

# Why controlling interdomain traffic is difficult ?

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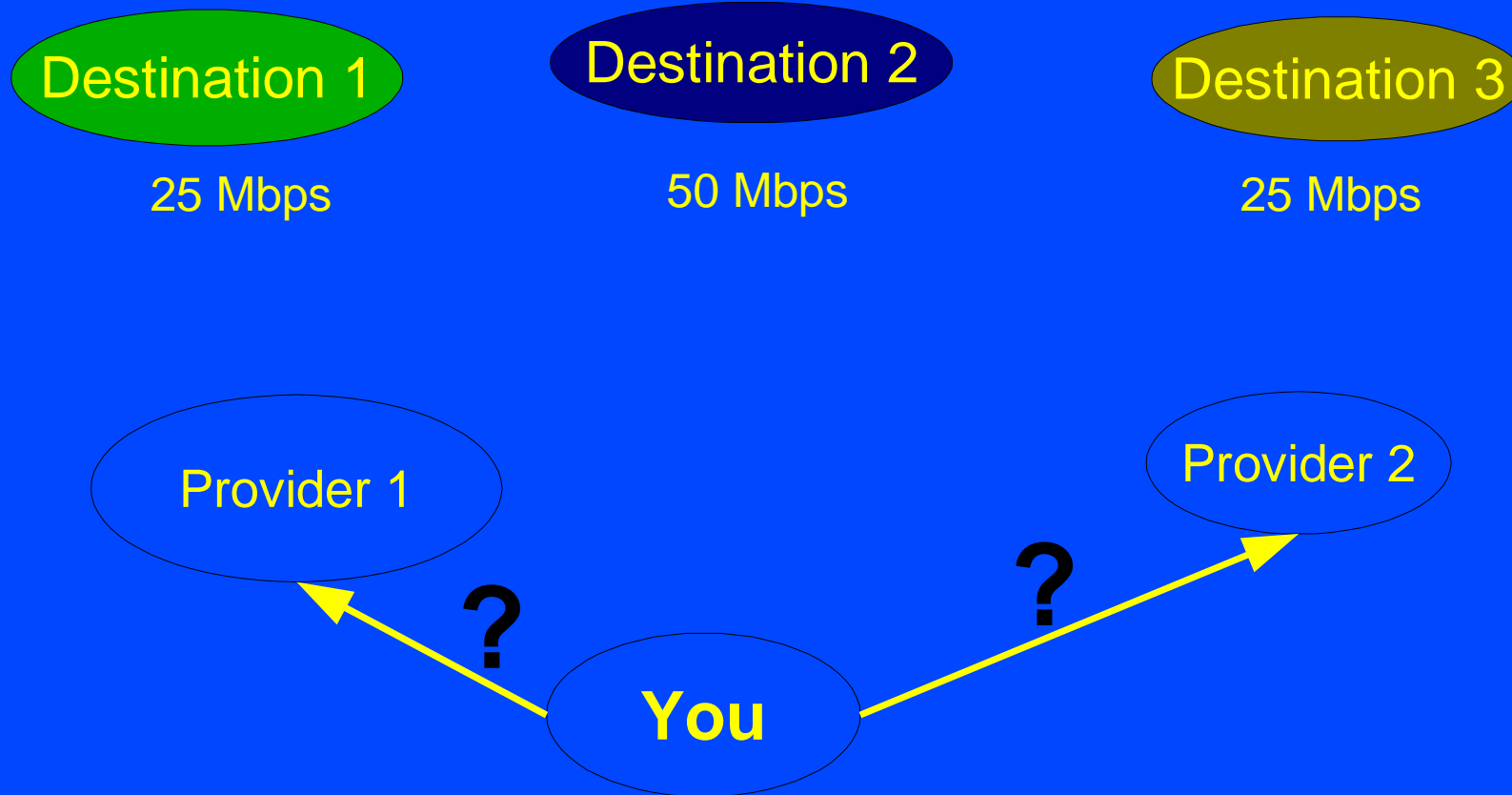
# Background

- **Interdomain Internet ~ 15,000 ASes**
- **More than 60 % of multi-connected ASes**
- **Any AS exchanges traffic with 1000's ASes each day**
- **Interdomain traffic  $\equiv$  traffic exchanged between ASes**
- **Interdomain routing  $\equiv$  routes exchanged between ASes with BGP**

# Subject of this talk

|               |  |
|---------------|--|
| <b>What ?</b> | <b>Controlling interdomain traffic</b>   |
| <b>Why ?</b>  | <b>1) Growing proportion of multi-connected ASes<br/>2) multi-connected ASes care about interdomain traffic<br/>3) BGP = reachability/ = traffic</b> |
| <b>How ?</b>  | <b>By tweaking BGP</b>   |

# Interdomain traffic distribution



# How does BGP work ?

1) Getting BGP routes



neighbour 1 routes

...

neighbour n routes

2) Building routes database



BGP routing table

3) Choosing the best route



**BGP decision process**

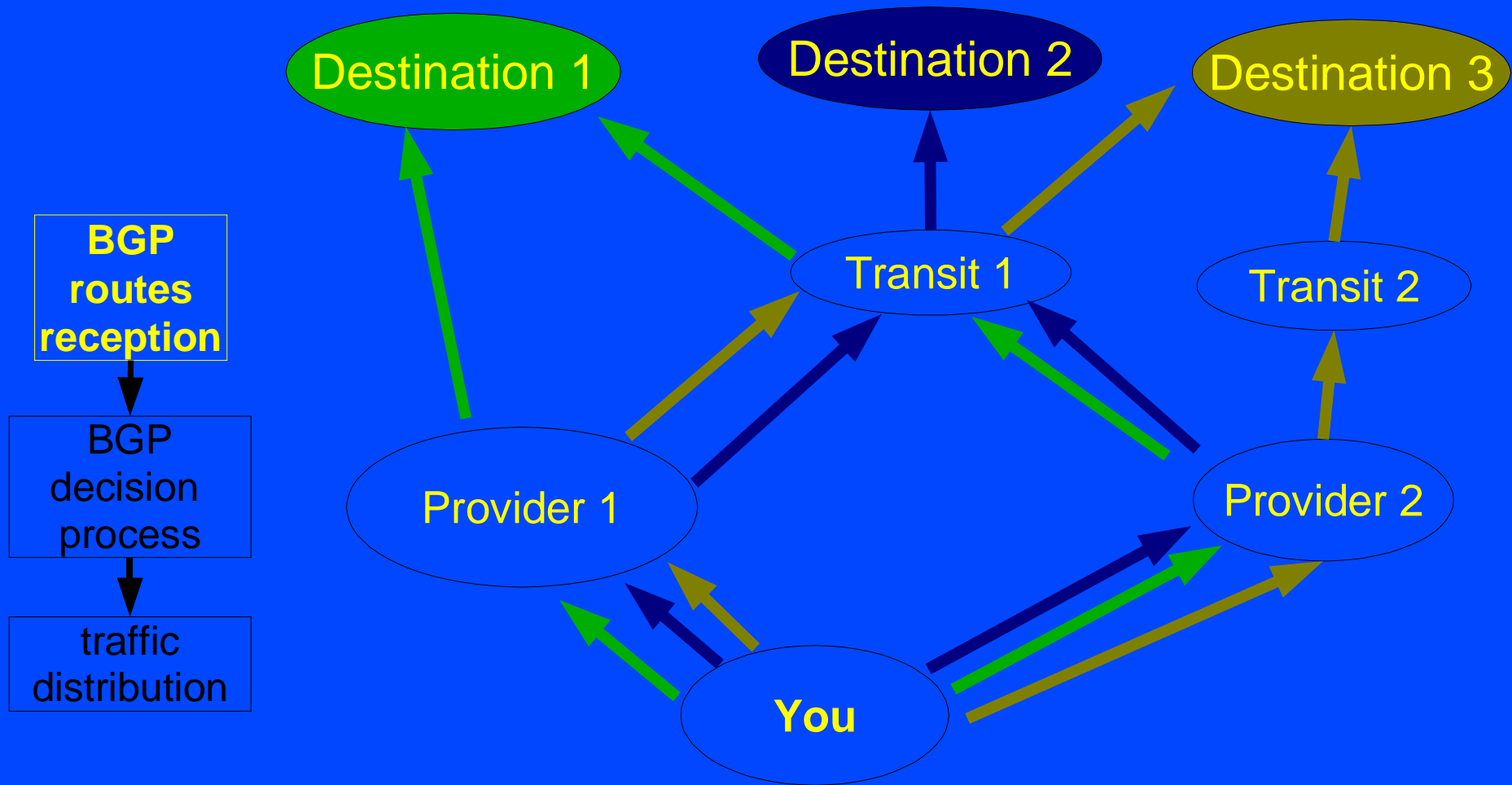
1. highest local-pref
2. shortest AS path
- [3-7]. tie-breaking rules

4) Forwarding traffic using best routes

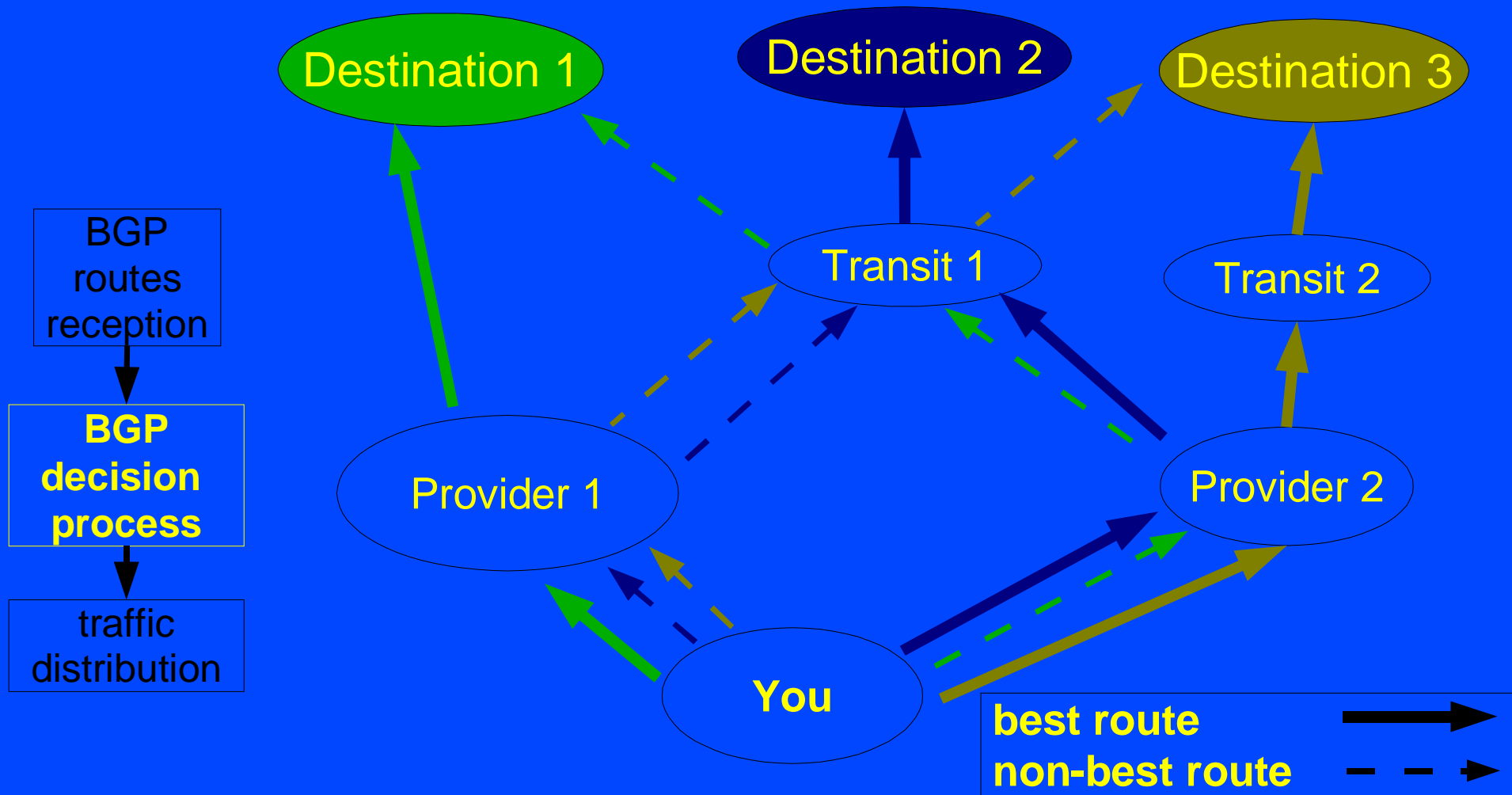


Best BGP routes

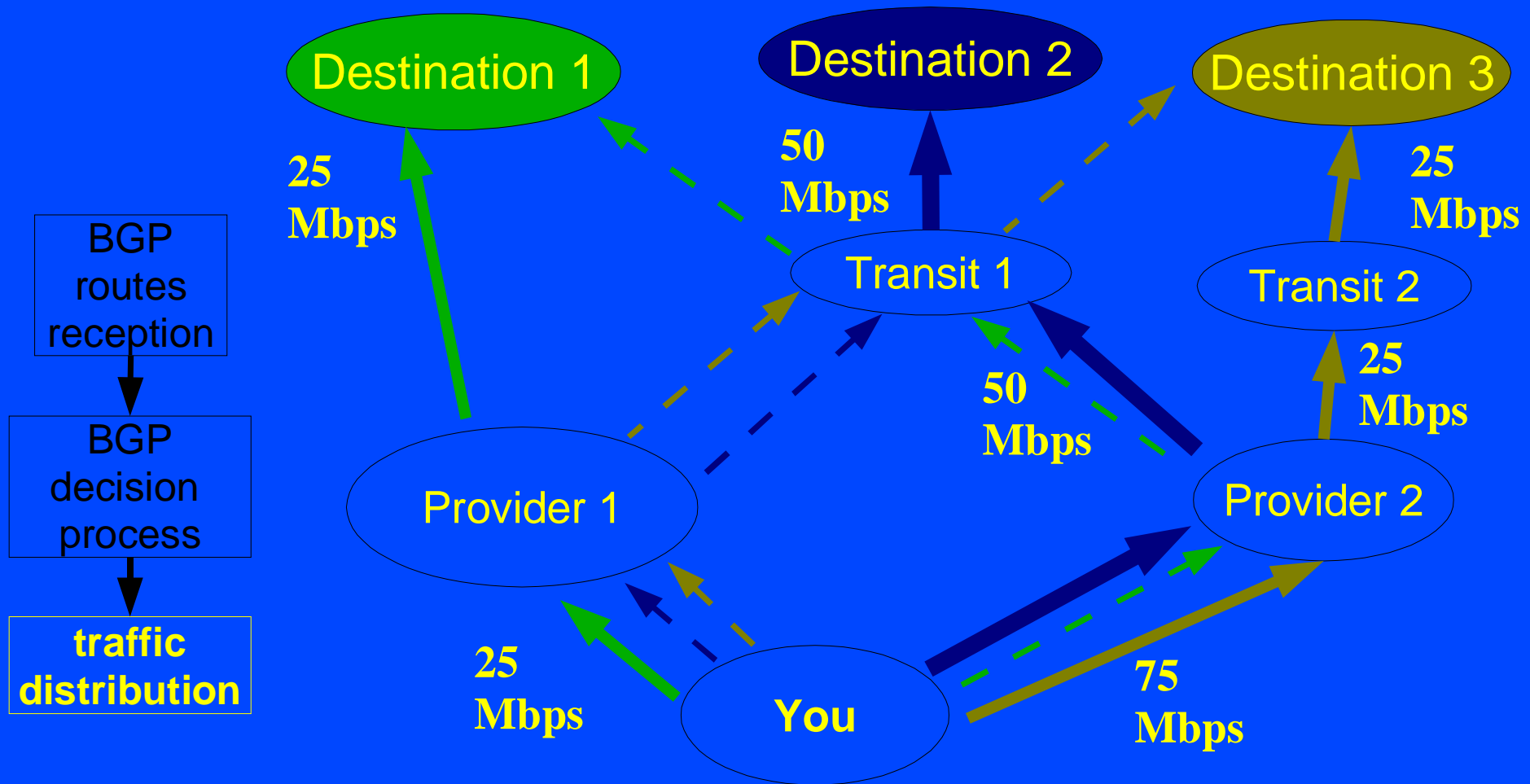
# Interdomain routes diversity



# Best route choice by BGP



# Interdomain traffic distribution





# Sketch of our ITC paper

- **Goal** : optimize objective function on the traffic (minimize cost, traffic balance,...)
- **Method** : move traffic among providers by changing BGP routes
- **Problem** : 100's of destinations' routes to influence
- **Solution** : rely on BGP "filters" that work on traffic aggregates
- **Technique** : population-based search + heuristic to aggregate traffic

# Summary

**What ?**

**Controlling interdomain traffic is difficult**

**Why ?**

- 1) lot of destinations (100's)**
- 2) uneven traffic for destinations**
- 3) potentially 100's of BGP route changes**
- 4) complex BGP decision process (tie-breaking)**

**Solution : Influence traffic aggregates**