Growlithe

A Developer-Centric Compliance Tool for Serverless Applications

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Data protection challenges in Serverless

Sensitive Data

Personally-identifiable data
Financial information, User credentials

Shared Responsibility

Provider: Secures underlying infrastructure
Tenant: Configures access control &
ensures data protection

Heterogeneity

Languages &
Cloud Services

Environment

Container reuse can leak
data across requests

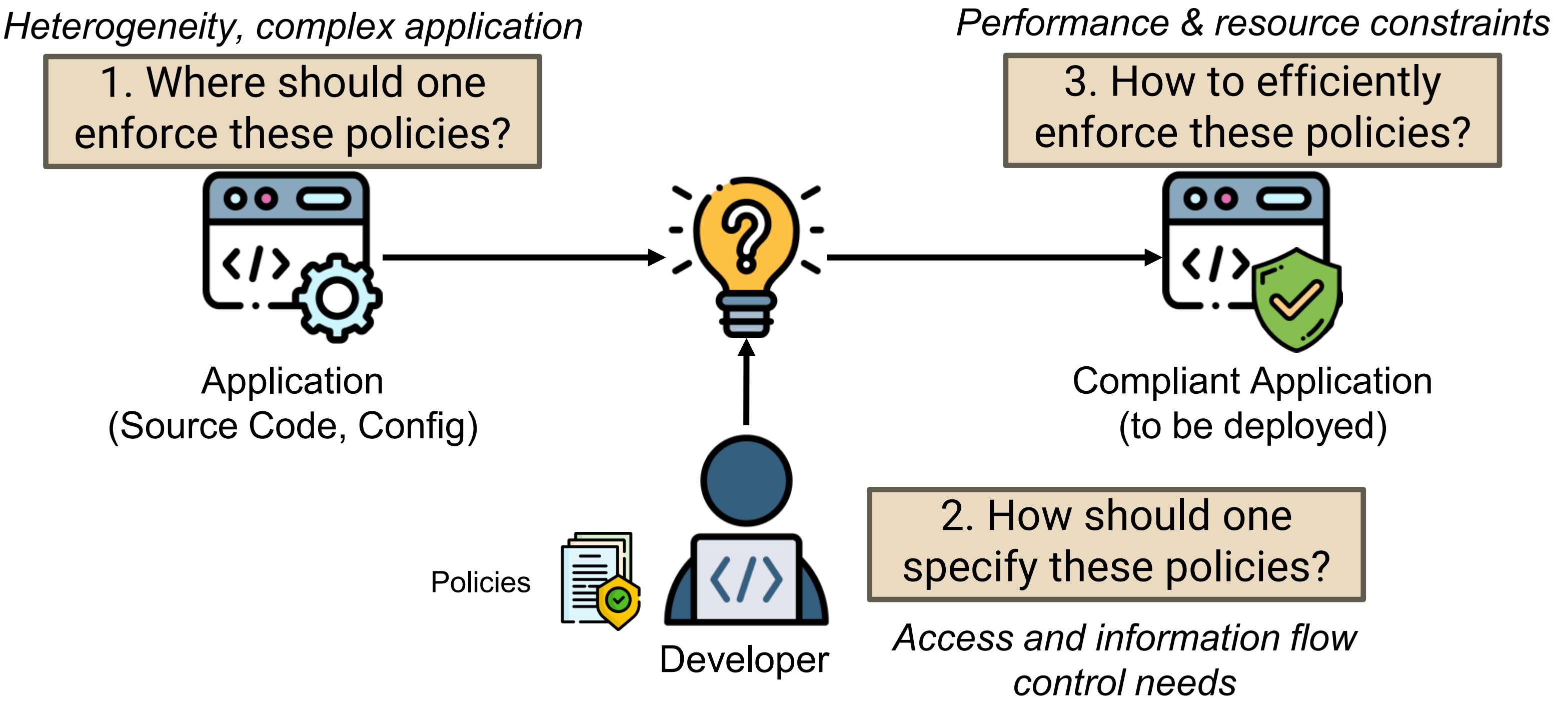
Complexity

Diverse event sources
Evolving application

Short-Running

Strict Latency Requirements

Design Challenges



Heterogeneity, complex application

1. Where should one enforce these policies?

Application (Source Code, Config)

Performance & resource constraints

3. How to efficiently enforce these policies?

Compliant Application (to be deployed)

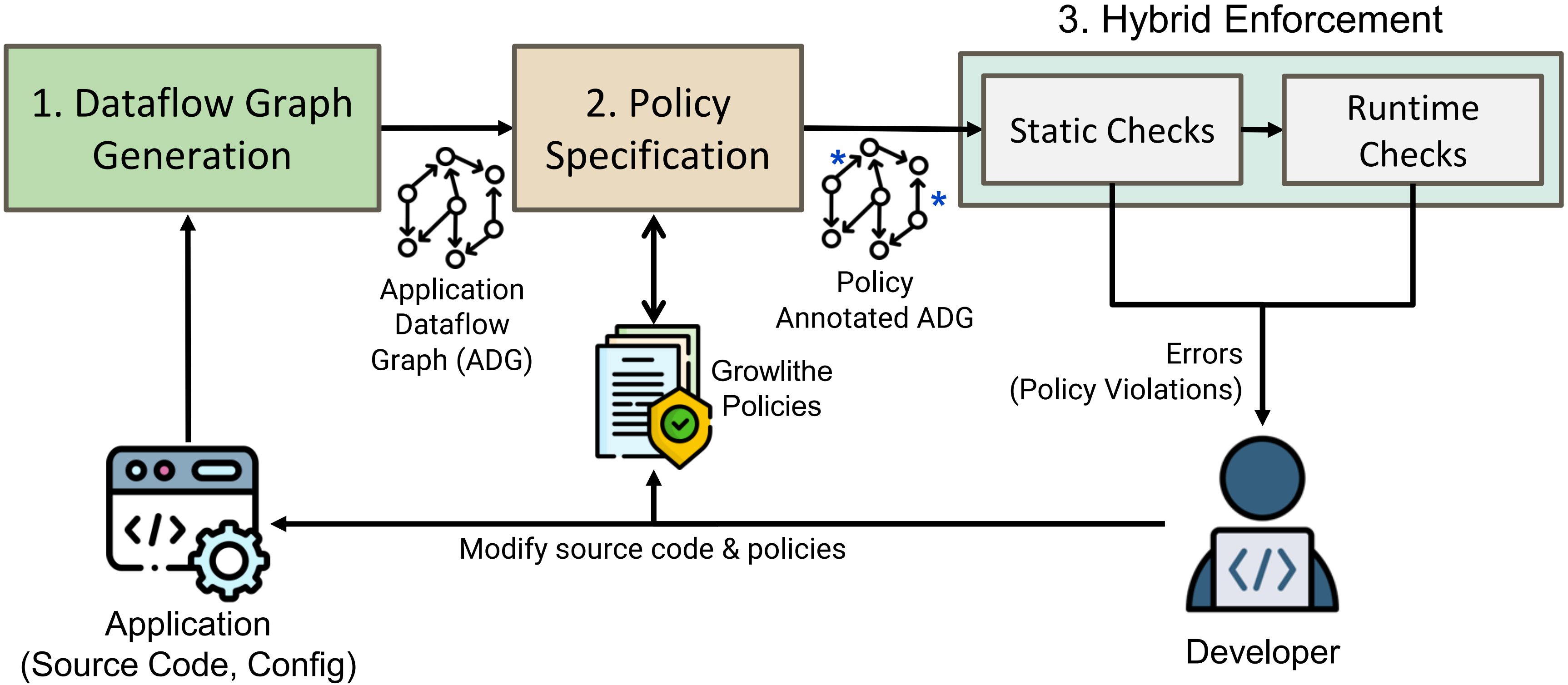
Policies

Developer

2. How should one specify these policies?

Access and information flow control needs

Growlithe Overview


3. Hybrid Enforcement
1. Dataflow Graph Generation
2. Policy Specification
Static Checks
Runtime Checks
Application Dataflow Graph (ADG)
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Policy Annotated ADG
Growlithe Policies
Errors (Policy Violations)
Modify source code & policies
Application (Source Code, Config)
Developer

Evaluation and Takeaways

- Average per function overhead over baseline
  - Growlithe$_{RT}$ (only runtime checks): 28ms
  - Growlithe$_{Opt}$ (Hybrid Enforcement): 23ms
- Hybrid enforcement on average 19% faster compared to runtime enforcement alone
- Scales linearly in linear chain and sub-linearly in fanout with increasing number of functions

Growlithe integrates compliance by design in serverless dev lifecycle

Full Text **Code**

- ✓ **Portable:** Platform-independent design, works across languages
- ✓ **Efficient:** Modest overhead makes it ideal for medium to large applications
- ✓ **Extensible:** Easily supports new languages/services
- ✓ **Adaptable:** Continuous compliance with application and policy updates

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