

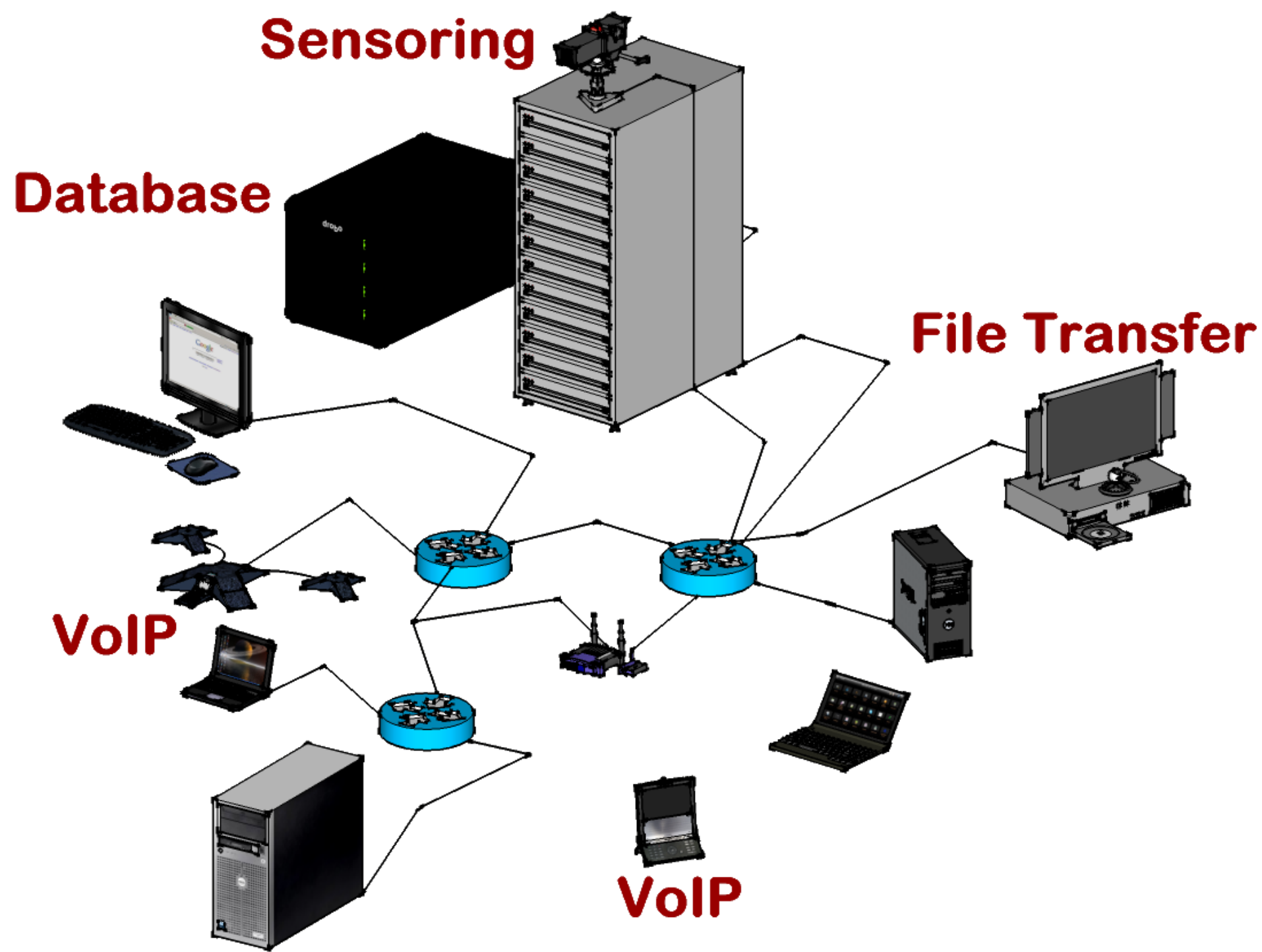


# Applications of Time-Series Analysis for Computer Networks

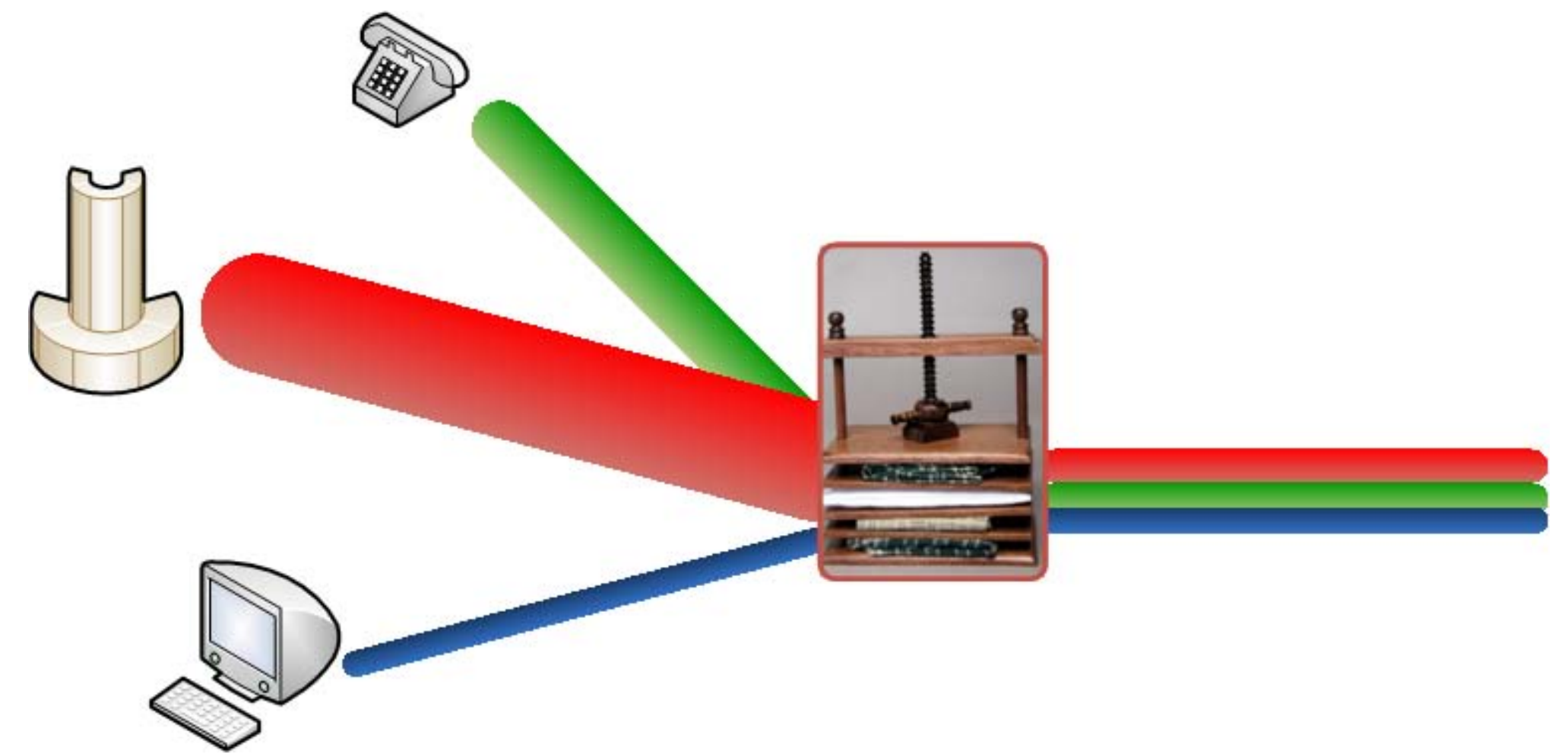
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In a computer network, **applications** usually **compete** for **network resources**.



This can often result in applications getting a **“fair”** share of the resources...  
But that in the point of view of the network, not the **user**.



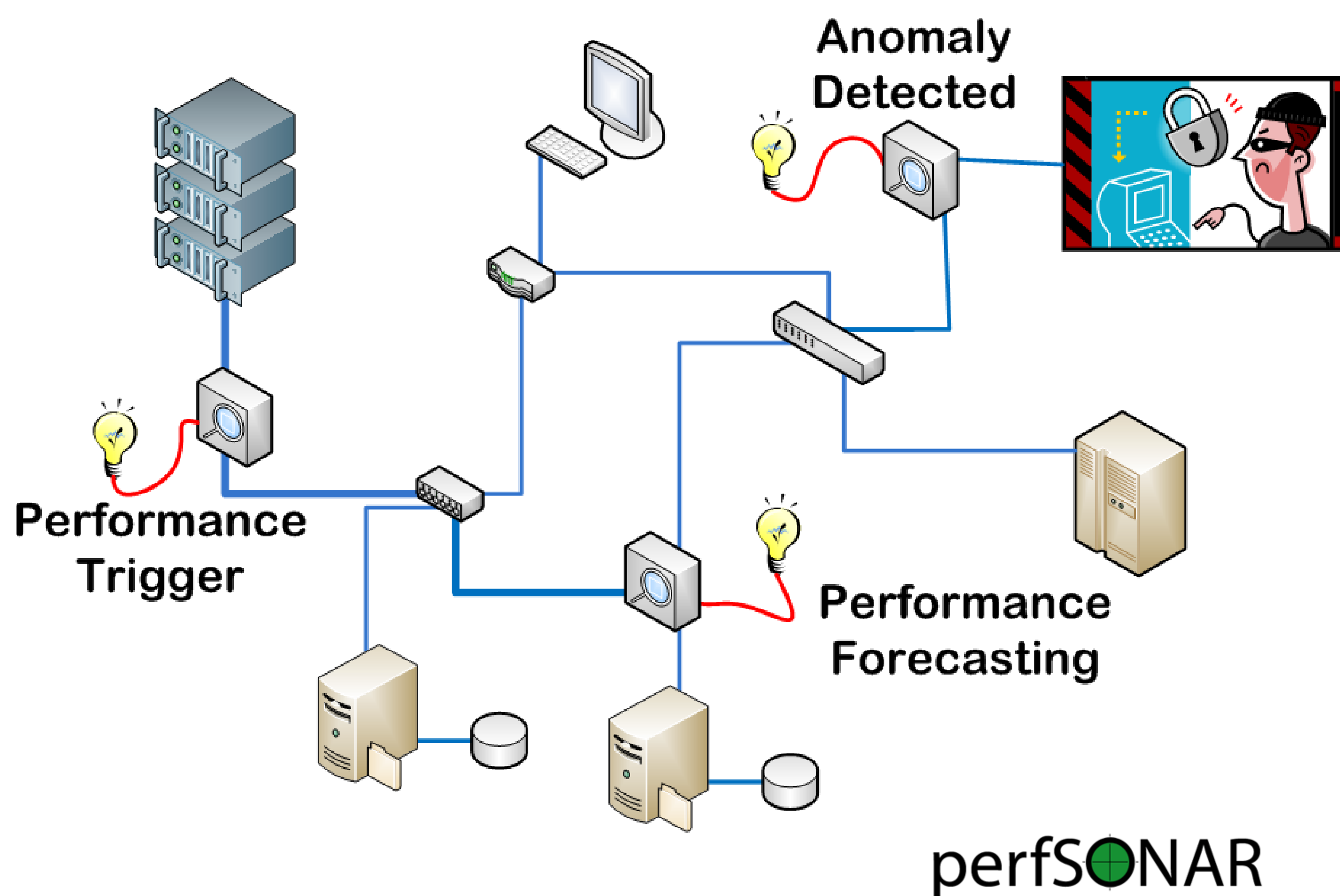
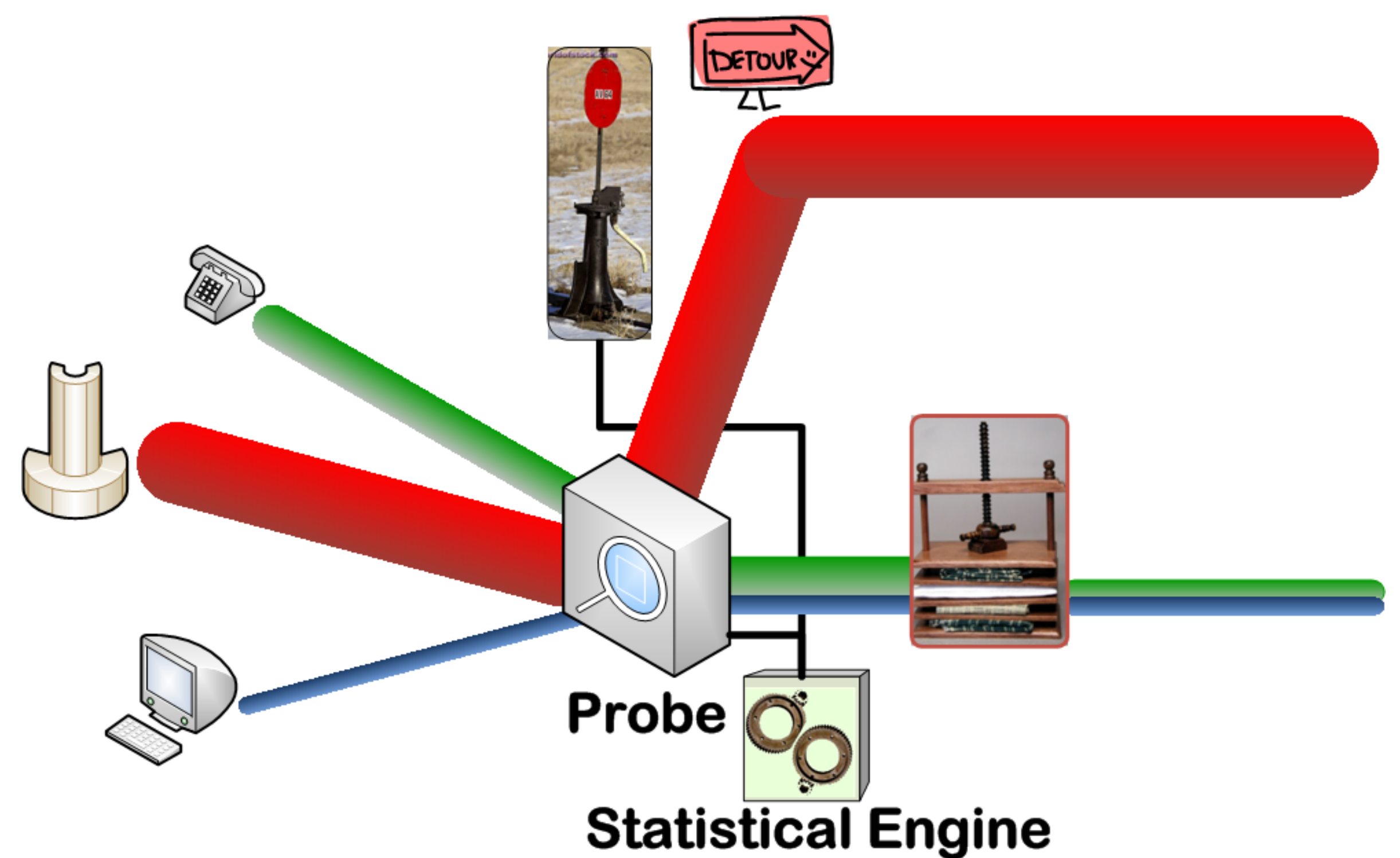
Technologies exist to administer guarantees of minimal **Quality of Service** to chosen applications, and/or manage a **fair usage** of the network by applications.

These guarantees can be established:

- Previously, by **service agreements**;
- Requested actively** by the applications at runtime.

In our work, we propose allowing the **network** control the resources, but based on a **previous history** of the applications' behavior.

- A **probe** monitors network flows. A flow is identified by five attributes: Source IP, Source Port, Destination IP, Destination Port, Protocol.
- A **Statistical Engine** uses Finite Automata techniques to detect flow behavior.
- When a historical high demanding flow appears, the engine recognizes it and takes action, for example, triggering a Virtual Circuit.



Furthermore, time-series analysis may be employed in a **network performance monitoring architecture**, such as **perfSONAR**, to provide services for **event triggering**, **alarming**, and **statistical auditing**.

One such application is **anomaly detection**, which can be applied for performance and security management. Another is **forecasting**, where the history of the network behavior and usage is exploited to predict future performance.

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