Internet2 End-to-End Diagnostic Initiative

Vision and Direction

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- Exploring the impact of an Internet with assured electronic communications and its impact on infrastructure, security, reliability, privacy and trust
- Assuring the ‘default’ electronic interaction
- Providing a means of non-repudiation for actions between two or more parties
- Providing a means to automate detection and analysis of faults and anomalies

How and who we impact?

- Providing a platform for the rapid development of diagnostic applications and the dissemination of events for
  - Engineers and operators of infrastructures
  - Developers of new services and protocols
  - Help desks
  - End users

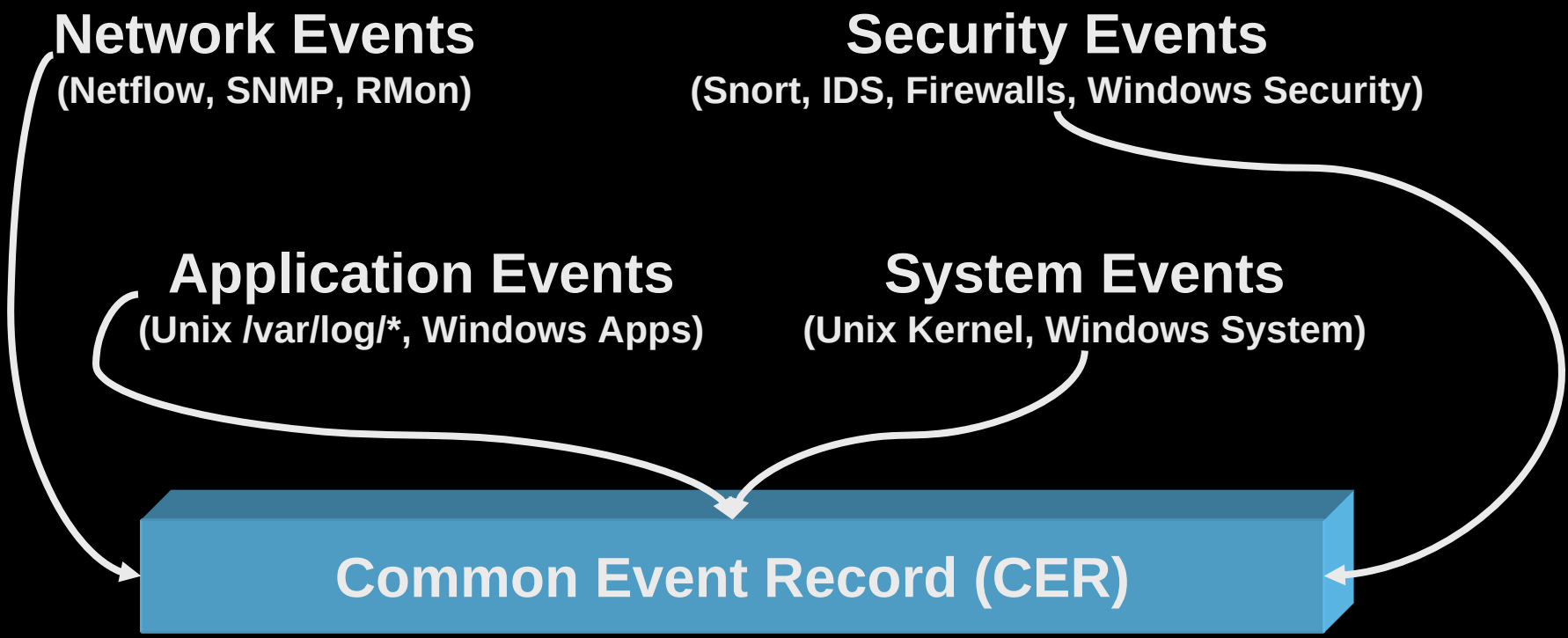
Unleashing the Genie

- Exposing an unprecedented wealth of diagnostic information for
  - Enabling new and enhancing existing diagnostic applications
  - Visualizing diagnostic events
  - Researchers through the establishment of a diagnostic observatory
  - Modeling new policy configurations to assess their impact on daily operations

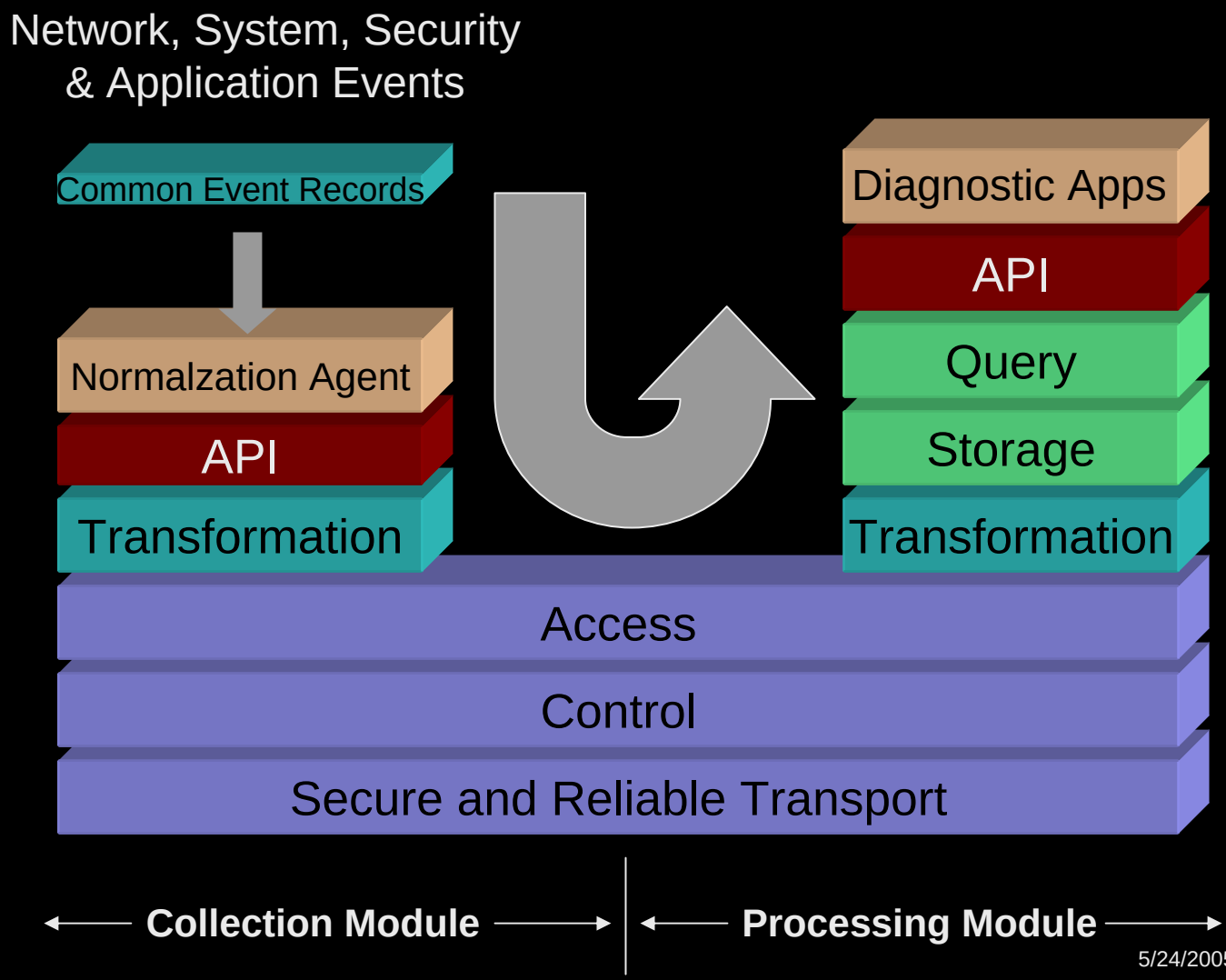
Methods for Success

- Establishing a common event record that aids in the correlation, dissemination and retrieval of network, system, application and security events
- Creating a diagnostic backplane as a dissemination infrastructure for event information
- Enabling the rapid development of diagnostic applications by giving them access to the dissemination infrastructure

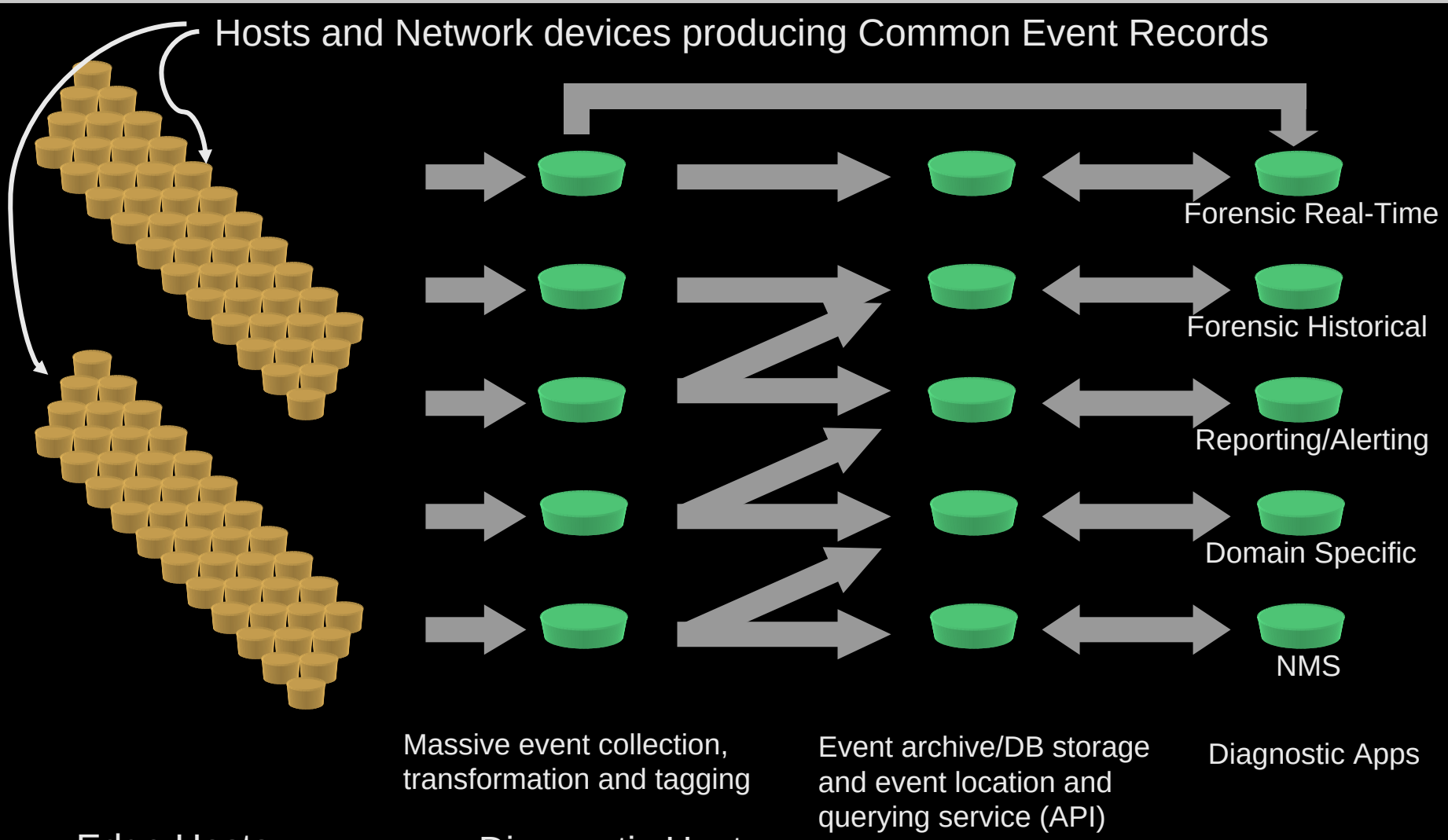
Combining Event Types



Diagnostic Backplane Elements



Diagnostic Backplane Topology



Next Generation Diagnostics Applications

- Proactive reporting and notification
- Reactive real time forensics that dynamically gather distributed information to both broad or highly specialized diagnostic applications
- Enabling the correlation of event information from interdependent subsystems or multiple layers in the network stack
- Allow for collaboration between diagnosticians in remote locations and different organizations

Next Generation Diagnostics Apps Cont.

- Establishing profiles of behavior for applications, services and underlying protocols
- Enabling both historical or real-time event discovery and assessment
- Providing a method of answering ‘what if’ scenarios
- Forensic assessment to help identify future risks and damage after a fault

Development and Deployment

- Establish a distributed diagnostic framework across Internet2 and beyond
  - Development in concert with
    - Standards efforts
    - New applications and services
    - Commercial products
  - Deployment at key organizations
    - Internet2 member institutions
    - Abilene
    - National Lambda Rail
    - Government and private sectors

Leverage Activities

- Use existing technologies within
  - Internet2
    - Middleware
      - Shibboleth
      - MACE-DIR
    - Performance and Measurement
      - OWAMP
    - Security
  - External Organizations
    - SurfNet
    - Detective
    - EduRoam

Enabling other Efforts and Tools

Diagnostic assistance is provided through the system in several ways:

- Existing diagnostic tools have been or can be fitted with EDDY normalizers and translators to join into the backplane and make their data available to other applications or to specific help desk/service personnel.
- Applications can be fitted with similar EDDY normalizers to inject their error logs and diagnostic information into the Backplane.
- Existing diagnostic tools can be enriched though access to additional diagnostic data through tapping into other sources of information within the backplane.
- New diagnostic consoles can be developed and assembled from components that access and analyze the rich resources on the backplane.
- Applications can utilize diagnostic data at lower levels of the protocol stack and present better information to users about problems in access or performance.
- The diagnostic capabilities can be positioned to provide audit mechanisms as well.

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