Broker

Bro's New Communication Library

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Bro Communication

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Exchanging Events

Separates event generation from handling.

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Logging Remotely

Aggregates logs on remote side.

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Provides shared view across instances.

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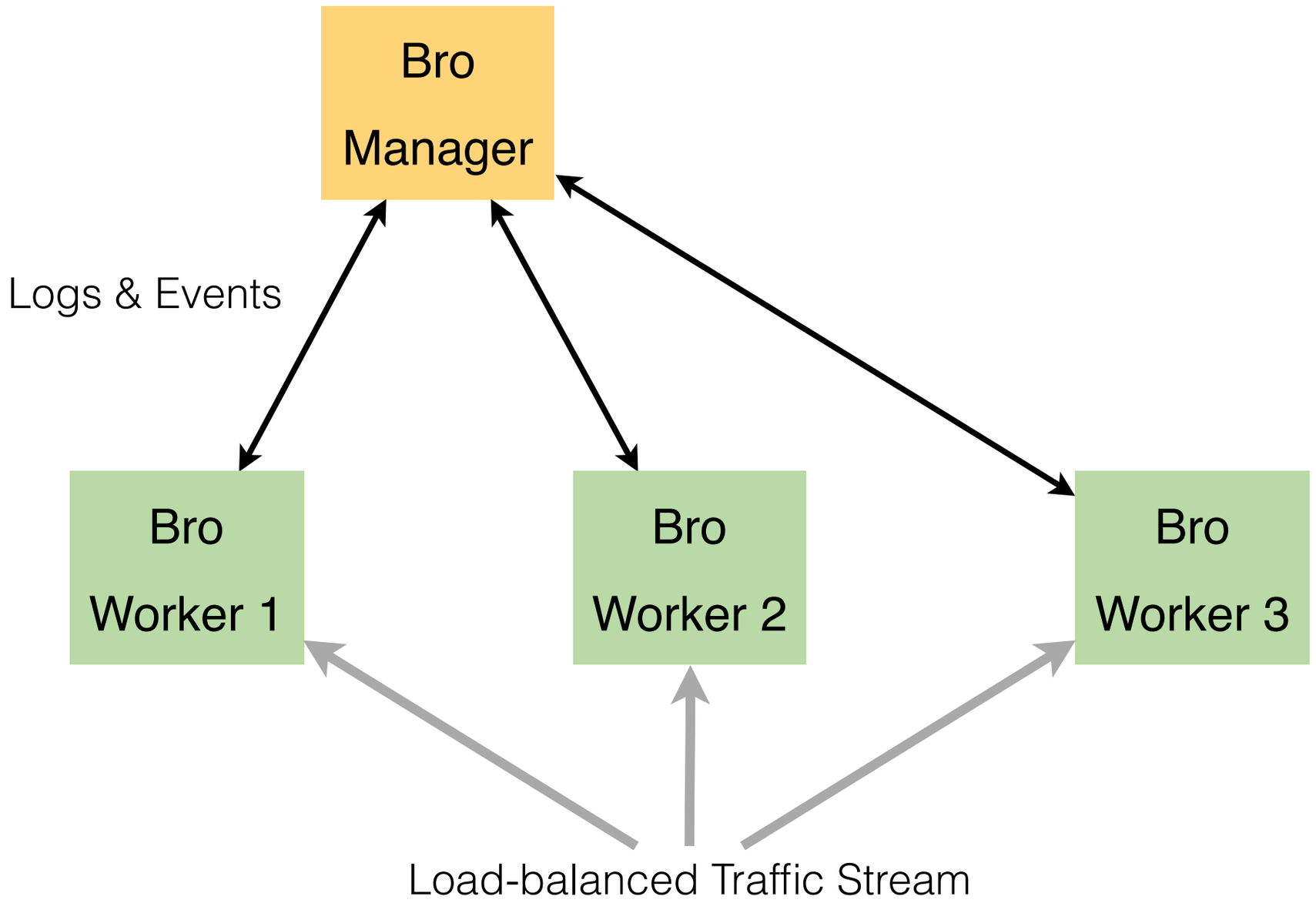
Use Case: Bro Cluster



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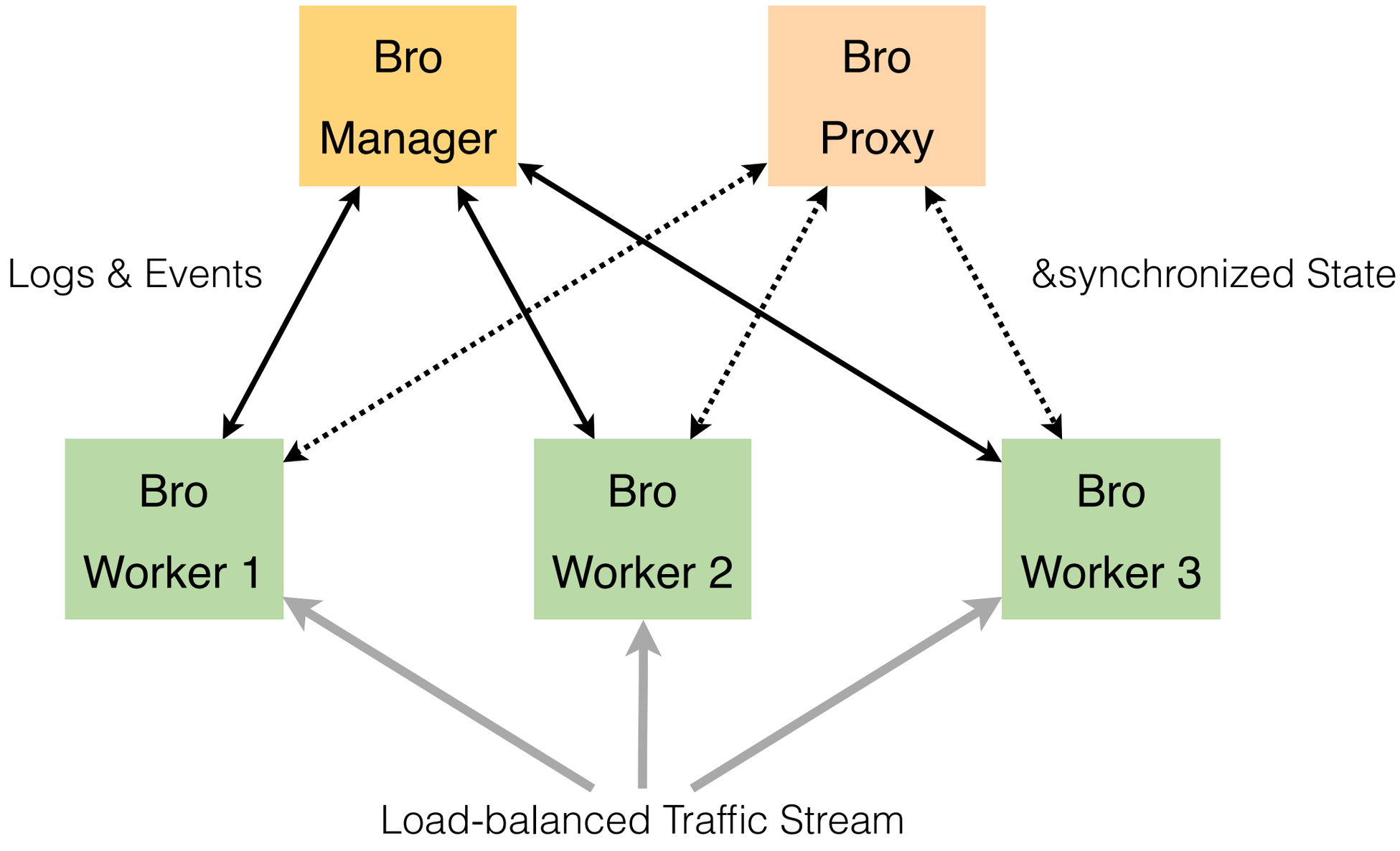
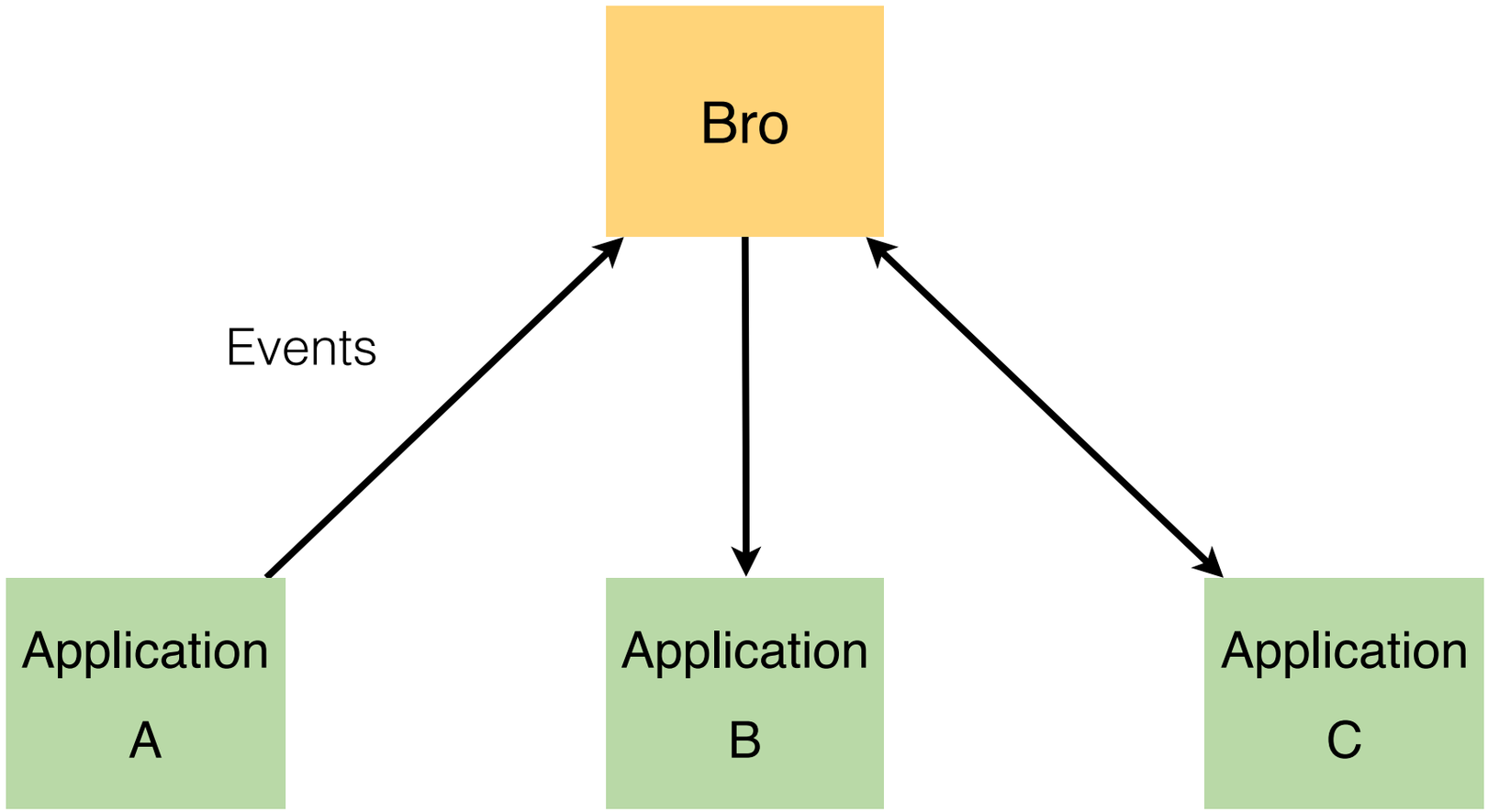


Use Case: External Integration



Traditional Implementation

Events

Logs

State Updates

Bro A

Bro B

Traditional Implementation

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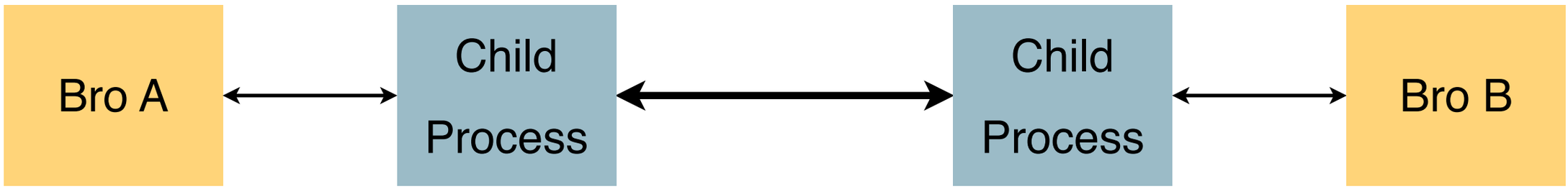

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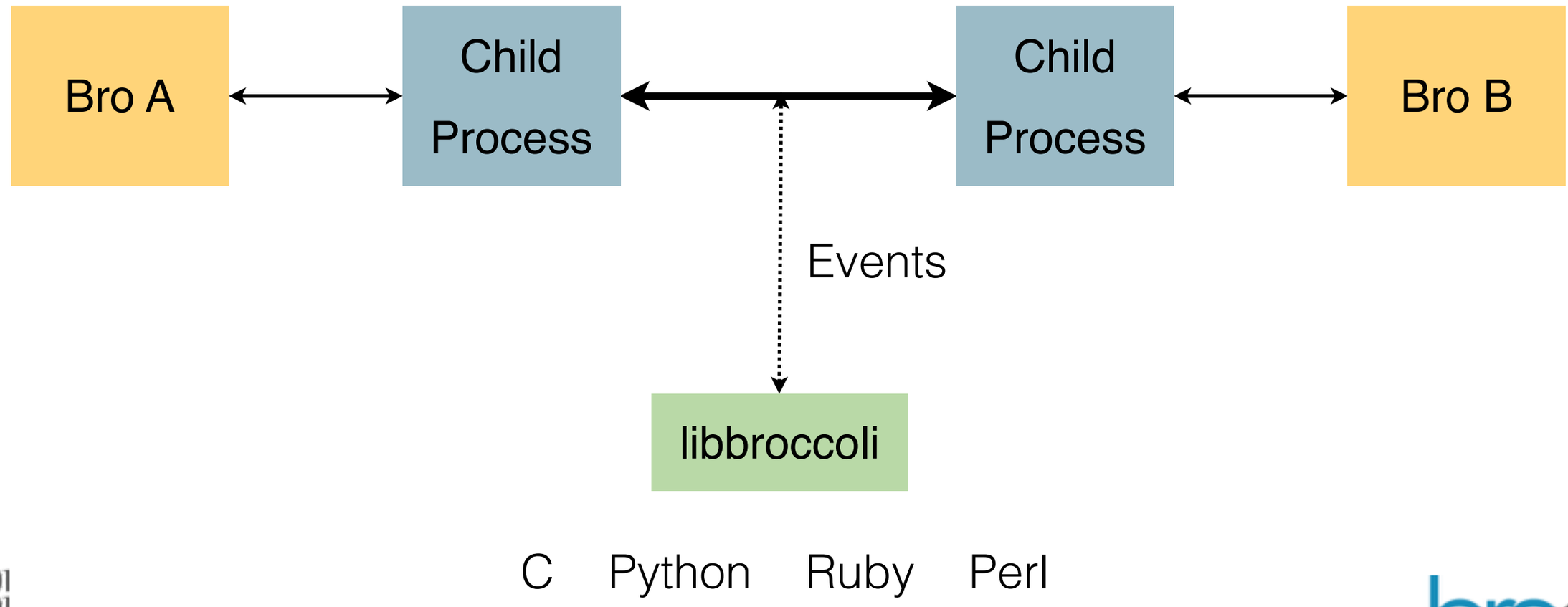

Traditional Implementation

Events

Bro A

Bro B

It's showing its age …

Race conditions with &synchronized.

No good persistence story.

Not much control over data flow.

Complex & inefficient protocol.

Implementation deficiencies.

Two independent implementations.

Introducing the Broker Library

Events

Logs

State Updates

Bro A

Bro B

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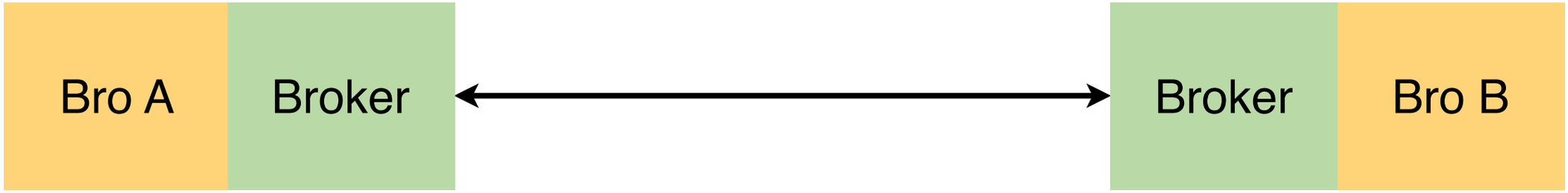

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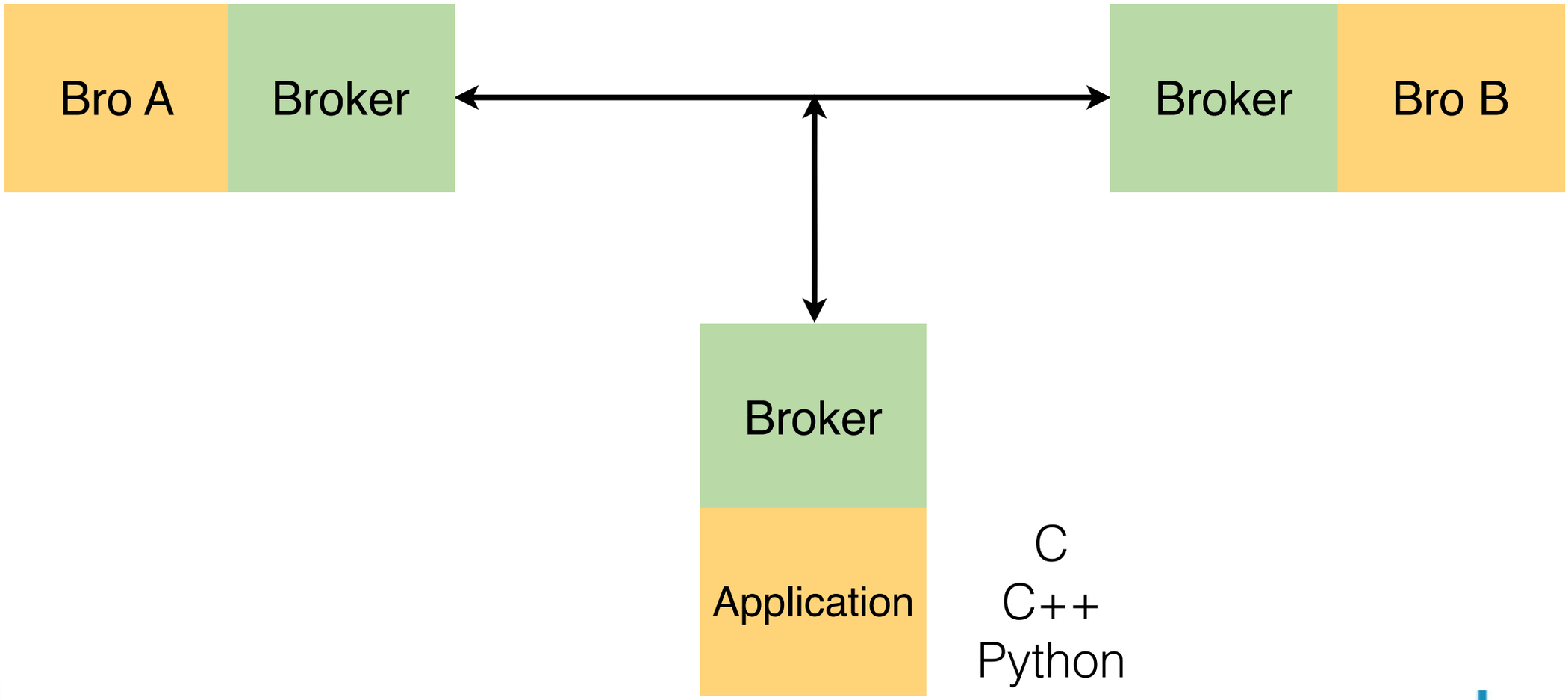

C
C++
Python

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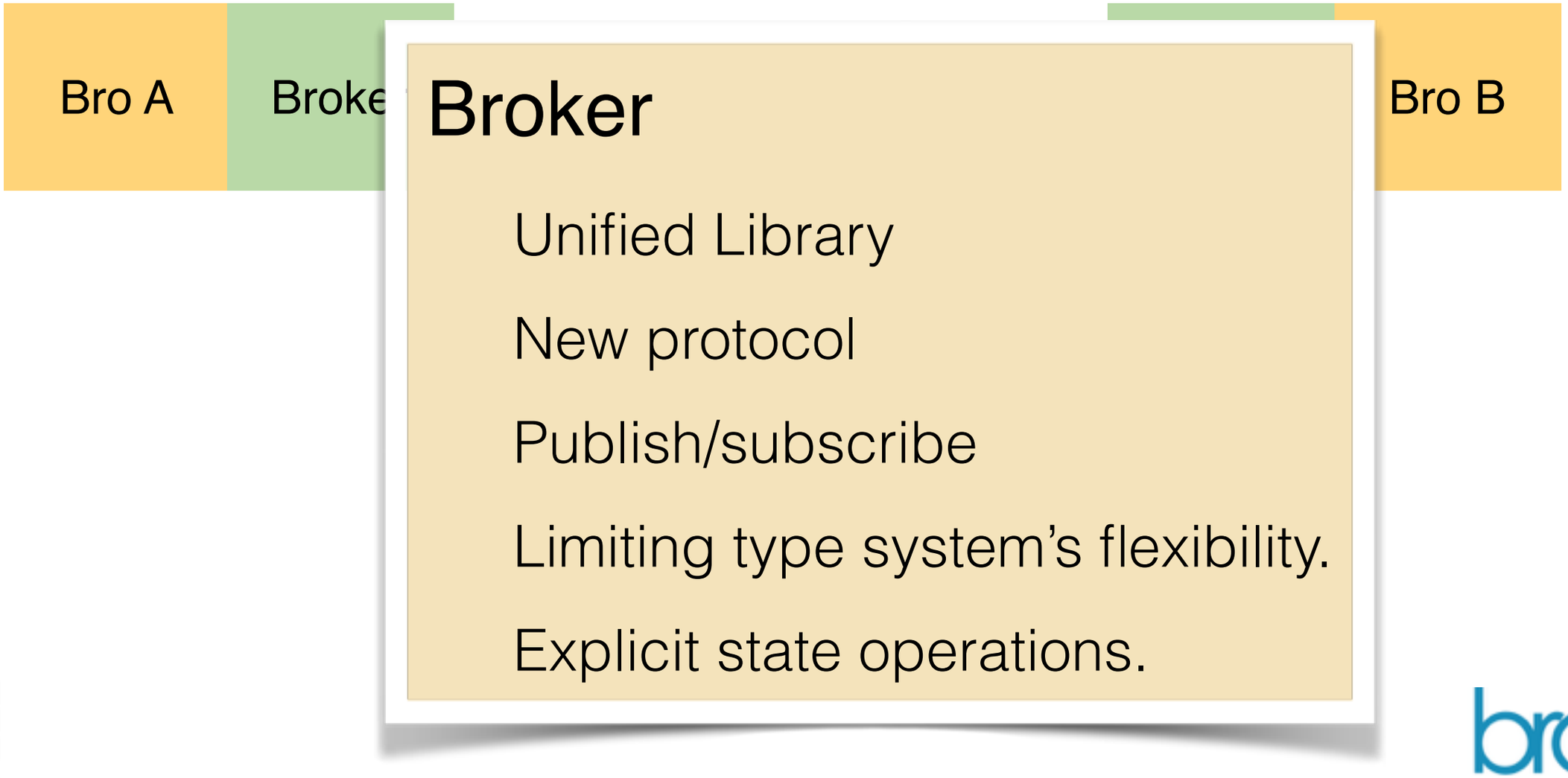


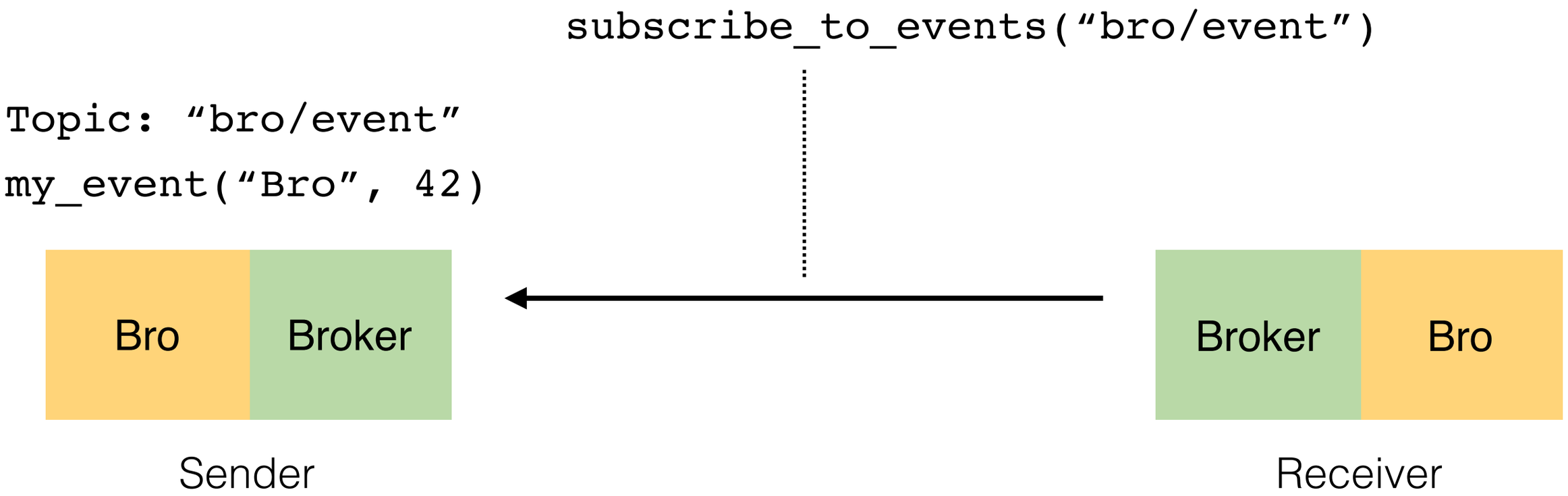
Exchanging Events with Broker

```
my_event(“Bro”, 42)
```

Exchanging Events with Broker

```
Topic: “bro/event”
my_event(“Bro”, 42)
```

Exchanging Events with Broker



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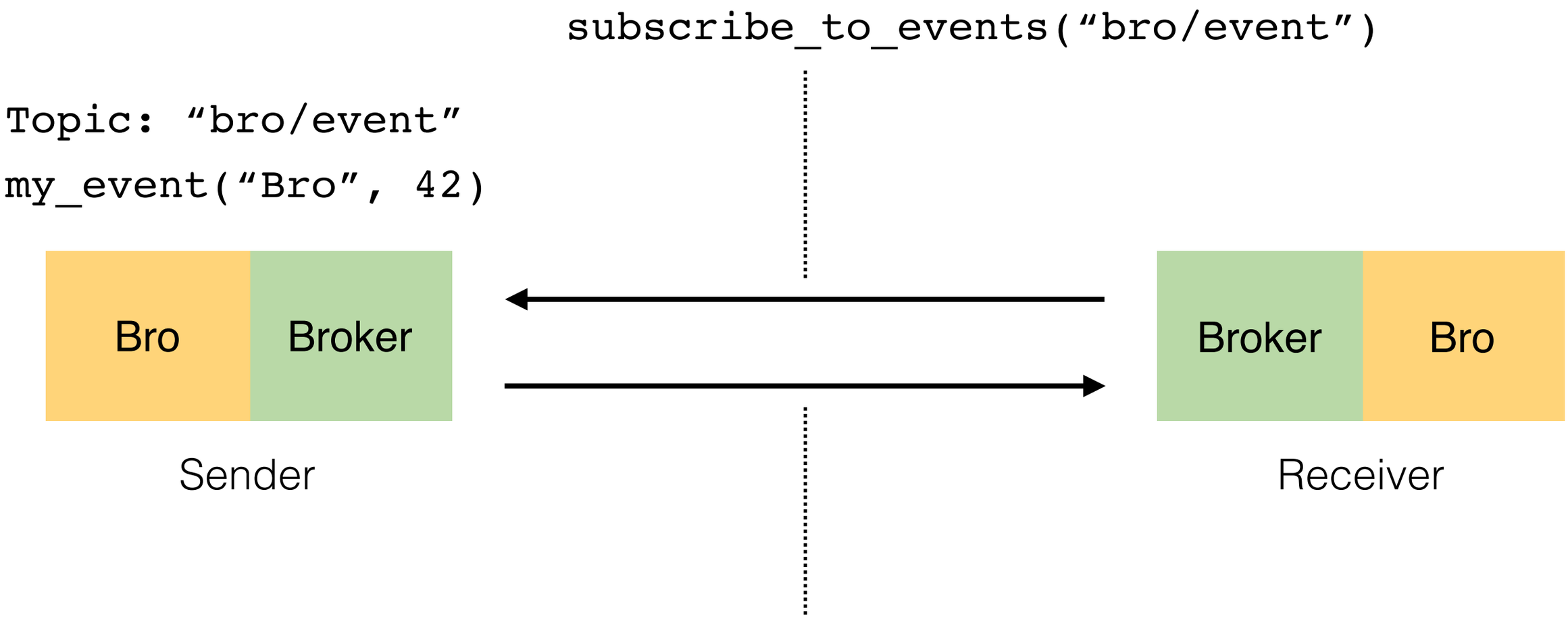

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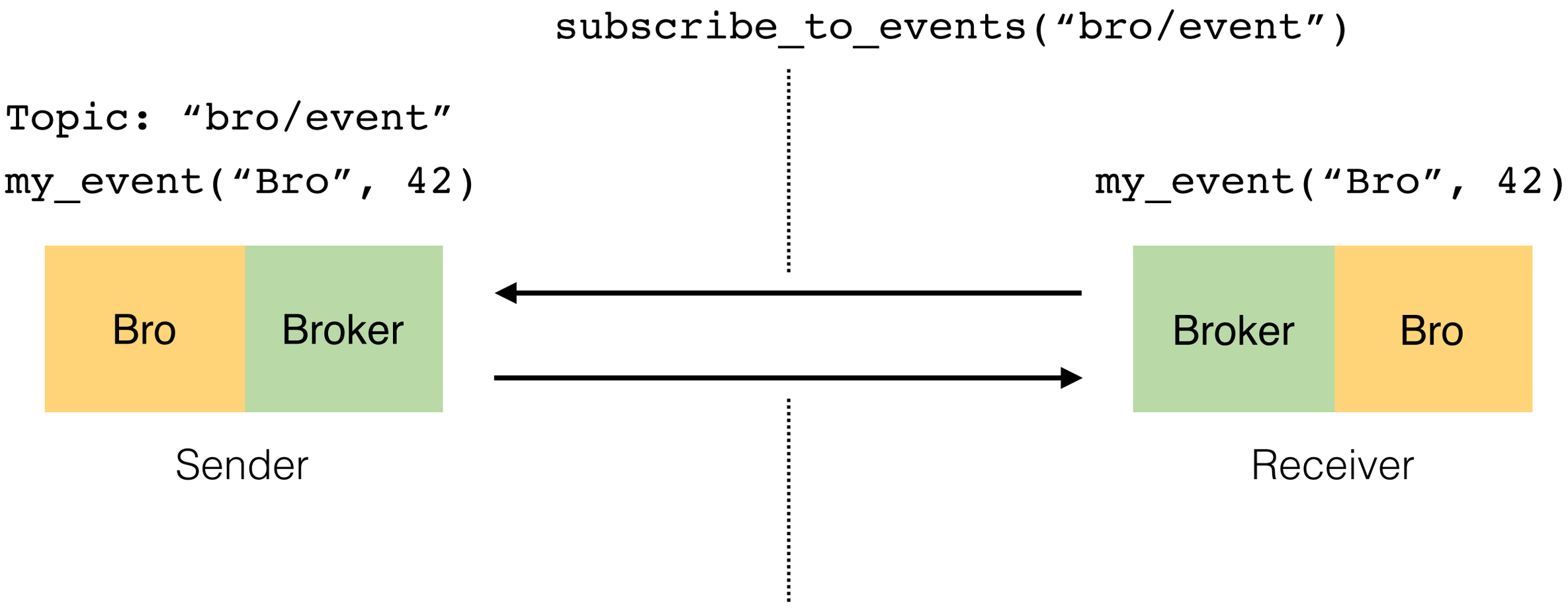


Exchanging Events with Broker

Demo

Forwarding Logs with Broker

```
Log::write(…)
```

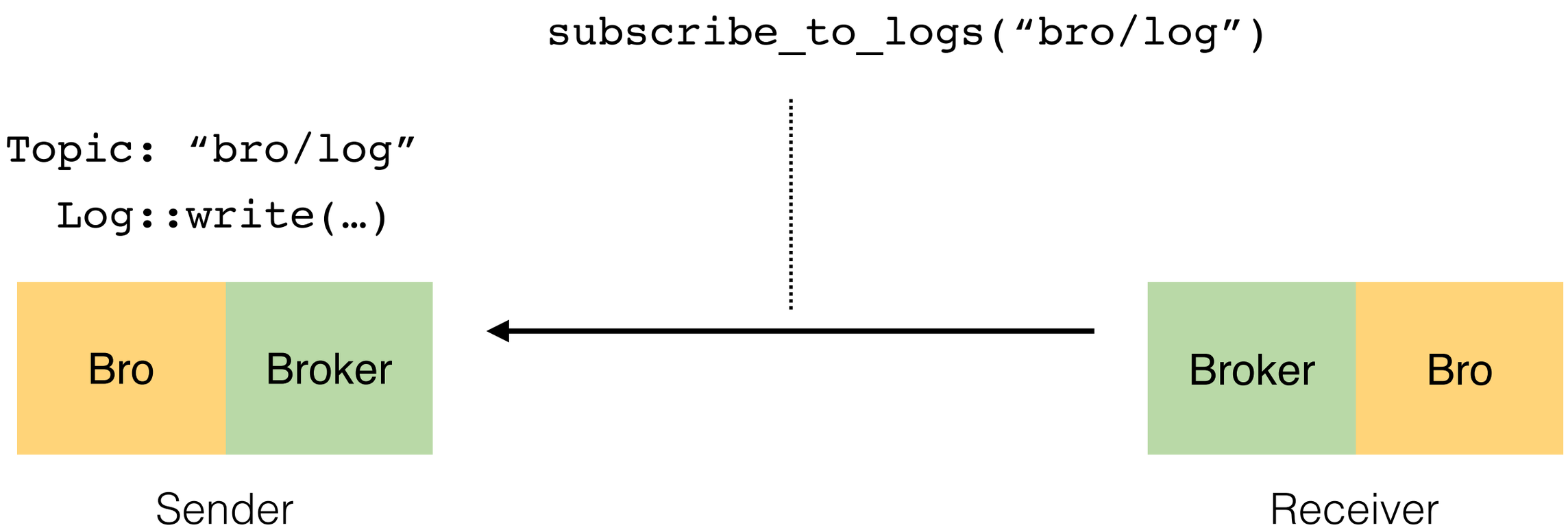
Sender

Receiver

Forwarding Logs with Broker

```
Topic: “bro/log”
  Log::write(…)
```

Forwarding Logs with Broker



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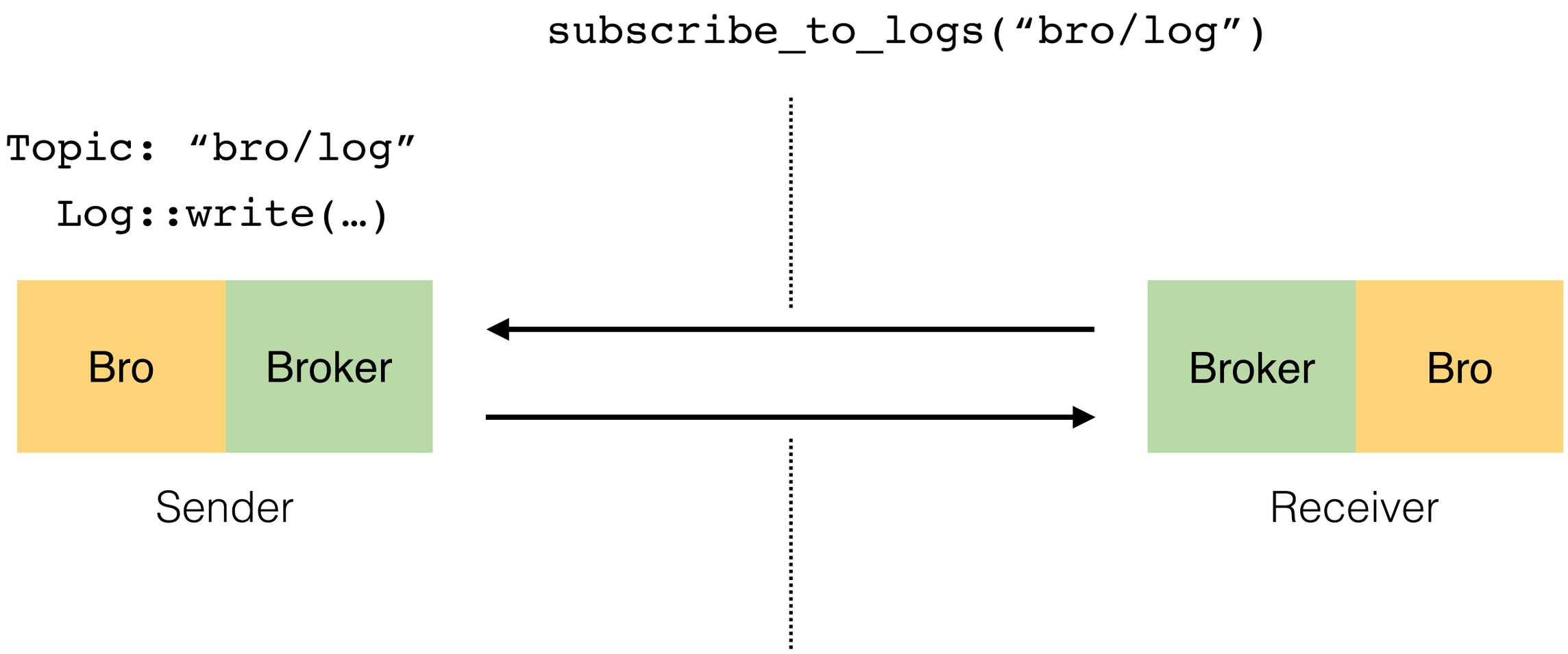

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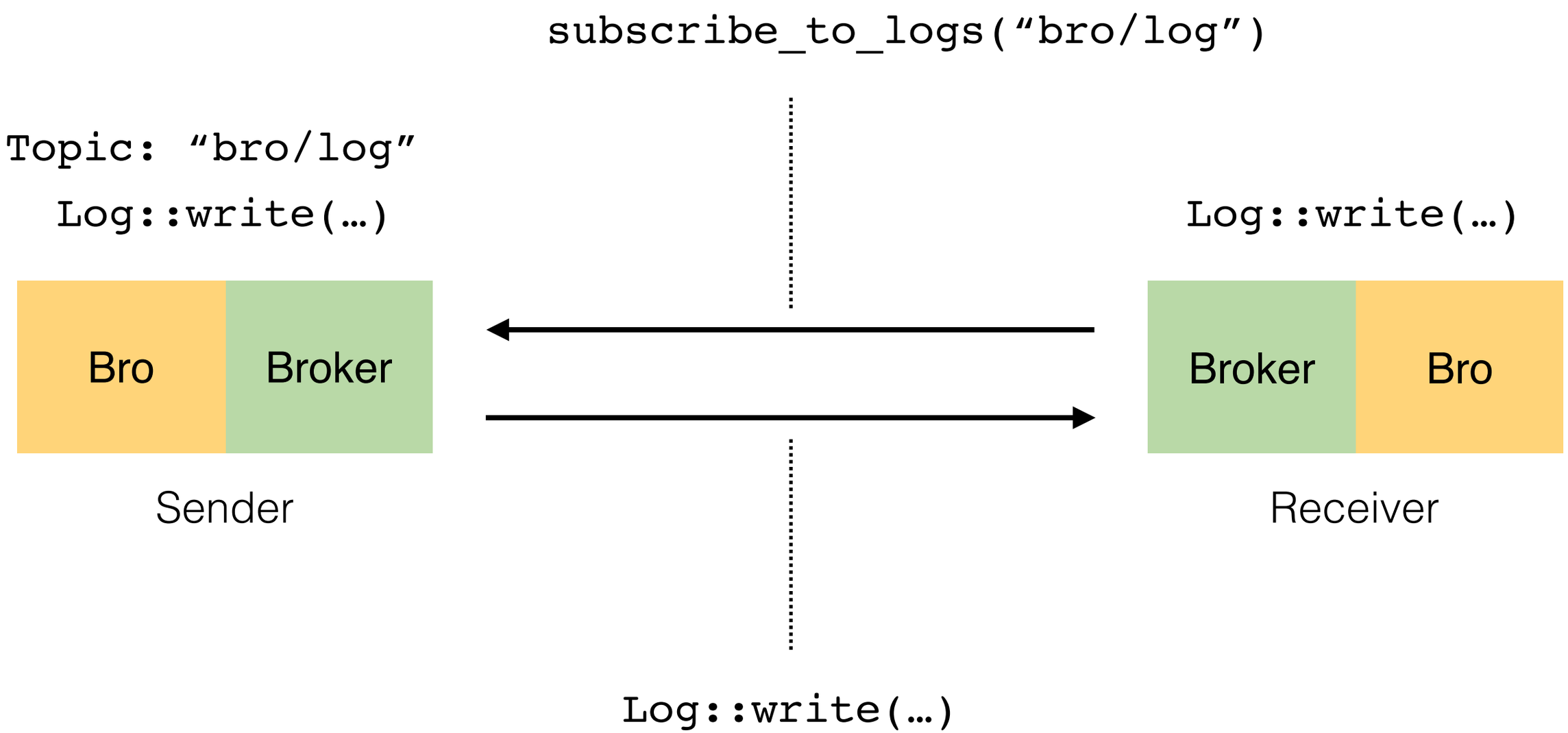

Data Stores with Broker

Data Stores with Broker

Broker maintains global, persistent key/value stores.

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Client

Master

Data Stores with Broker

Broker maintains global, persistent key/value stores.

```
s = create_master("my_store")
```

Data Stores with Broker

Broker maintains global, persistent key/value stores.

```
s = create_master(“my_store”)
insert(s, 192.150.187.12, 21)
```

Data Stores with Broker

Broker maintains global, persistent key/value stores.

```
s = create_master("my_store")
insert(s, 192.150.187.12, 21)
insert(s, 131.159.14.1, 5)
```

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c = create_clone("my_store")
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```
s = create_master("my_store")
insert(s, 192.150.187.12, 21)
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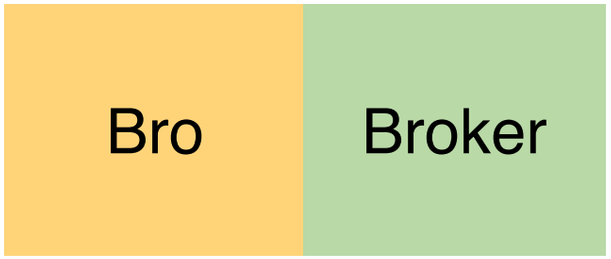
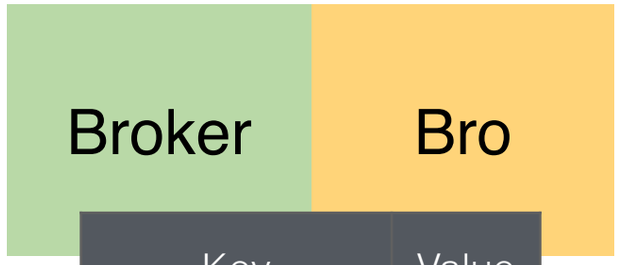


Client



Key	Value
192.150.187.12	21
131.159.14.1	5

Authoritative Version

Data Stores with Broker

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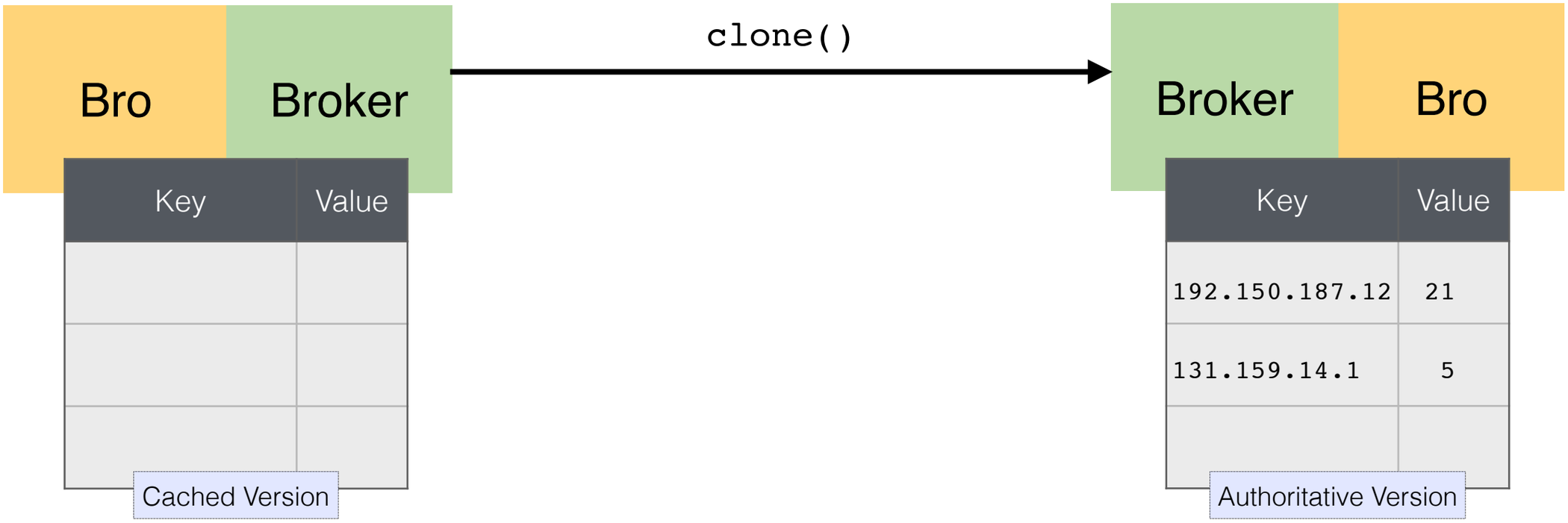

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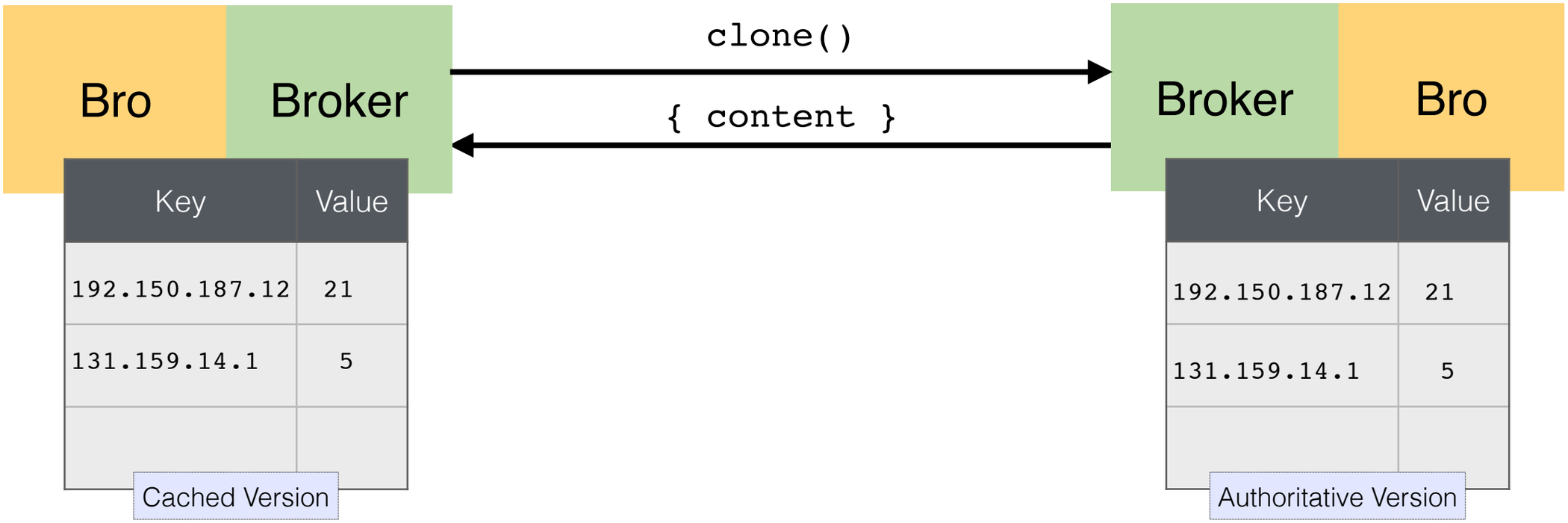

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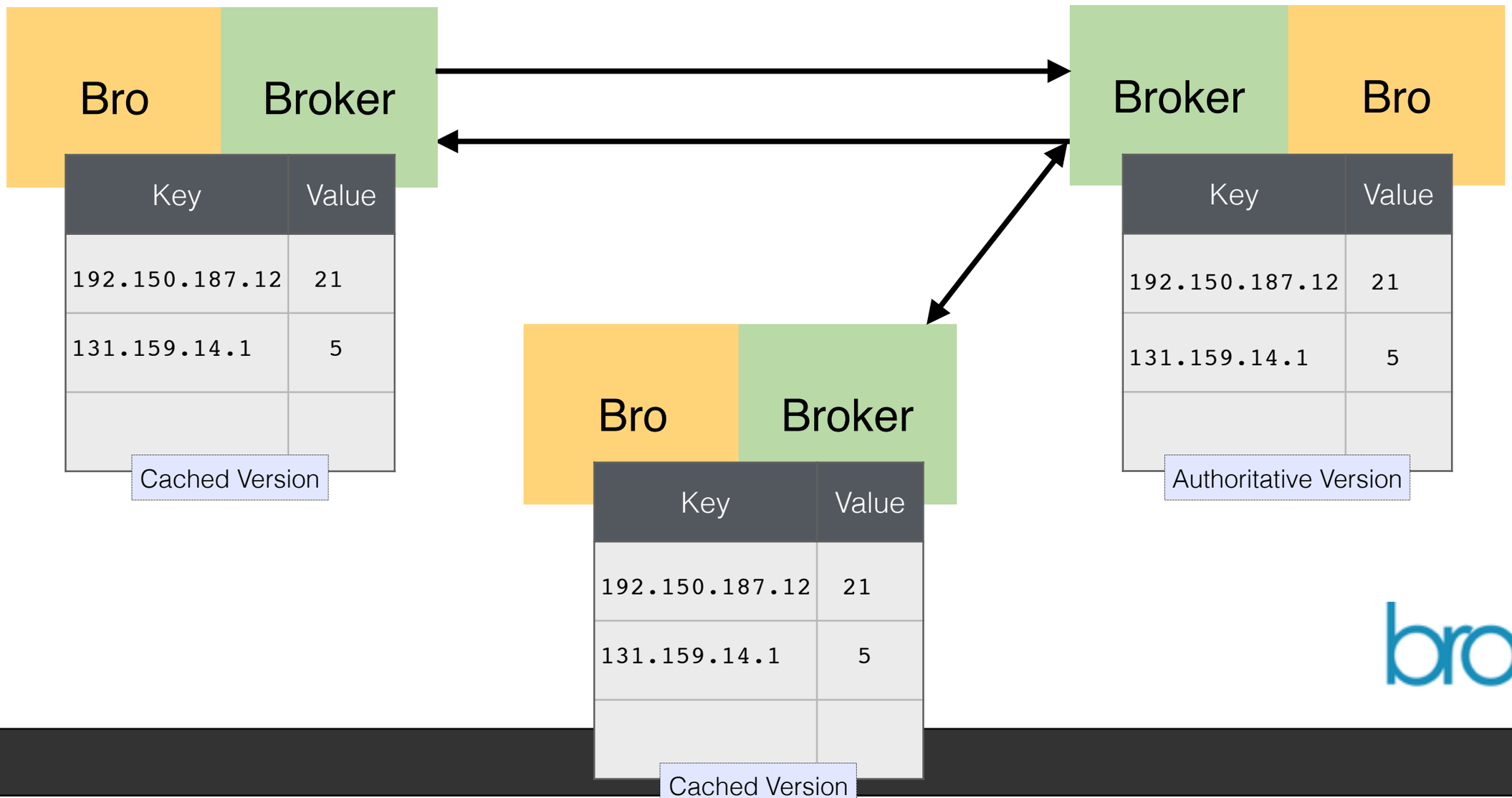

Data Stores with Broker

Broker maintains global, persistent key/value stores.

```
c = create_clone("my_store")
n = lookup(c, 192.150.187.12)
```

```
s = create_master("my_store")
insert(s, 192.150.187.12, 21)
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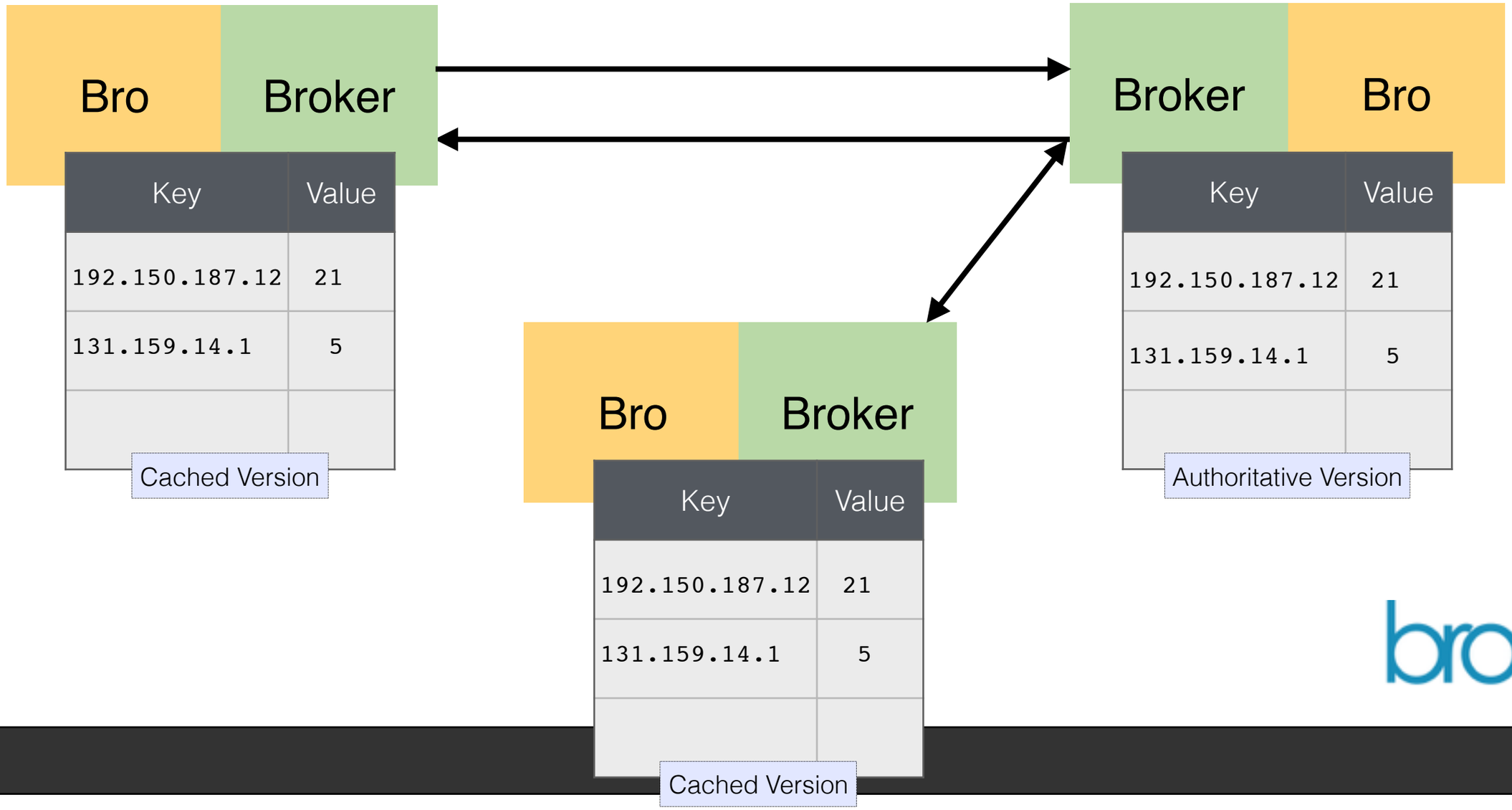
```

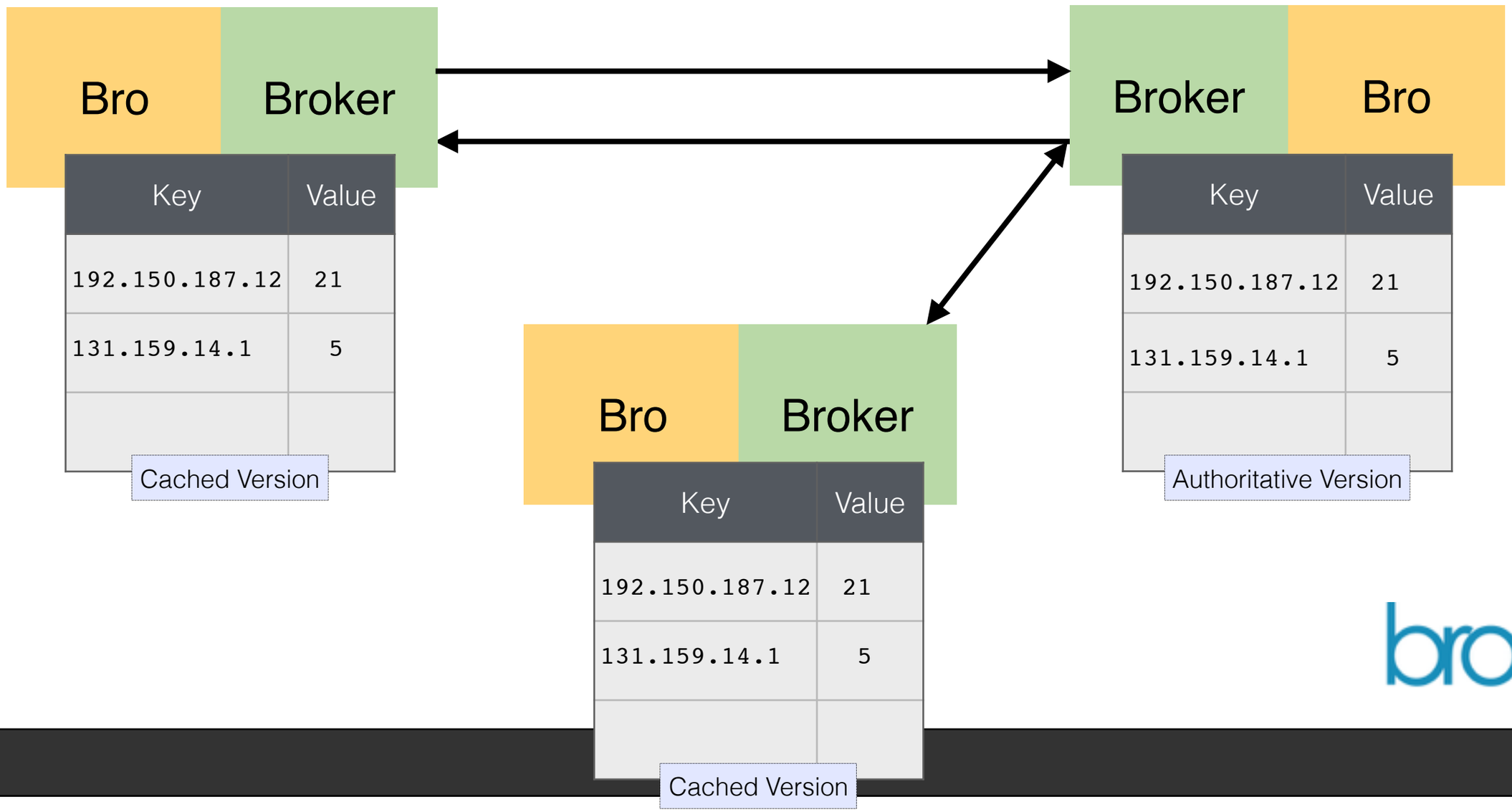


Data Stores with Broker

Broker maintains global, persistent key/value stores.

```
c = create_clone("my_store")
n = lookup(c, 192.150.187.12)
insert(c, 192.150.187.43, 1947)
```

```
s = create_master("my_store")
insert(s, 192.150.187.12, 21)
insert(s, 131.159.14.1, 5)
```



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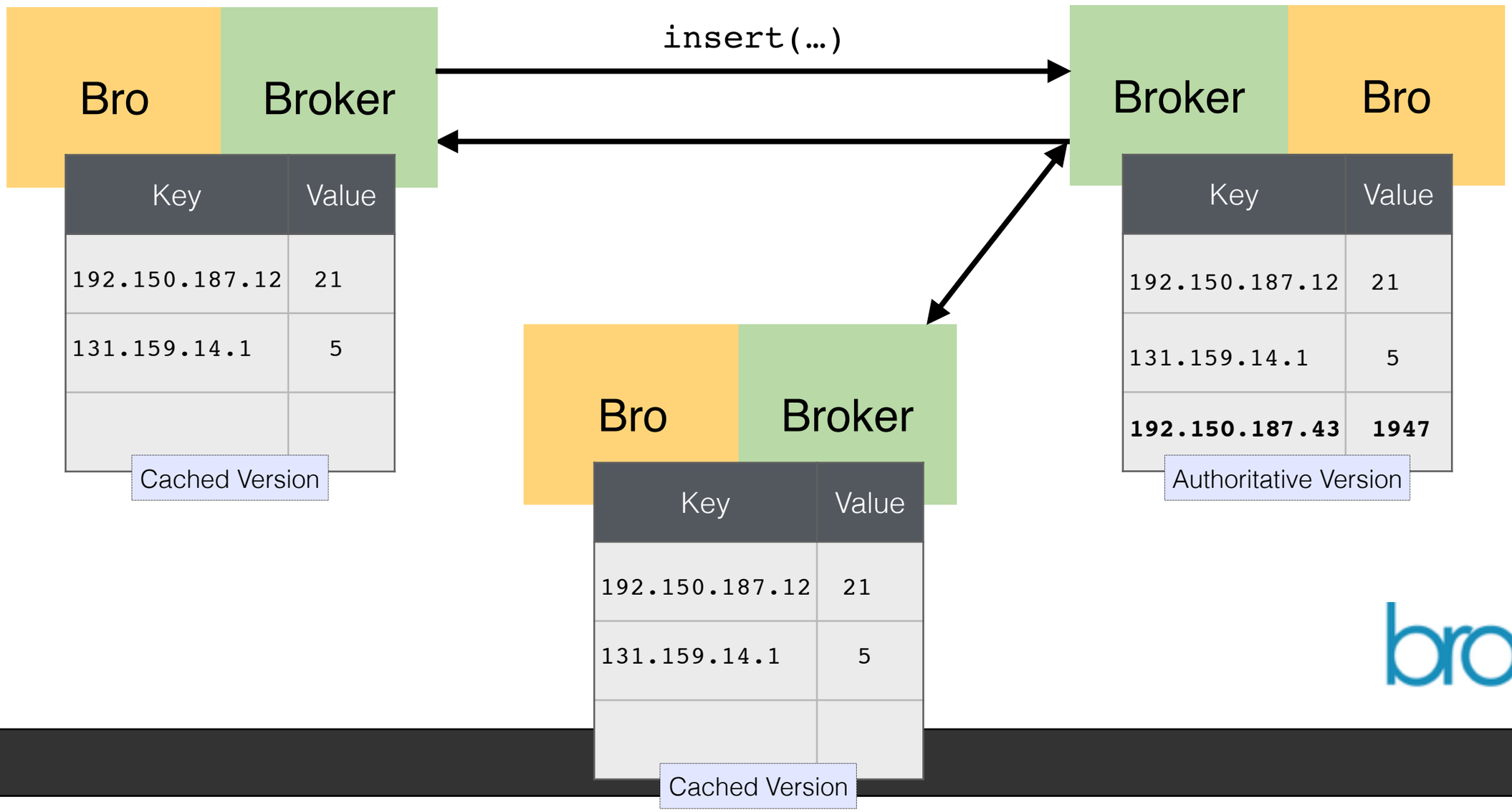

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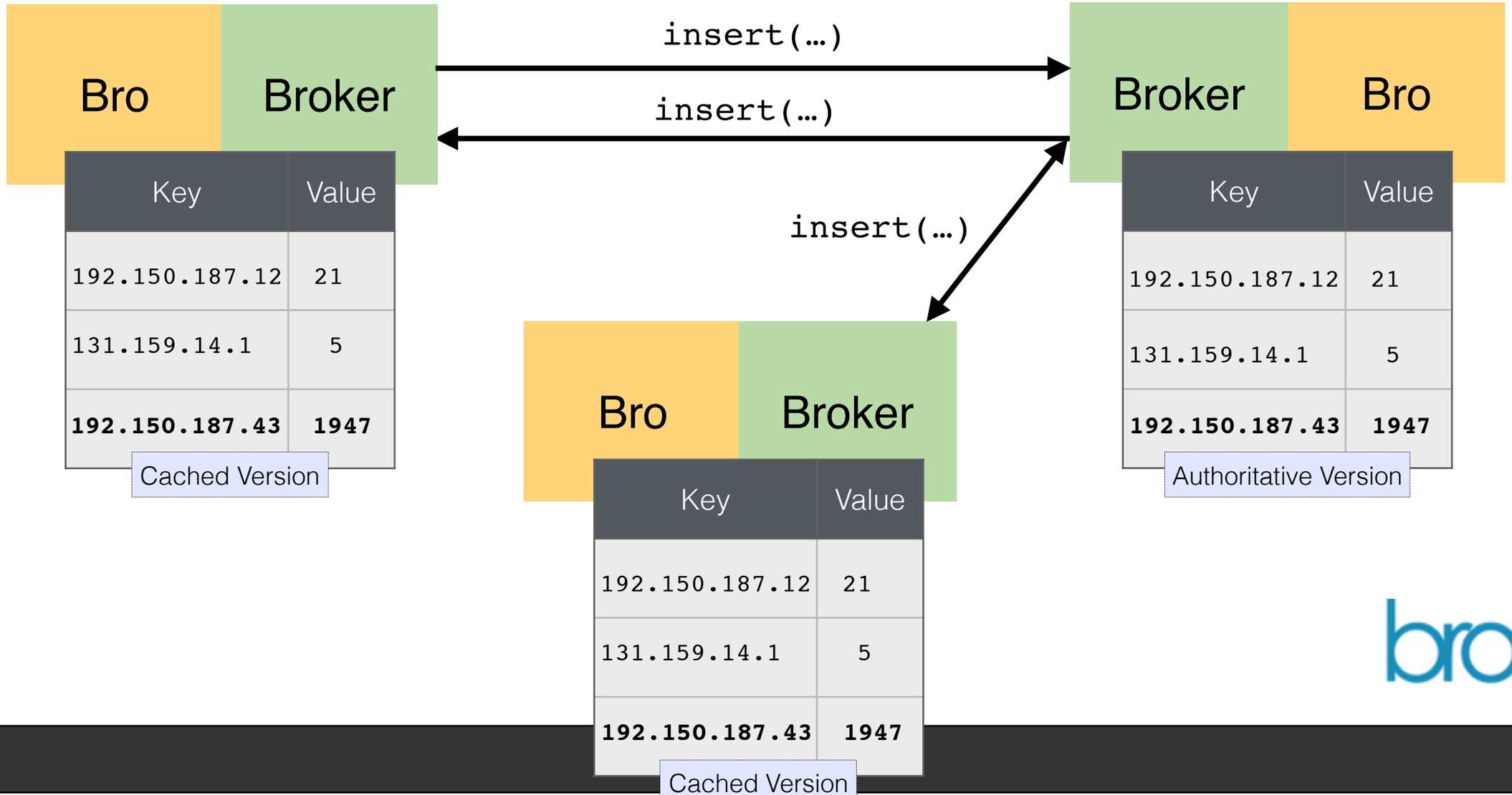

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192.150.187.43	**1947**

Cached Version

Key	Value
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131.159.14.1	5
192.150.187.43	**1947**

Authoritative Version

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Cached Version

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Demo

Data Store Features

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Data Types

Supports Bro data types for keys & values.

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Operations

- Increment/decrement.
- Set insert/delete.
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- Automatic expiry.

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Persistence

Choice of SQLite or RocksDB.

Broker Bits & Pieces

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Fine-granular Subscription Model

- All elements come with a topic or name.
- Prefixed-based subscription for topics.
- Fine control what's published and subscribed to.

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Security Model

- Peers are assumed to be trustworthy.
- Currently no encryption/authentication; SSL later.

Broker's Foundation: CAF

C++ Actor Framework

http://actor-framework.org

Broker's Foundation: CAF

C++ Actor Framework

- Concurrency through Erlang-style lightweight actors.
- Concise messaging API.
- Network-transparency abstracting transport.
- Efficient and adaptive.
- BSD license.

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Trade-Offs

- Needs a C++11 compiler.
- Introduces a new, non-standard dependency.

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The Future: A “Stateful Deep Cluster”

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Example: Geographically distributed organization.

Global Master

Bro

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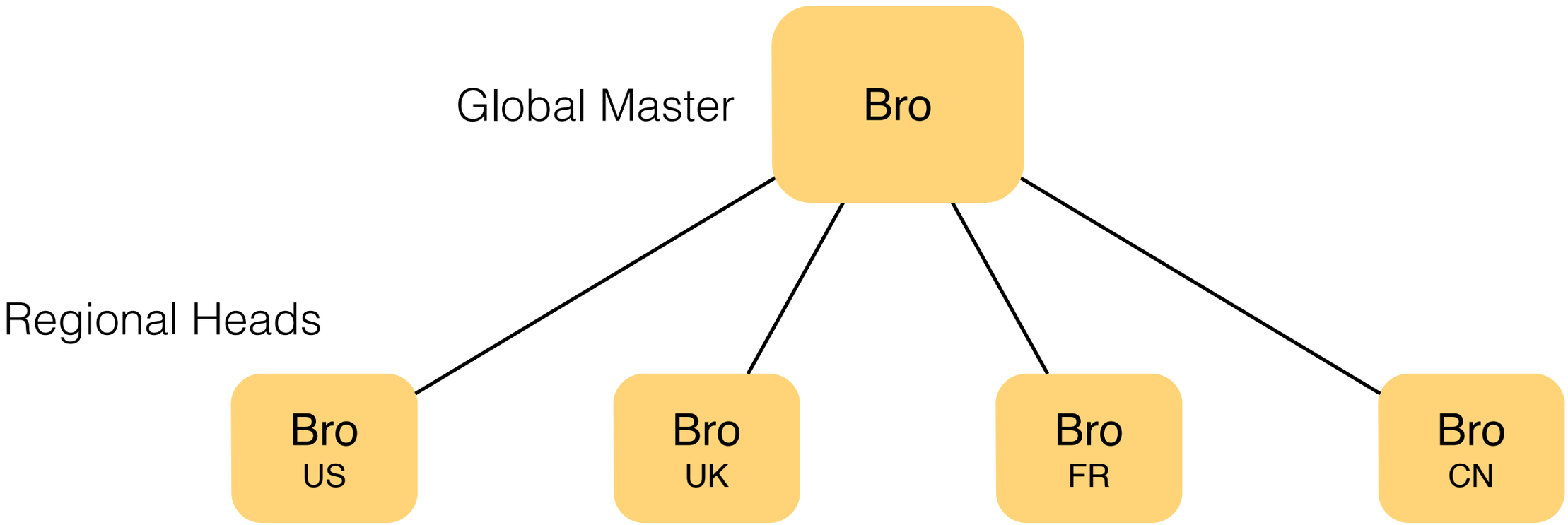

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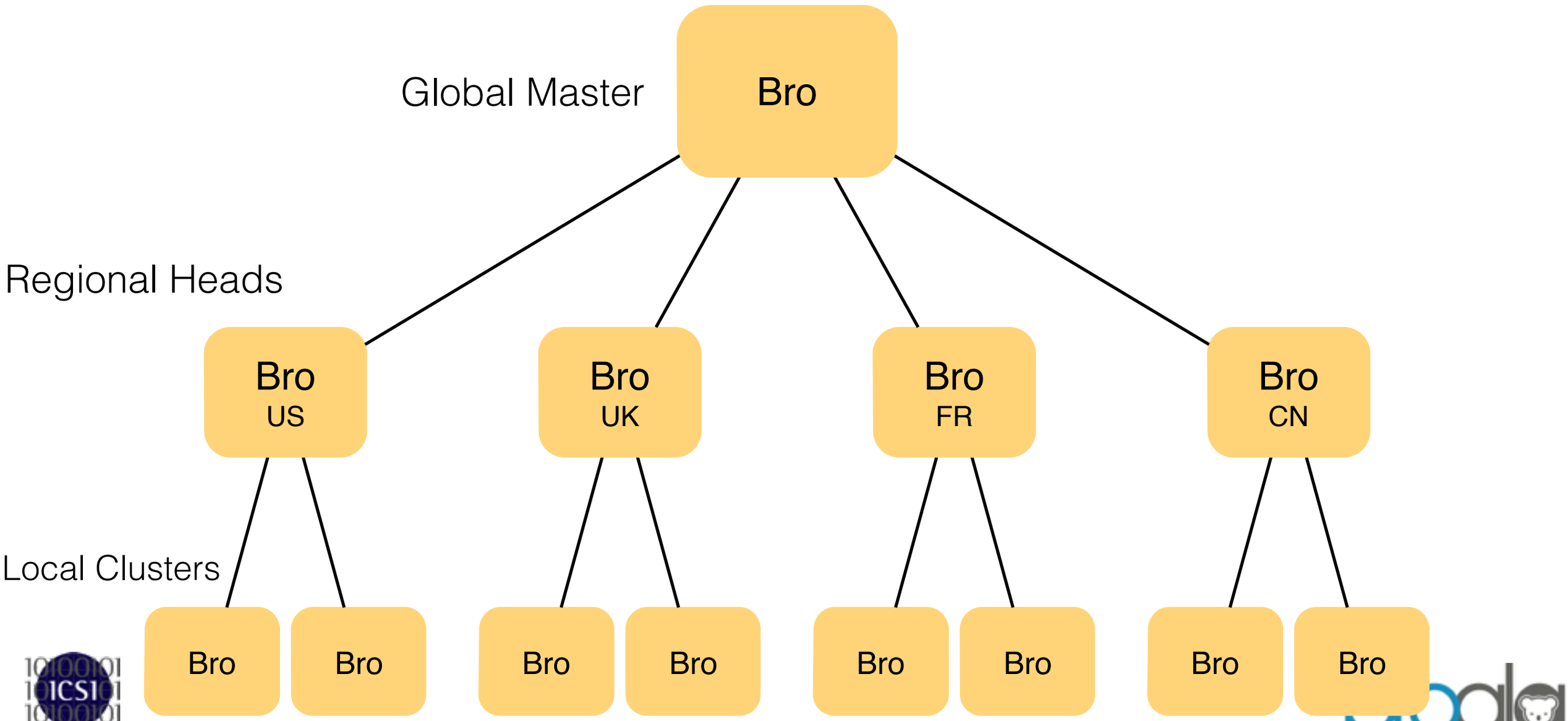

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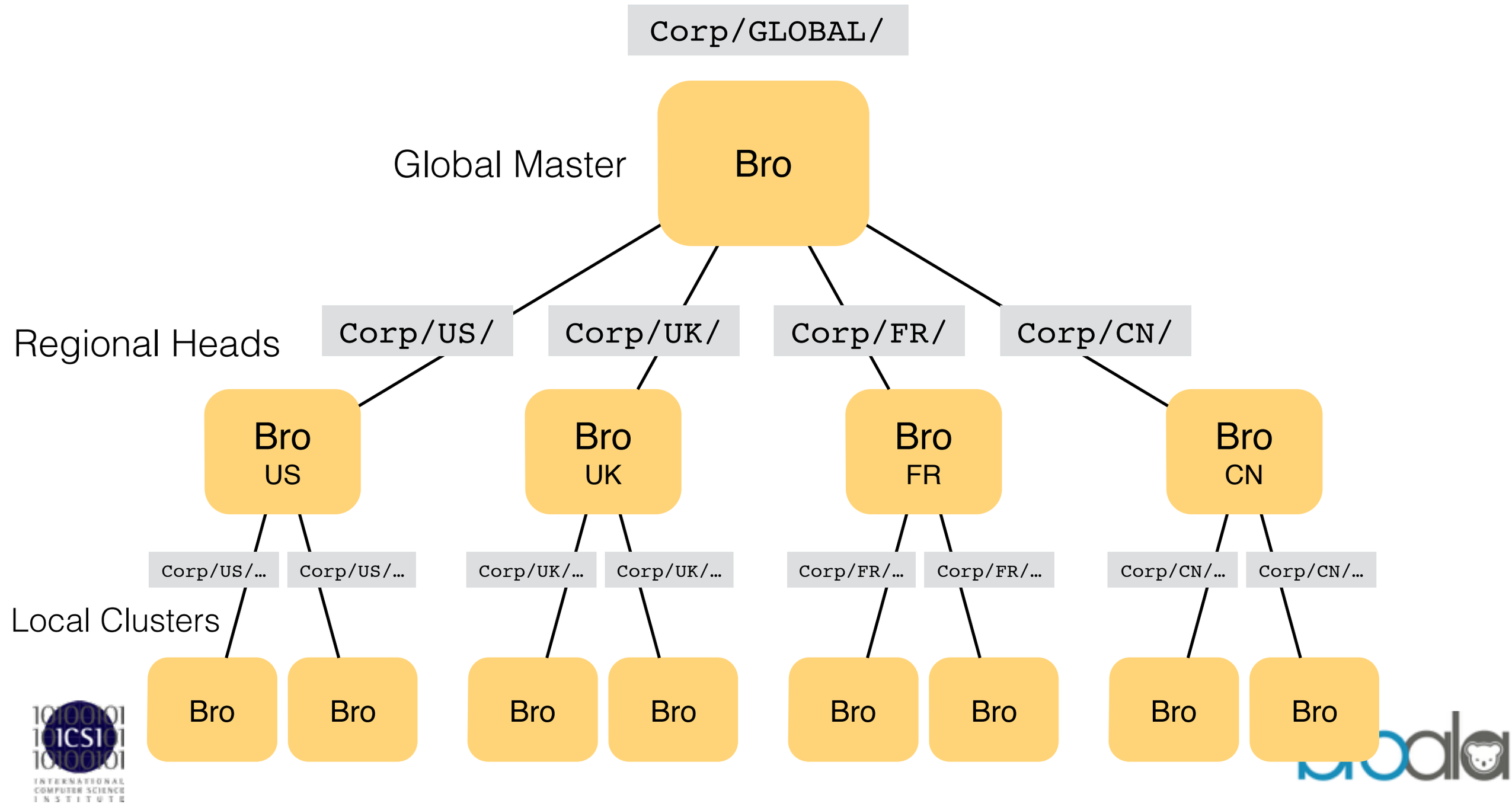

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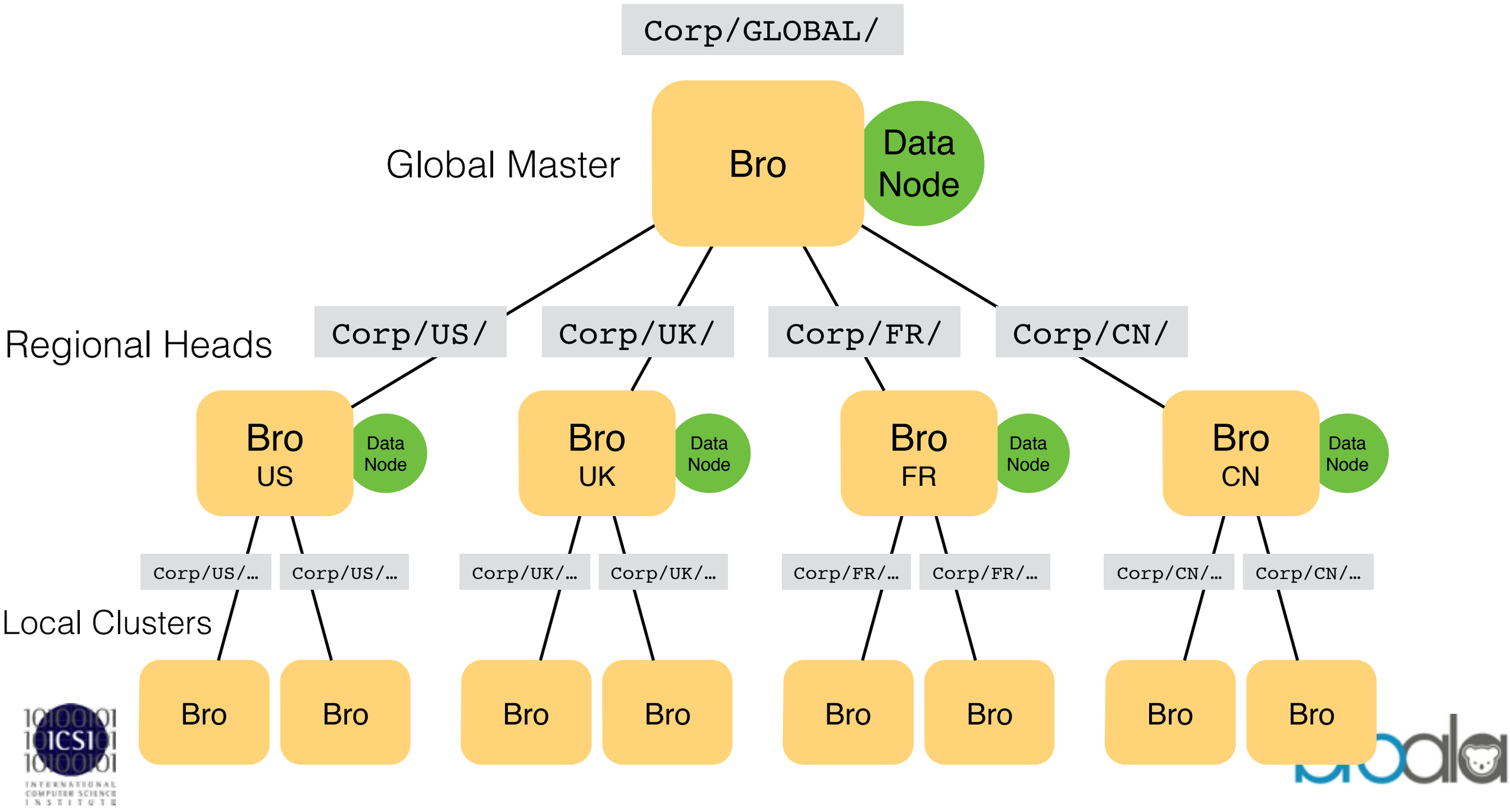

Broker, beyond Bro

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Distributed,

real-time

publish/subscribe

platform,

with a data model.

broala

What This All Means for You Right Now

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Credit for Broker goes to Jon Siwek!

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