Idempotency in Payment Syetem

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Idempotency

- Idempotency means clients can make the same call repeatedly and produce the same result

Exactly-once

- It is executed at least once

- At the same time, it is executed at most once
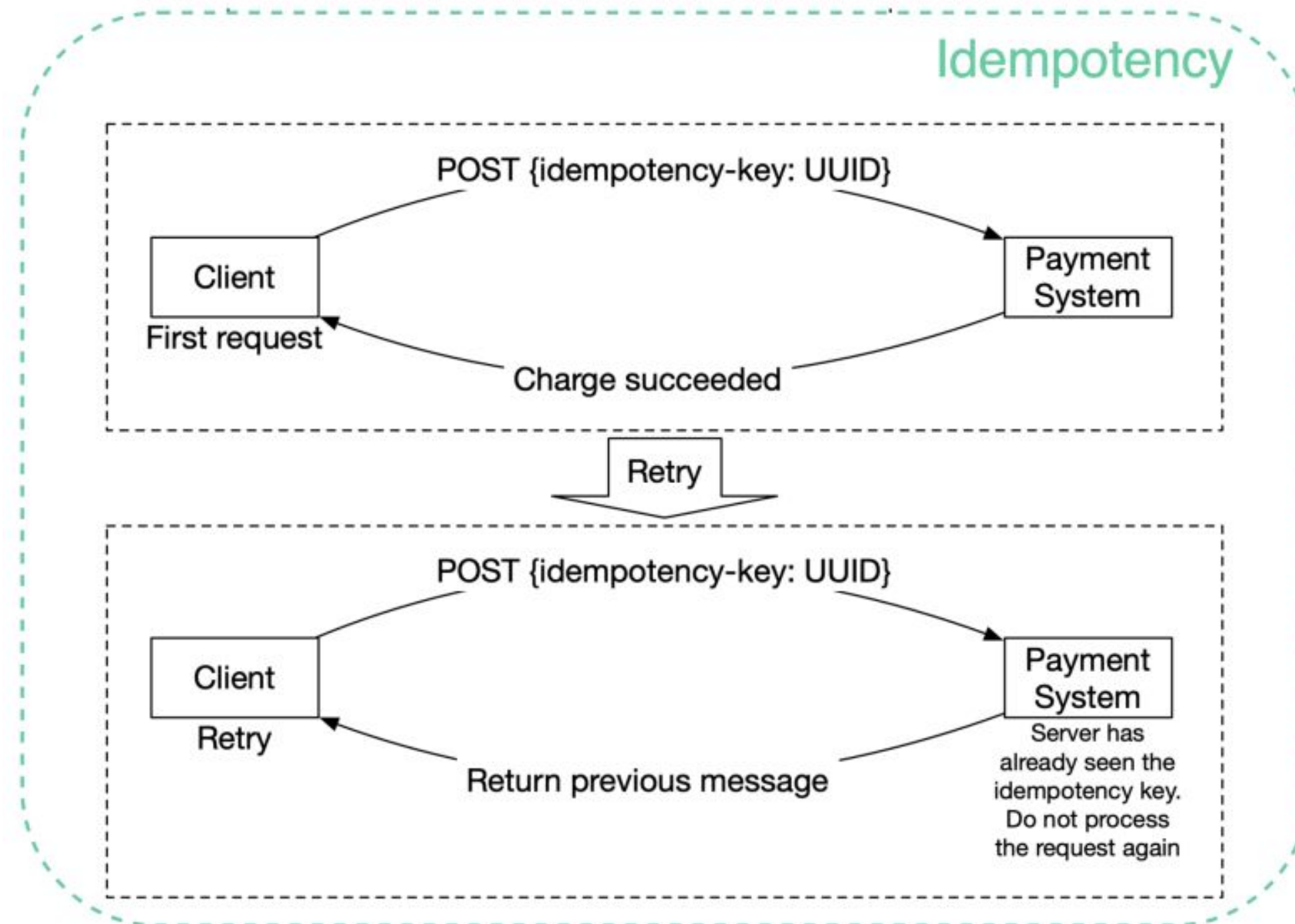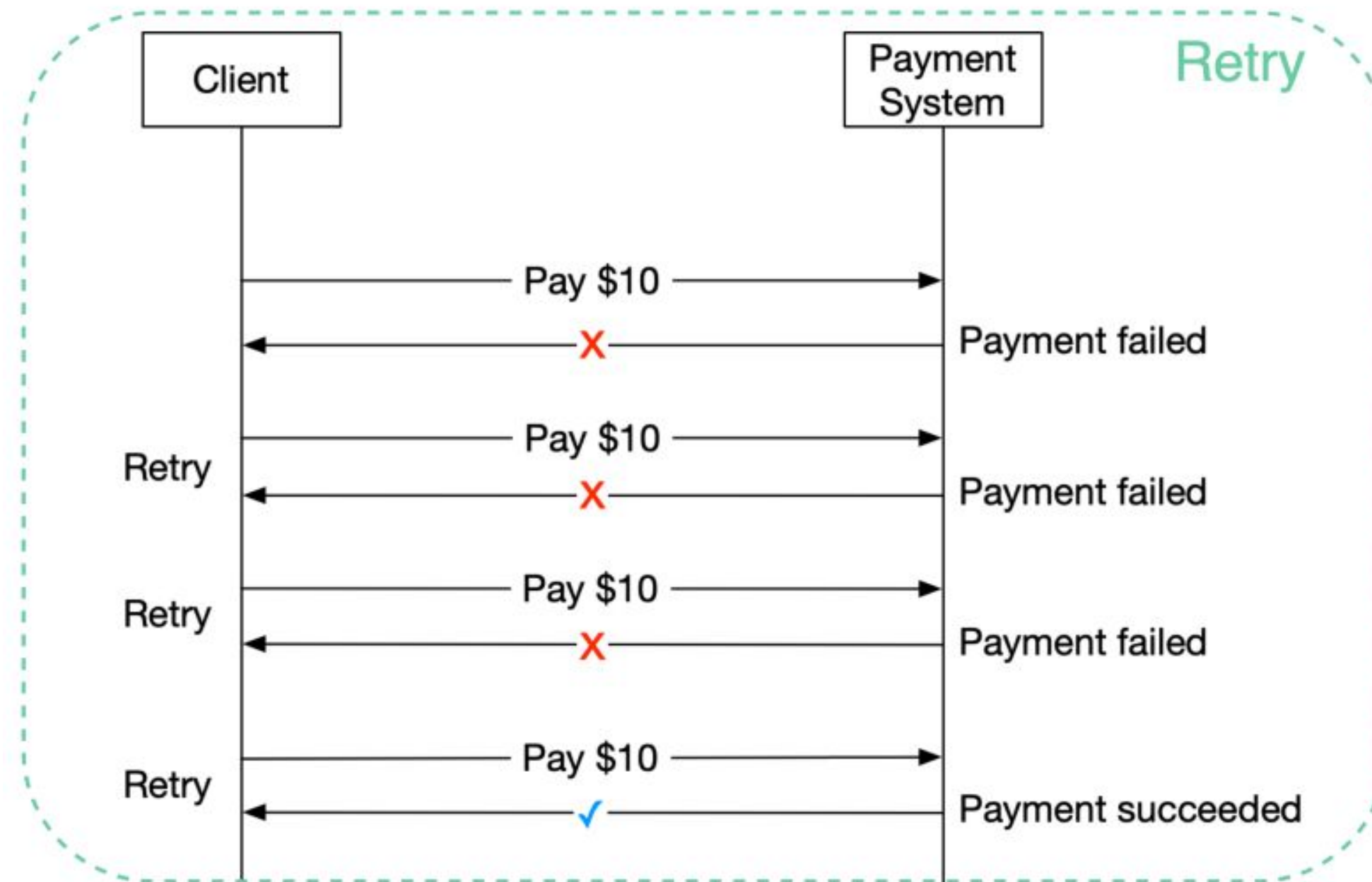
At Least Once

- **Retry** a payment transaction due to system errors or timeout

At Most Once

- An **idempotency key** is a unique value that's generated by a client and sent to an API along with a request. The server stores the key to use for bookkeeping the status of that request on its end.

- An idempotency key is added to the HTTP header: <idempotency-key:key_value> when performing an idempotent payment request

```
curl https://api.stripe.com/v1/charges \
  -u sk_test_4eC39HqLyjWDarjtT1zdp7dc: \
  -H "Idempotency-Key: cOvzds47EMQ1rOuE" \
  -d amount=2000 \
  -d currency=usd \
  -d description="My First Test Charge (created for API docs)" \
  -d source=tok_amex
```

How to avoid double payment

Retry

Client | Payment System

Pay $10 →
← ✗ Payment failed

Retry
Pay $10 →
← ✗ Payment failed

Retry
Pay $10 →
← ✗ Payment failed

Retry
Pay $10 →
← ✓ Payment succeeded

Idempotency

POST {idempotency-key: UUID}
Client → Payment System
First request
← Charge succeeded

Retry

POST {idempotency-key: UUID}
Client → Payment System
Retry
← Return previous message

Server has already seen the idempotency key. Do not process the request again

Reference

- https://stripe.com/docs/api/idempotent_requests