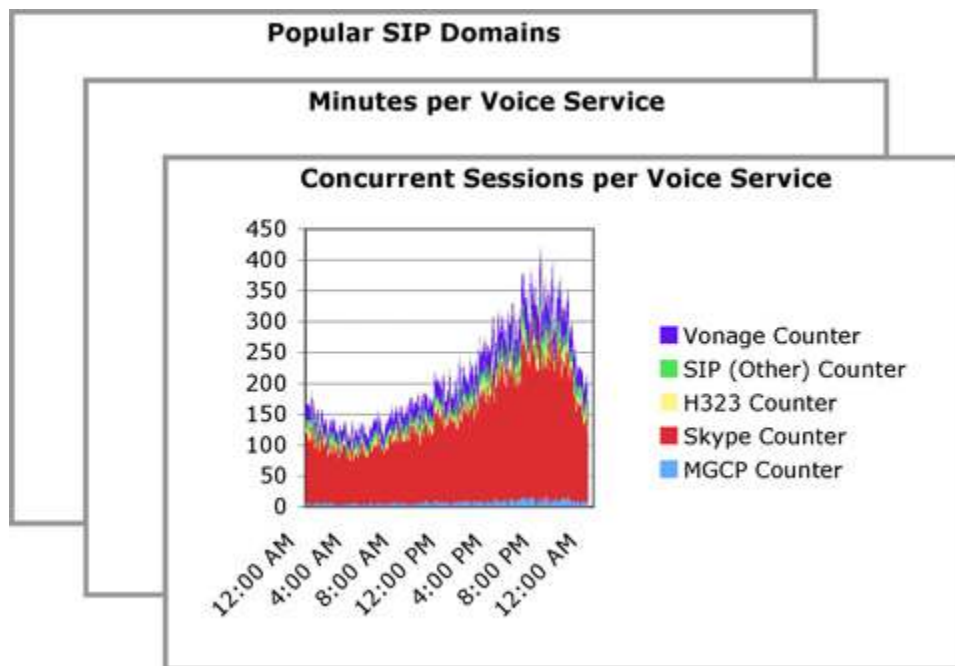
Value

Cisco Service Control broadband voice reports provide you with the information required to:

- Provide the quality of service required to ensure an acceptable voice call

- Track the call data records for each subscriber, ensuring accurate billing and accounting for the service

- Monitor popularity of third-party voice services, including number of calls and call minutes per service

CISCO SERVICE CONTROL SOLUTION—REPORTING SPECIFICATIONS

Data Collection Features

Data architecture

- Collection to standard Java Database Connectivity (JDBC)-compliant databases

- Centralized or distributed collection architecture

- Redundant collection and data storage

Data export

- Export data in comma-separated values (CSV) text format or Structured Query Language (SQL)

- Simple Network Management Protocol (SNMP)-based interface from Service Control Engines (SCEs)

- Direct usage feeds from SCE devices using Raw Data Record (RDR) data export

- Interface to billing and mediation systems

- Export reports in tabular or image format

- Ready for e-mail and Web publishing

Reporting Features

Report generation

- Interactive reporting tool

- Command-line interface for report automation

- Integration with any third-party SQL reporting tool

Report templates

- More than 100 standard reports available, including bandwidth and volume, demographic, peer-to-peer, malicious traffic, and broadband voice reports

- Ability to create custom reporting templates as dictated by traffic patterns, geography, and business model

Report filters

- Filtering by subscriber base, subscriber group, and individual subscriber

- Filtering by individual SCE device or device group

- Filtering by service, application, and protocol

- Filtering by time and date

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