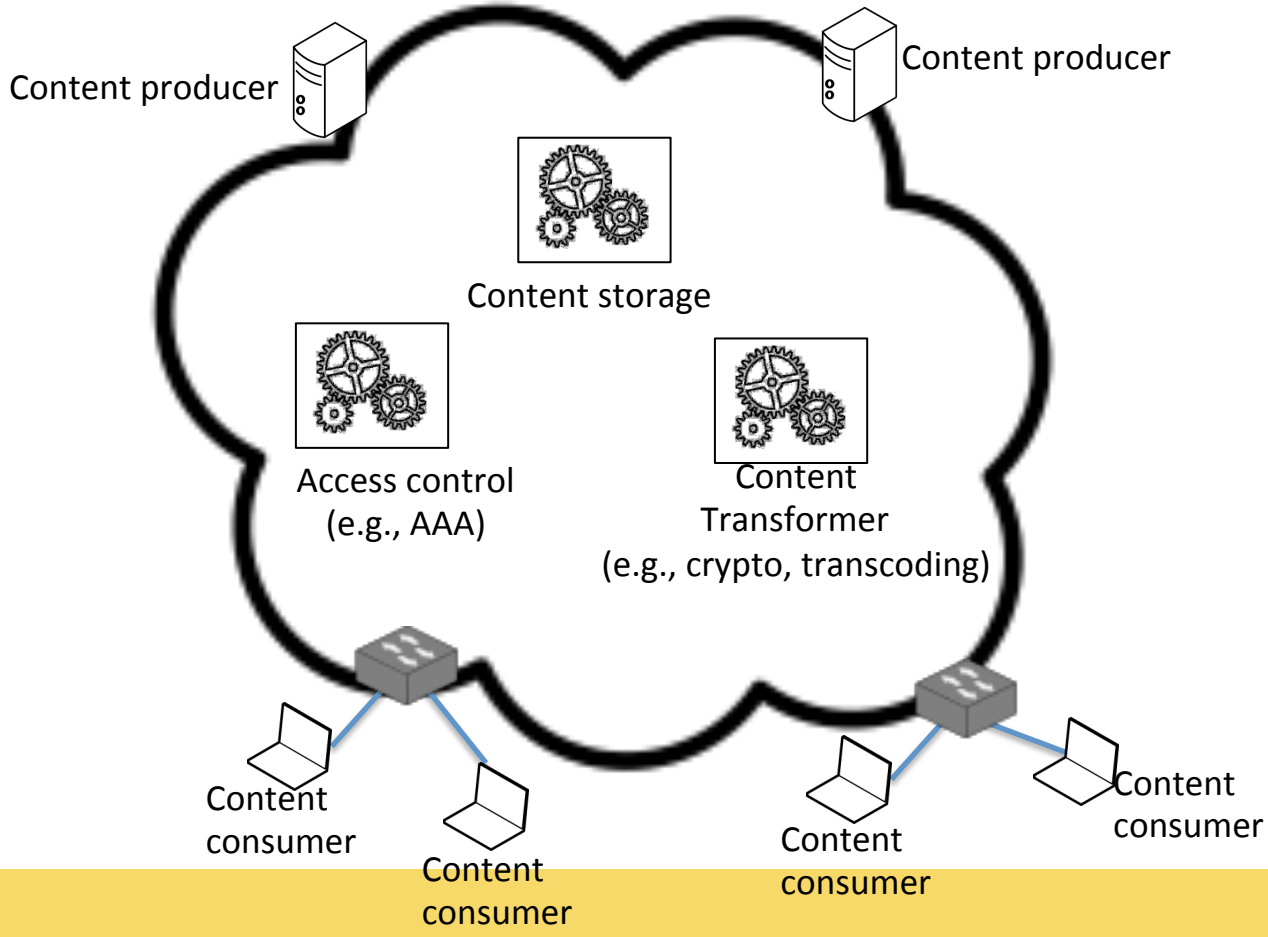
SDN Survey

- **B. Astuto et al., `A Survey of Software-Defined Networking: Past, Present, and Future of Programmable Networks' to appear in IEEE Com. Surveys & Tutorial, http://hal.inria.fr/hal-00825087**
  - History of SDN
    - Open Signaling, Active Networking, DCAN, 4D, NETCONF, Ethan
  - Main current Architecture
    - OpenFlow, ForCES
  - Forwarding
    - Forwarding table
    - Rules installation
  - Controllers (see table III)
    - Centralized vs distributed
    - Multi level (e.g., region, proxies…)
    - Granularity and reactivity vs proactivity
    - Code verification and debugging
  - API
    - Southbound communication
    - Northbound communication
  - SDN Development Tools (emulation vs simulations vs software switches (see table I) vs hardware switches (see table II))
  - SDN Applications
    - Enterprise Networks, Data Centers, Infrastructure-based Wireless Access Networks, Optical Networks, Home & Small Business)
  - Research Challenges
    - Controller & switch design, Internetworking/heterogeneous networks, ICN

Content delivery

- Contents are huge and greedy (e.g., video, medical imagery)
- Access is controlled (e.g., pay-per-view, sensitive information)
- Per-consumer adaptation (e.g., screen size, privacy)



Medical data example

- Data produced in medical centers but stored in regional/national database
- One-time access to data only
- Client data consumption workflow
  1. Authentication and accounting (virtual machines to grant and log access to data)
  2. On-the-fly generation of the data (encryption with the ephemeral key for the session)
  3. Transmission of the data to the consumer

VoD example

- Data produced in production centers but distributed in continental/ country/region/PoP caching facilities
- One-time access to video and pay per view
  - Authentication mechanism
  - Accounting
  - on-the-fly encryption
- Device adaptation
  - Transcoding to adapt to the device
- Mobility support
  - Transcoding to adapt to network condition
  - Dynamic flow table updates
- Popular contents
  - Caching mechanism to avoid overloading the network