Quilt: A System for Distributed Temporal Queries of Security Relevant Heterogeneous Data

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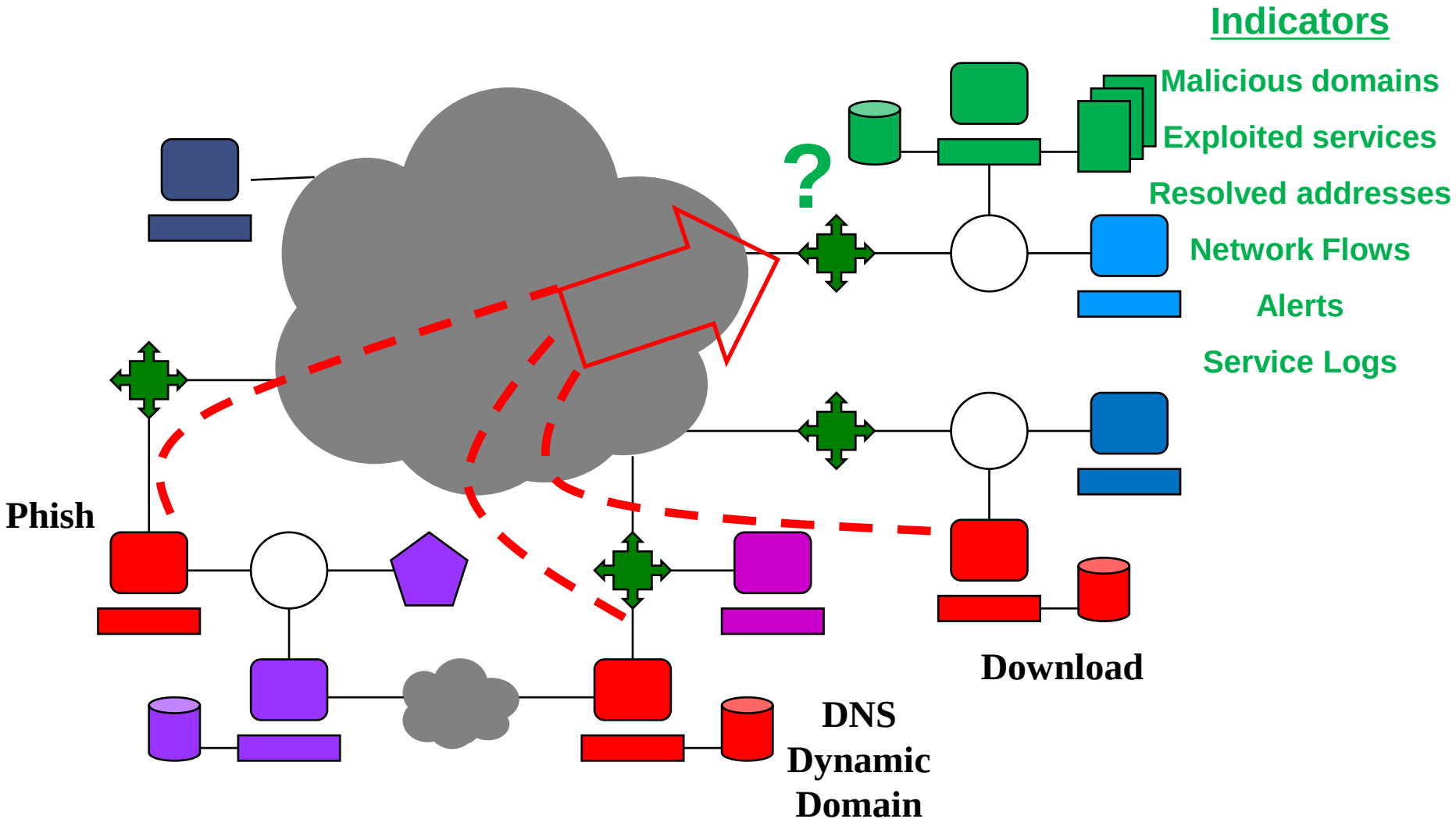
Problem: Querying multi-sorted network data



Project Introduction

Provide a basis for queries across data sources of differing kinds, locations, and content to retrieve security-relevant data

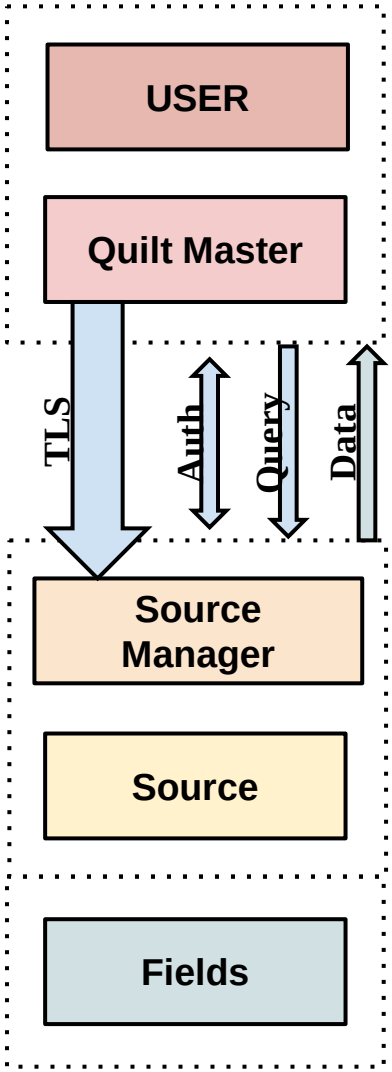
Currently: manual, back-haul & normalize, team caucus (time consuming, repetitious, space and bandwidth consumptive, timeliness)

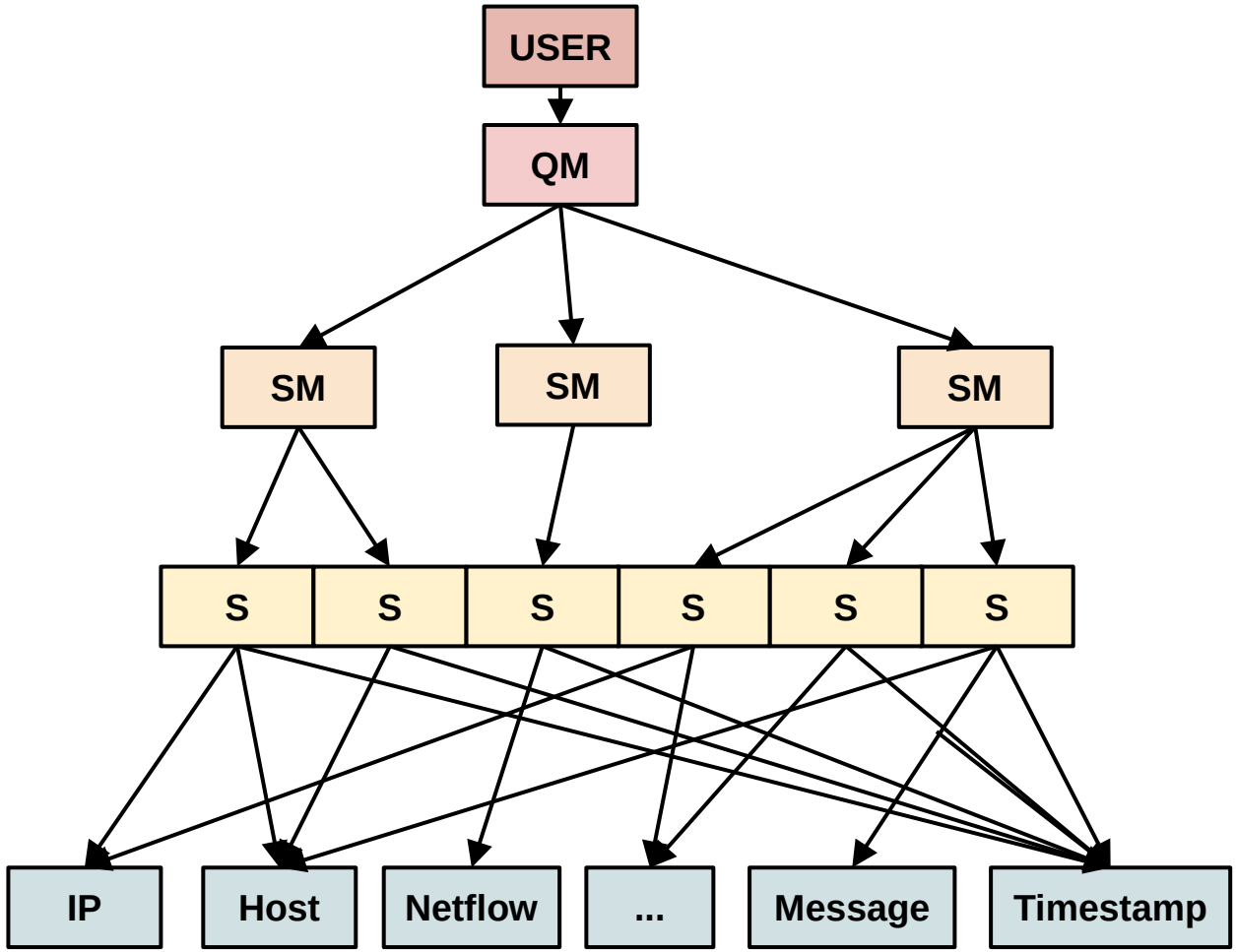
Quilt Approach:

1) Central query master, restating query into source-related components queried at data location via co-located source masters
2) Source masters return minimal and parameterized results with requery capability for drill-down or data completeness
3) Query master temporally associates results

- Flexibility in queries
- Convenient and simple data exploration model
- Easy to maintain and expand
- Safety of data
- Lightweight

Quilt Architecture





Quilt Architecture Levels(1)

User

- Domain knowledge
- Access rights
- Awareness

Source Manager

- Native data retrieval interface
- Present credentials as required
- Results filtering

Query Master

- User interface
- Restate query for source manager
- Specify filtering of results
- Temporal filtering (concurrent, sequential, until)
- Results presentation

Source

- Retrieve data
- Preserve native structure
- Preserve access rights
- All results timestamped

Quilt API

User: Standard Query Language (Augmented Python)

Query master – User: Standard Query Library

Query master – Source manager: Smart client that stays on line long enough for authentication, refinement and potential callbacks.

- package{dict of types needed, dict of filters, dict of sources}

Source manager – Query master:

- SMQuery(package, authentication)

Source manager – Source:

- Startup(authentication, authCallback())
- DBQuery(derived_query, DataCallback())
- CloseDown(authentication)

Summary

Distributed data query engine

Allows for broad range of data

- Network flow
- IDS Logs
- System logs and messages

Intrinsically supports temporal relationships

Minimal data interchange

- Bulk query using native retrieval on site
- Filter retrieved results to isolate needed fields
- Communicate with efficient representations