A graph-based approach to tracker detection

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Motivation

Problem

Trackers collect information about a user’s activity on the Internet

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Tracker blocking solutions mainly rely on Filter Lists

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- **Keeping up with changes**

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How can we solve this? *Build an automated tracker detection system!*

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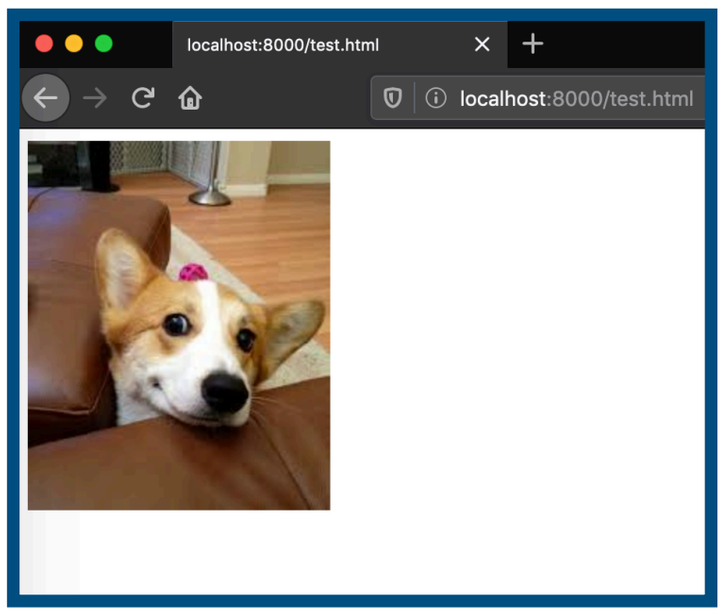
Goal: *Build a machine learning model to identify trackers for inclusion in filter lists*

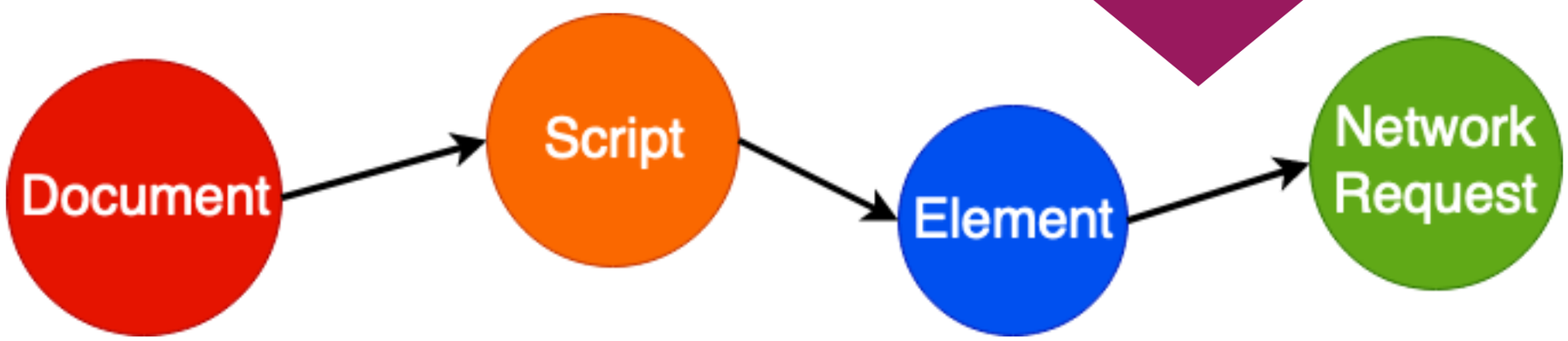
How can we solve this? *Build an automated tracker detection system!*

Build a *graph representation* of page load events

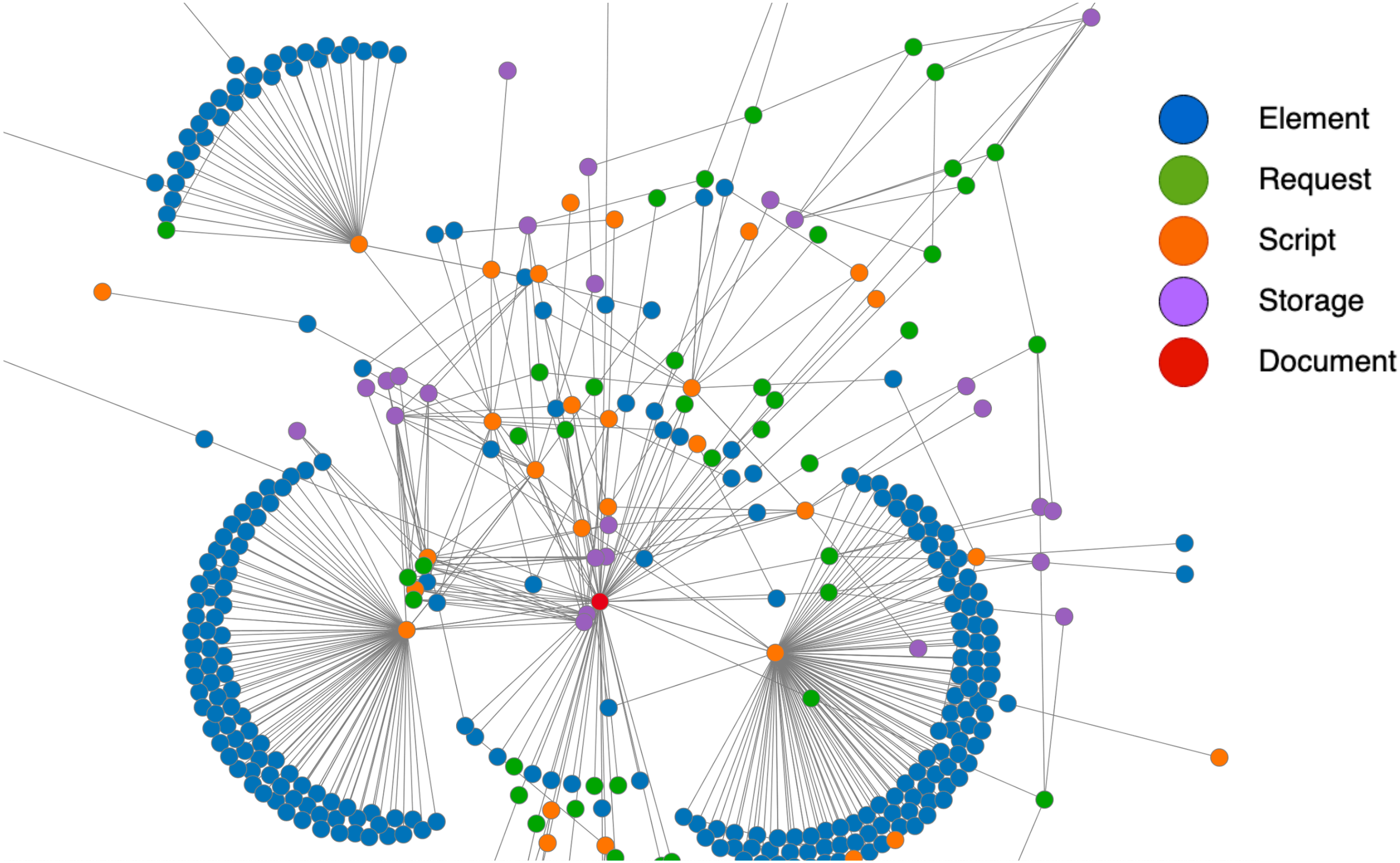
Simple Example



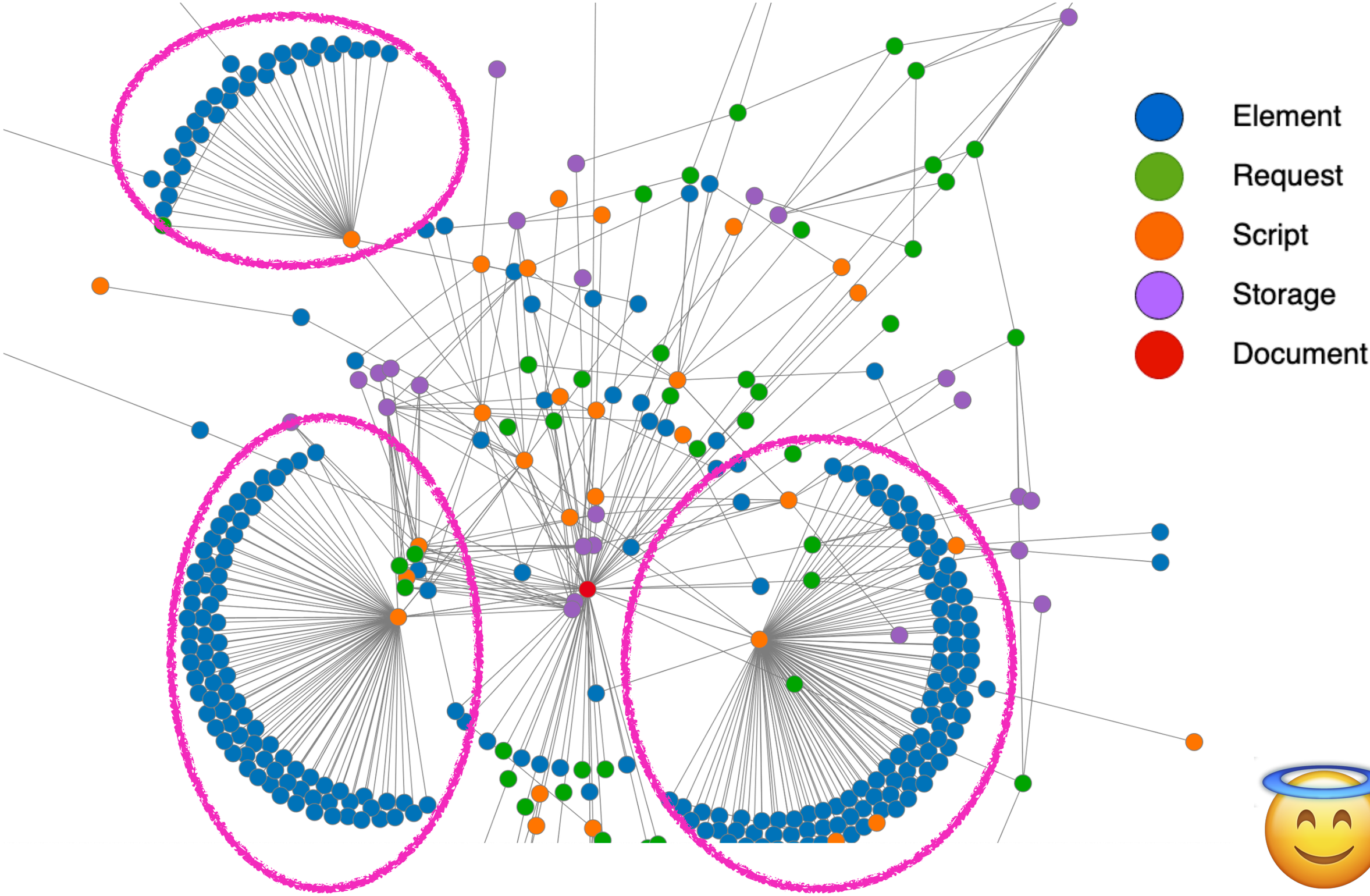

```
<html>
  <body>
     <script>
       var newimg = document.createElement("img");
       newimg.src = "https://encrypted-
tbn0.gstatic.com/images?
q=tbn:ANd9GcQgrjE6kteaw0qJ2jeeeeOUyR_-qb-
DQ9ke3j33pS_dE0vvQXDR";
       document.body.appendChild(newimg);
     </script>
  </body>
</html>
```



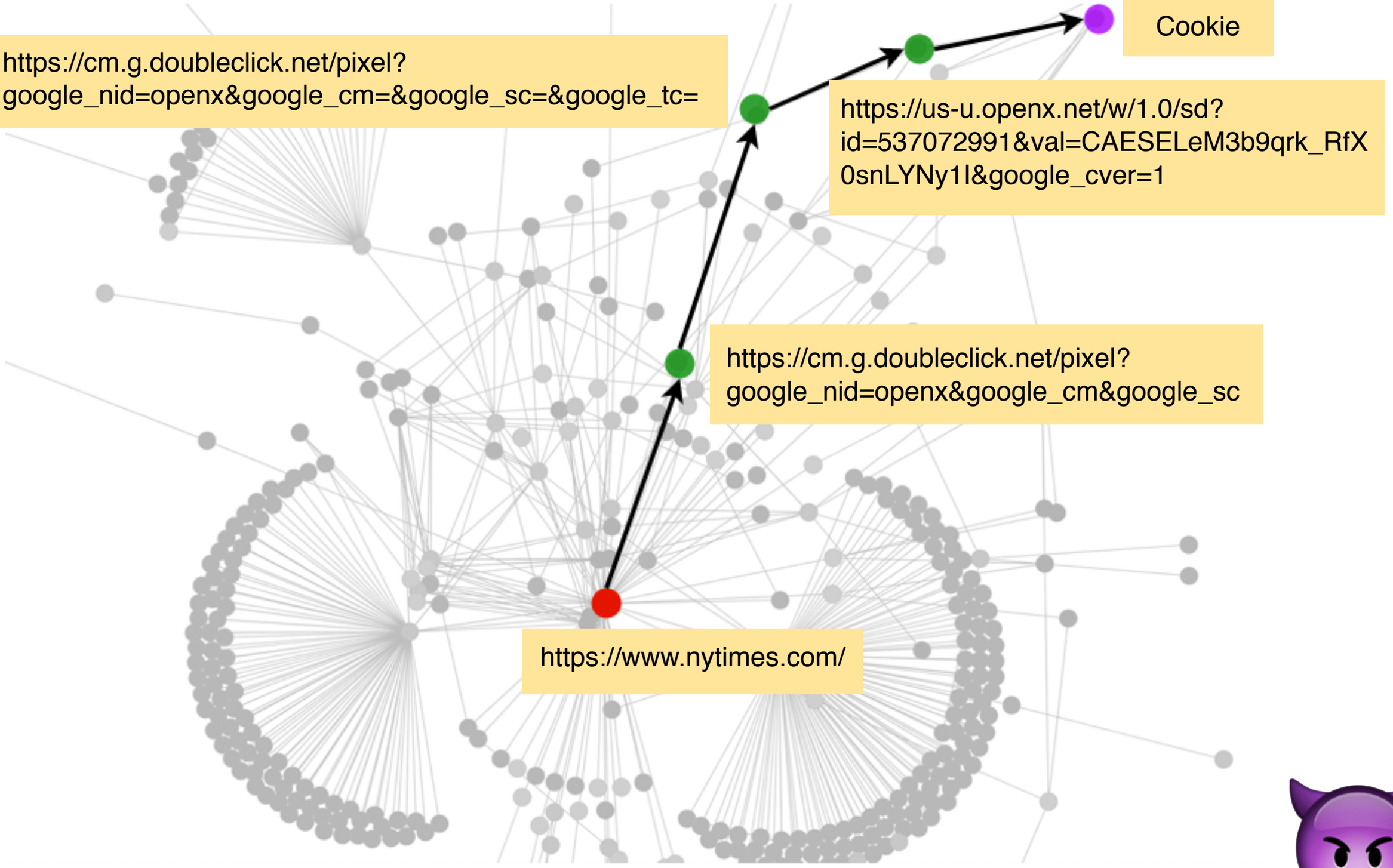
Graph Representation — Example



Graph Representation — Normal events



Graph Representation — Tracker events



Extracting features from the graph

Node Features

- Node type
- Node sub-type
- URL length
- Presence of ad keywords

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Connectivity Features

- Neighbors
- Centrality measures

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Present in existing systems

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Data Flow Features

- Content transmissions
- Cookie related actions

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Present in existing systems

Questions we want to answer

- Can data flow features from our graph representation help us create a reliable tracker classification system?
- Do the data flow features enable us to discover fundamental tracker behavior that is hard to hide?
- Will the classifier be robust to temporal changes in websites?