XPORT: Extensible Profile-driven Overlay Routing Trees

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**Basic XPORT Model**

- A generic data dissemination system
  - Overlay network construction
- Separates "plumbing" from app-specific dissemination logic:
  - Apps provide a small set of methods:
    - Data and profile definitions
    - Profile matching functions
    - Performance goals and constraints
  - XPORT automatically builds, maintains, optimizes an overlay dissemination network

**Extensibility in XPORT**

- Profile/Data extensibility, e.g.,
  - match\((m,p)\): true if message matches profile
  - merge\((p_1,p_2)\): merge two profiles to one
- Cost extensibility: 2-level aggregation model
  - Level 1: Defines the local node cost
    - Aggregation of a metric over some neighbors
  - Level 2: Defines the global system cost
    - Aggregate costs of all nodes

**Sample Network Transformations**

- subtree promotion
- subtree migration
- sibling swap
- child promotion
- parent-child swap

**Example Cost and Constraint Specification**

- Optimization goal:
  "Minimize total bandwidth consumption while keeping dissemination latencies under 100ms."
- In XPORT:
  \[ \text{min}\left(\sum(\text{children}, \text{in\_data})\right) \text{ while } \sum(\text{ancestors}, \text{link\_latency}) < 100\text{ms}. \]

**Demo Applications:**

1) Multiplayer Networked Game
2) RSS Feed Dissemination

**Network Configuration and Visualization Tools**

**XPORT Dissemination Network**

Game Server

Player

RSS

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