

A glass bottle lies on a sandy beach, partially submerged in the gentle waves of the ocean. The background shows a vast expanse of water meeting a clear blue sky, with distant hills visible on the horizon. The scene is peaceful and evokes a sense of hope and discovery.

# Don't put your messages in a bottle

Implement messaging patterns

# Speaker Bio



**Eldert Grootenboer**

He/Him

Program Manager - Azure Service Bus

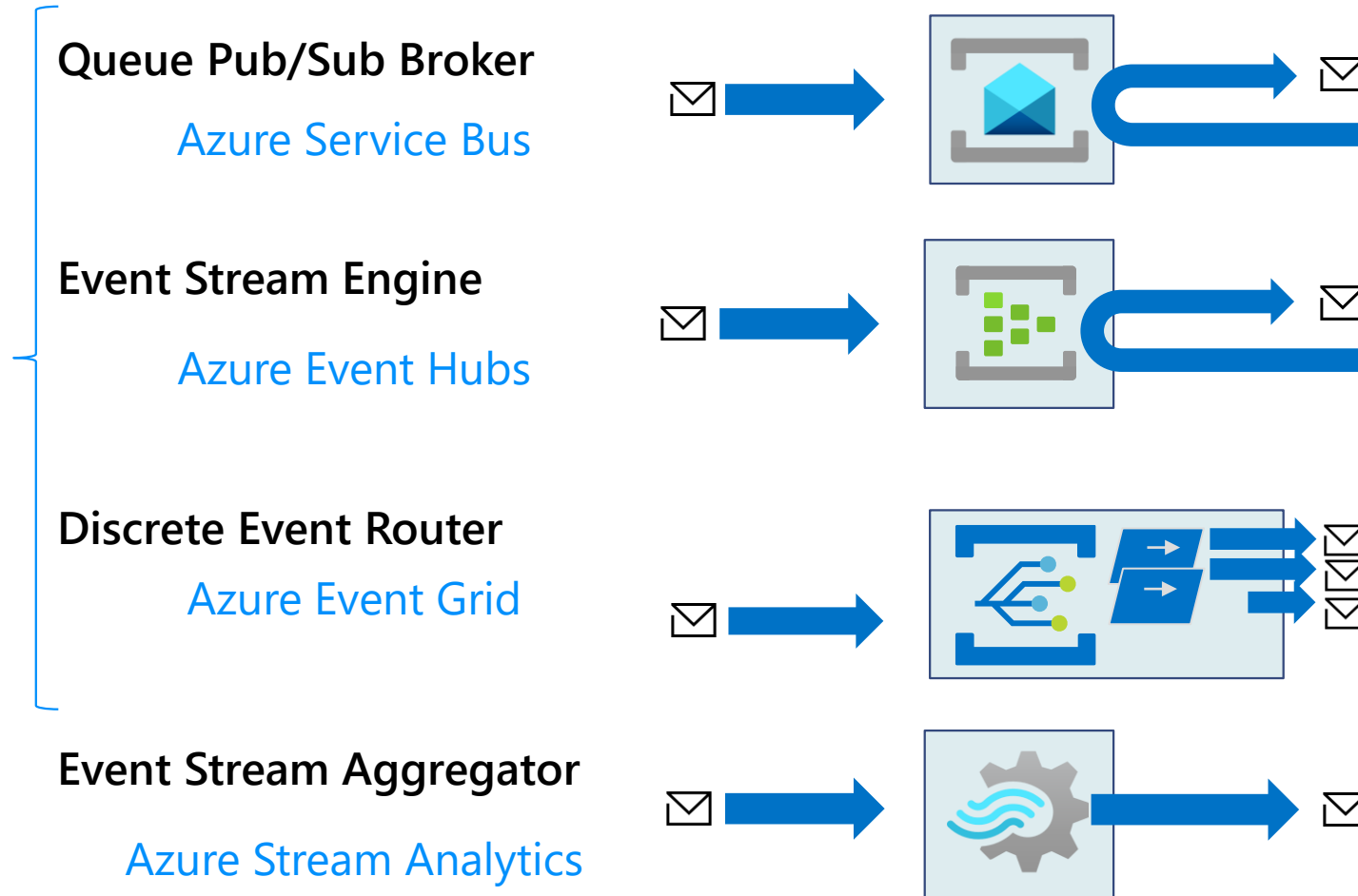
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egrootenboer@microsoft.com



# Azure Messaging Platform

Messages vs. events



Pull-style, queue-based transfer of jobs and control via message queues and topics

Partitioned, high-volume, tape-drive-style sequential recording and unlimited, pull-style re-reads of event streams.

Push-style distribution of discrete events to serverless workloads or other messaging infrastructures

Stateful transformation and analytics of event streams yielding event streams and discrete events as continuous output



# Messaging Patterns

# What are messaging patterns



Recurring scenarios



Abstract



Reusable

# Why use messaging patterns



Don't reinvent the wheel



Use experts' experience



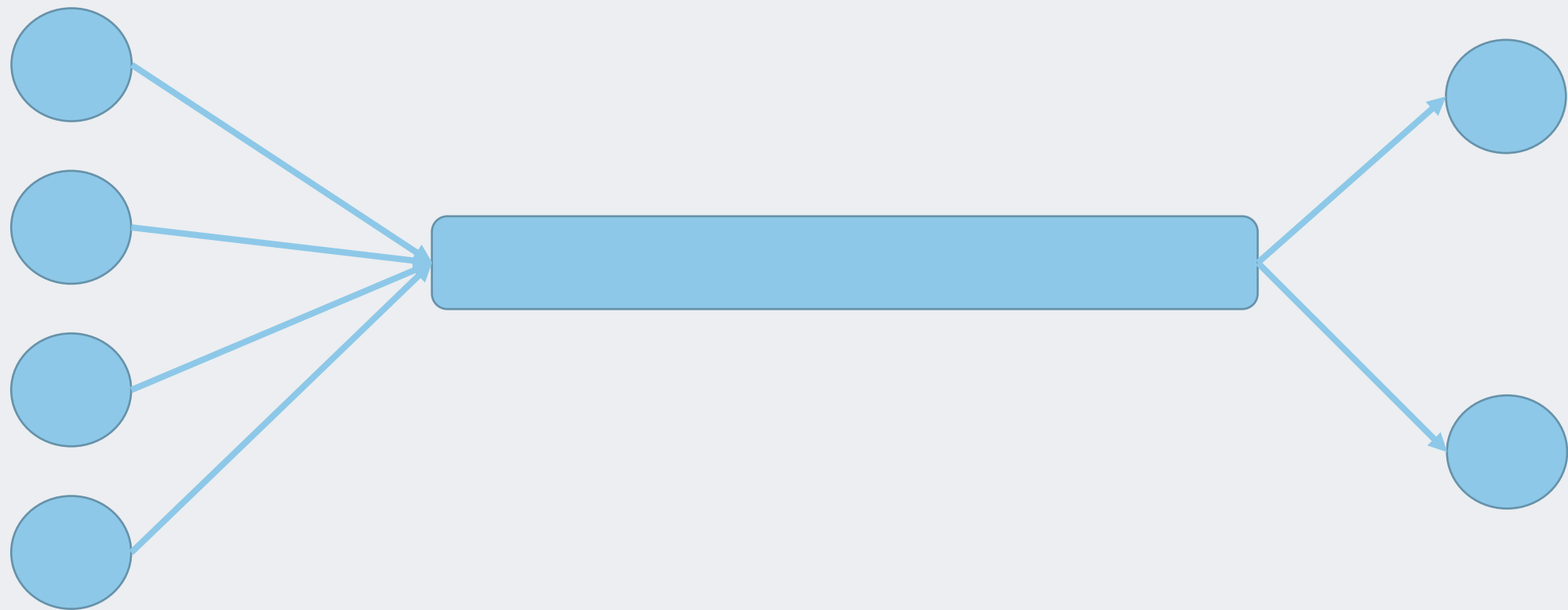
Standards



# Competing Consumers

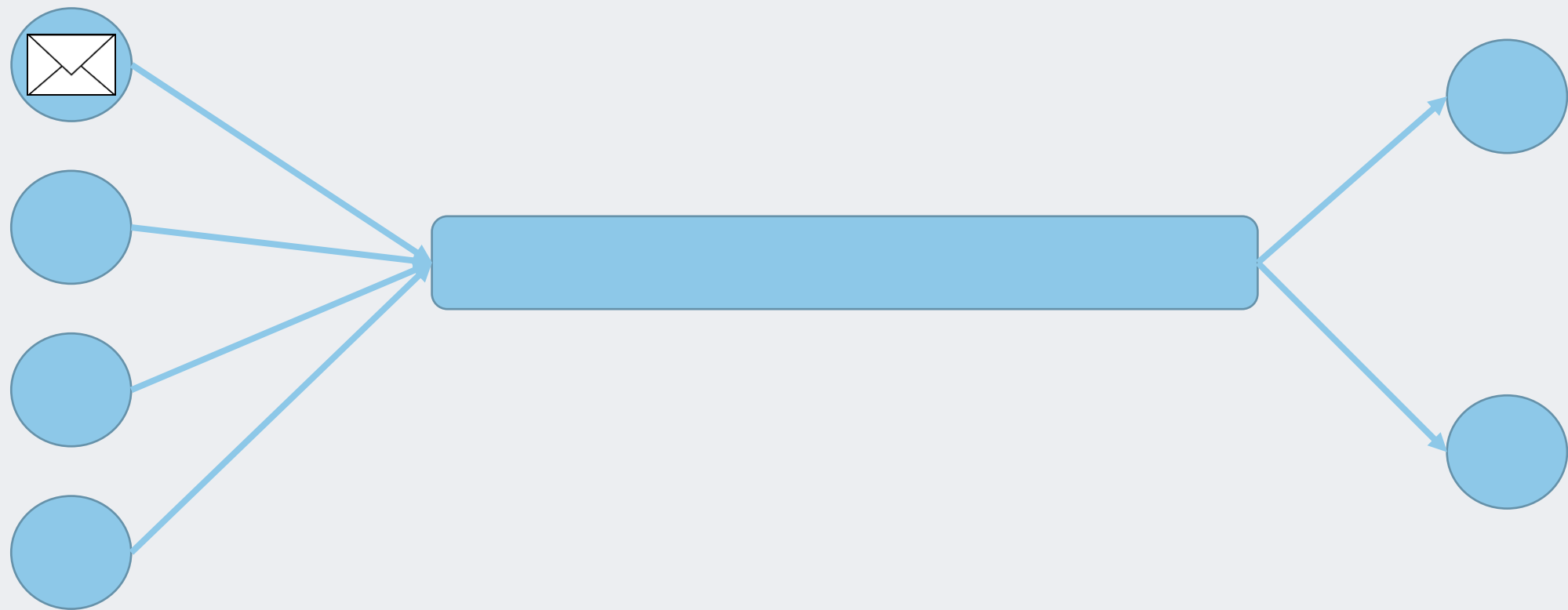
<https://docs.microsoft.com/en-us/azure/architecture/patterns/competing-consumers>

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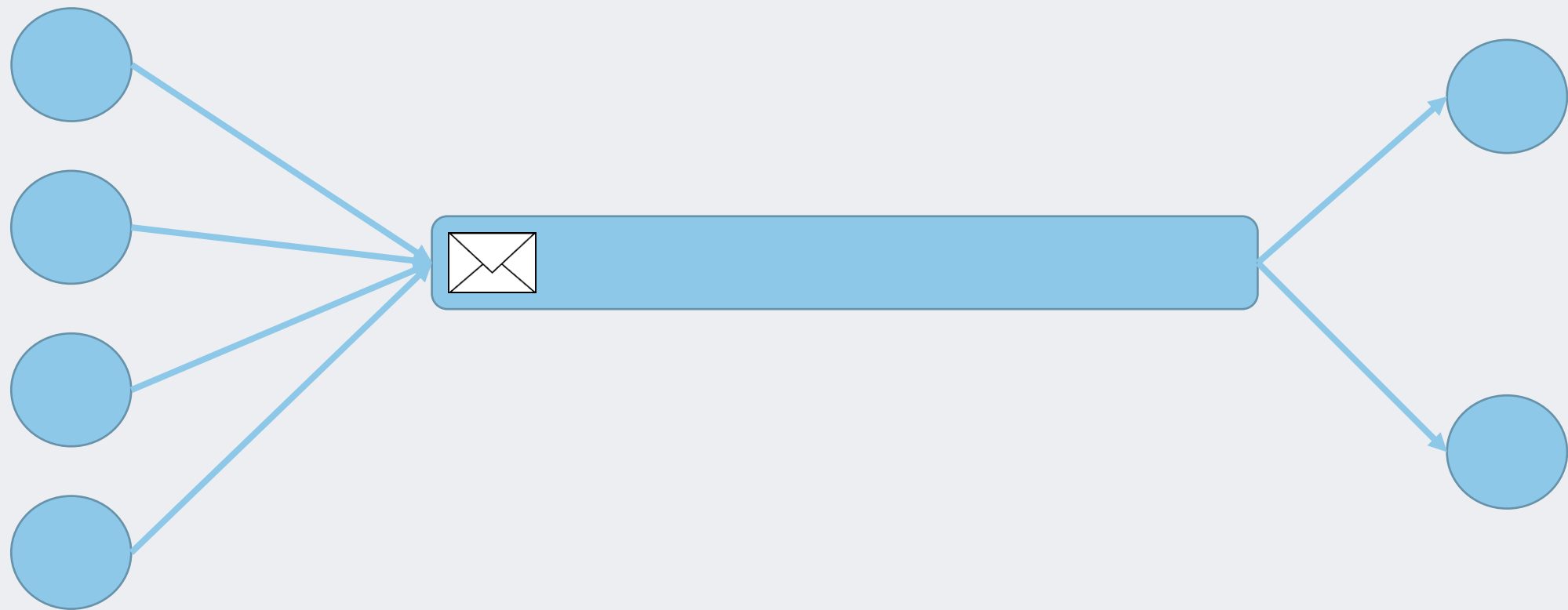




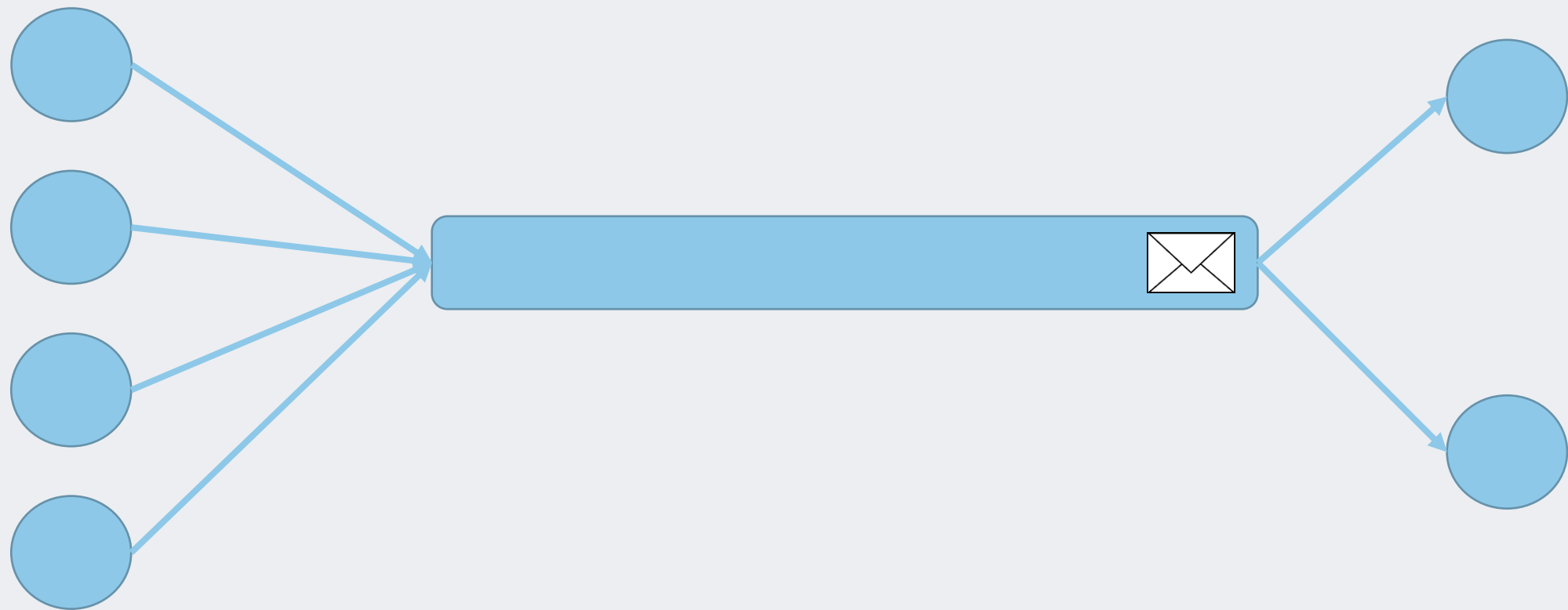
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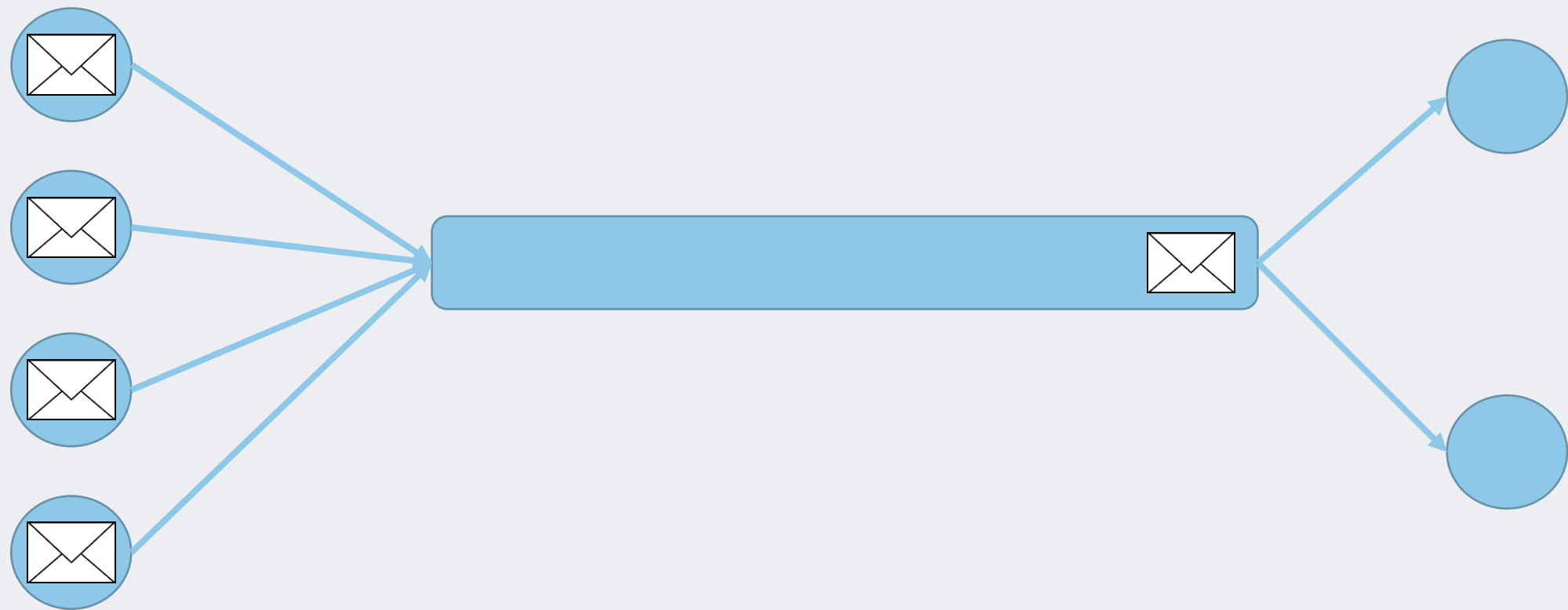
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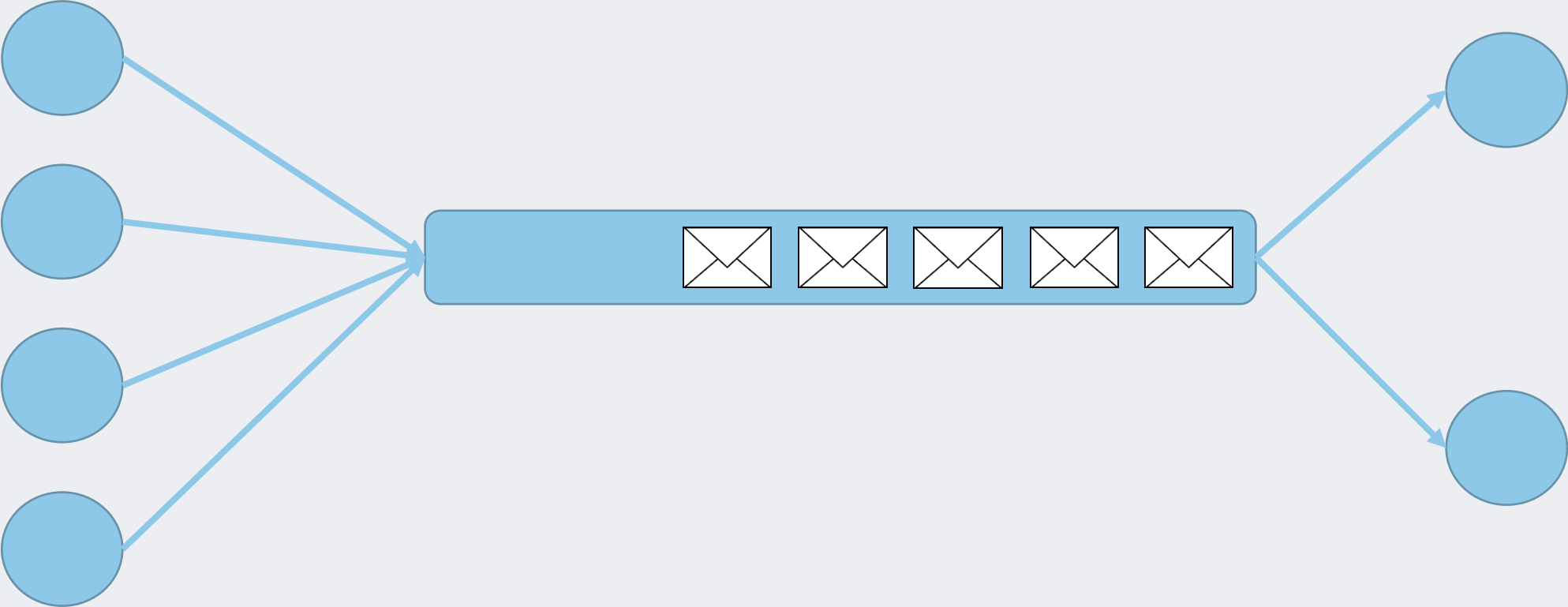
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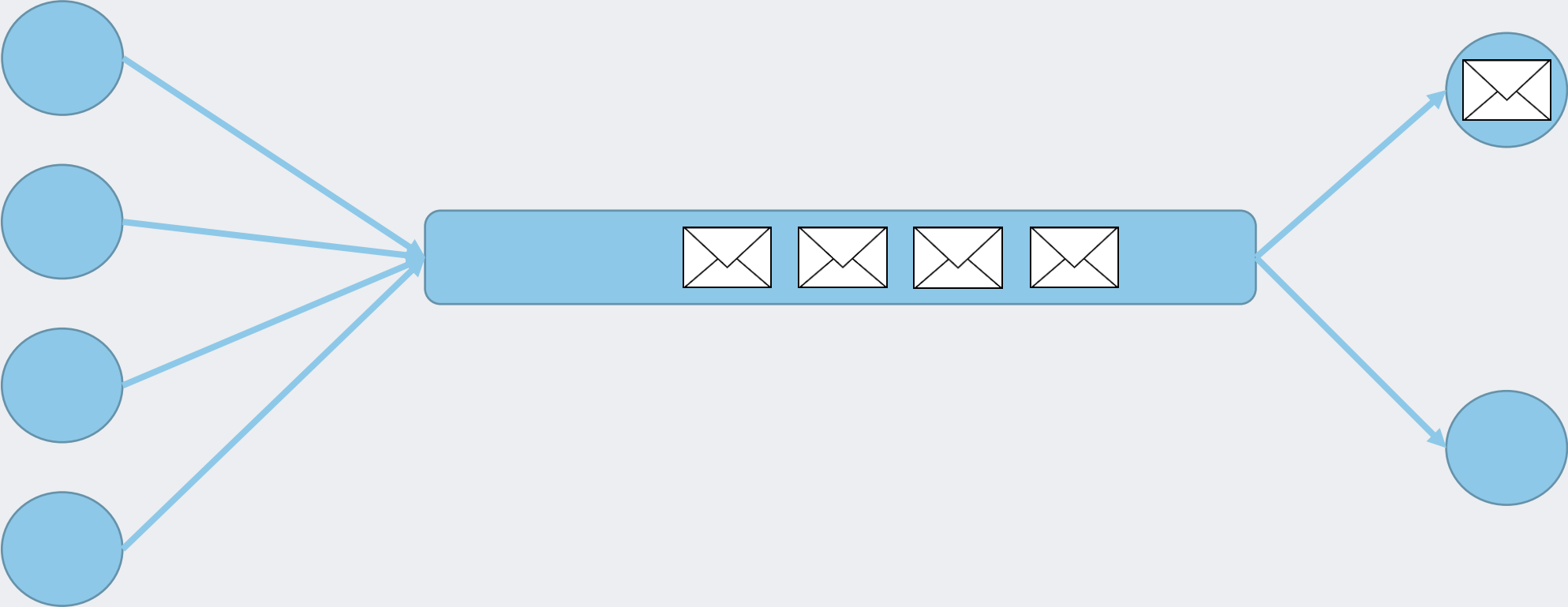
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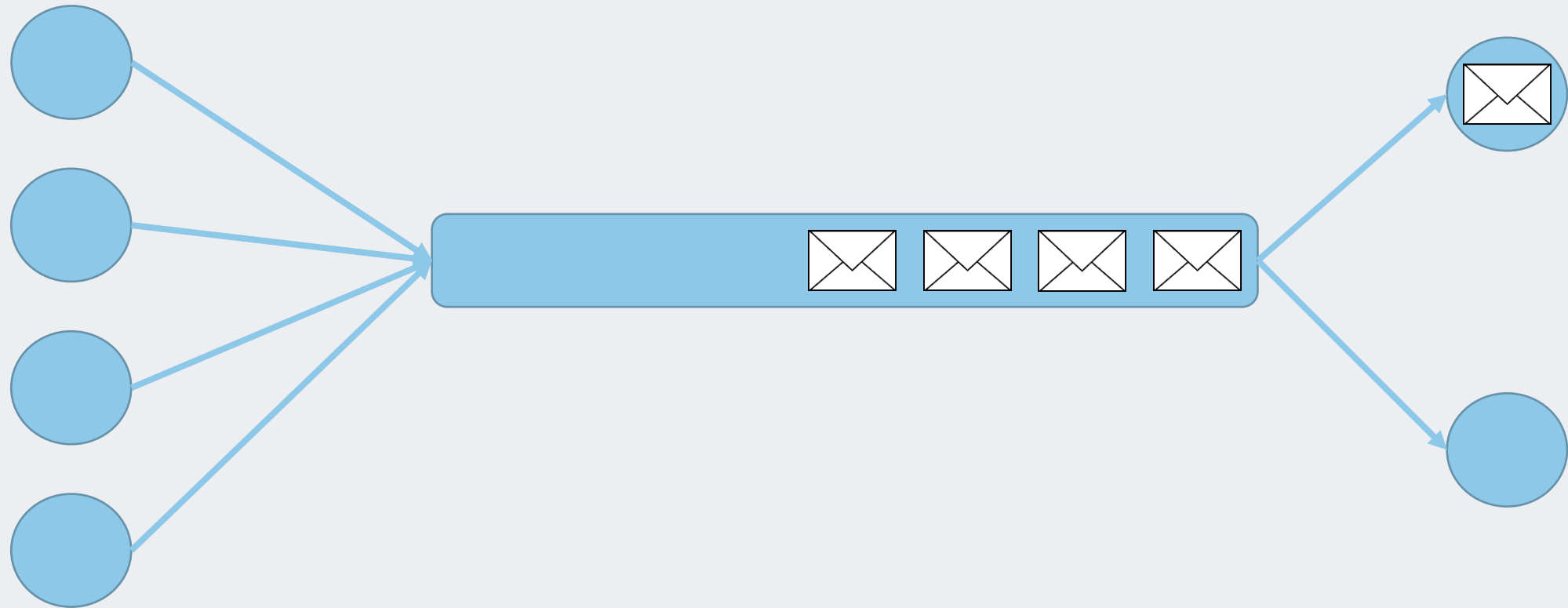
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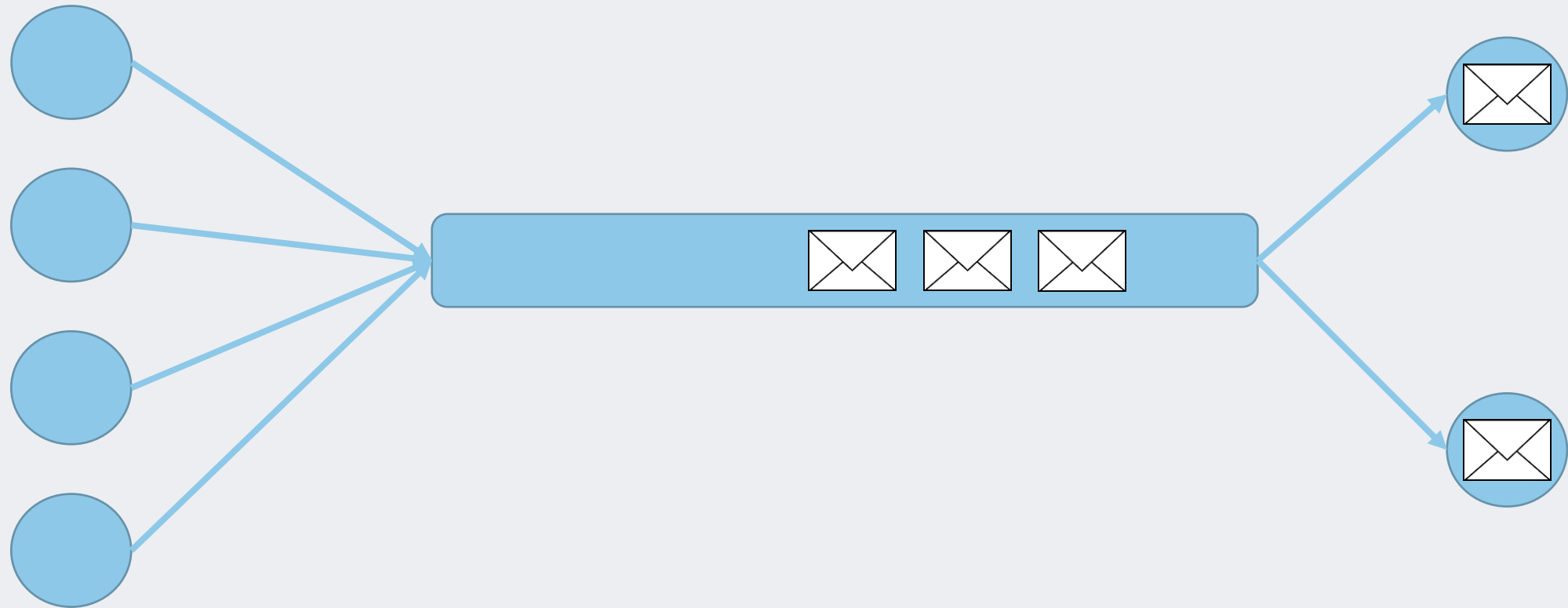
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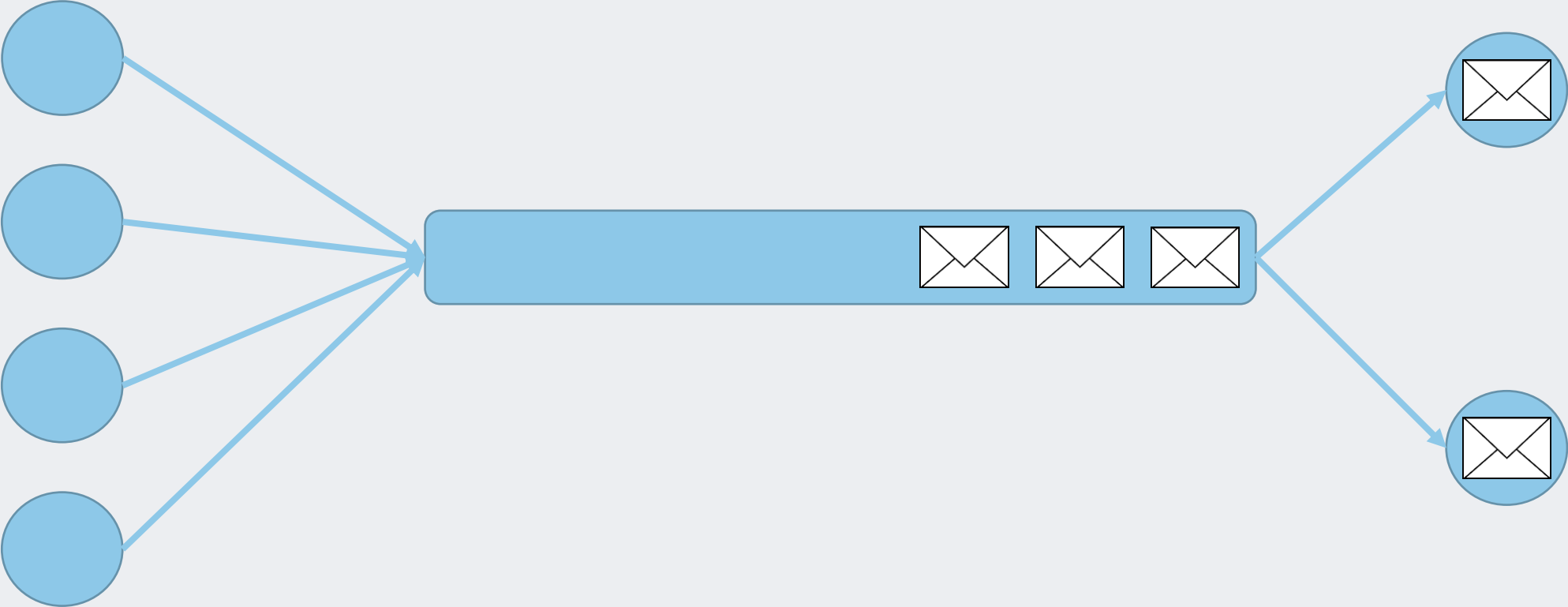


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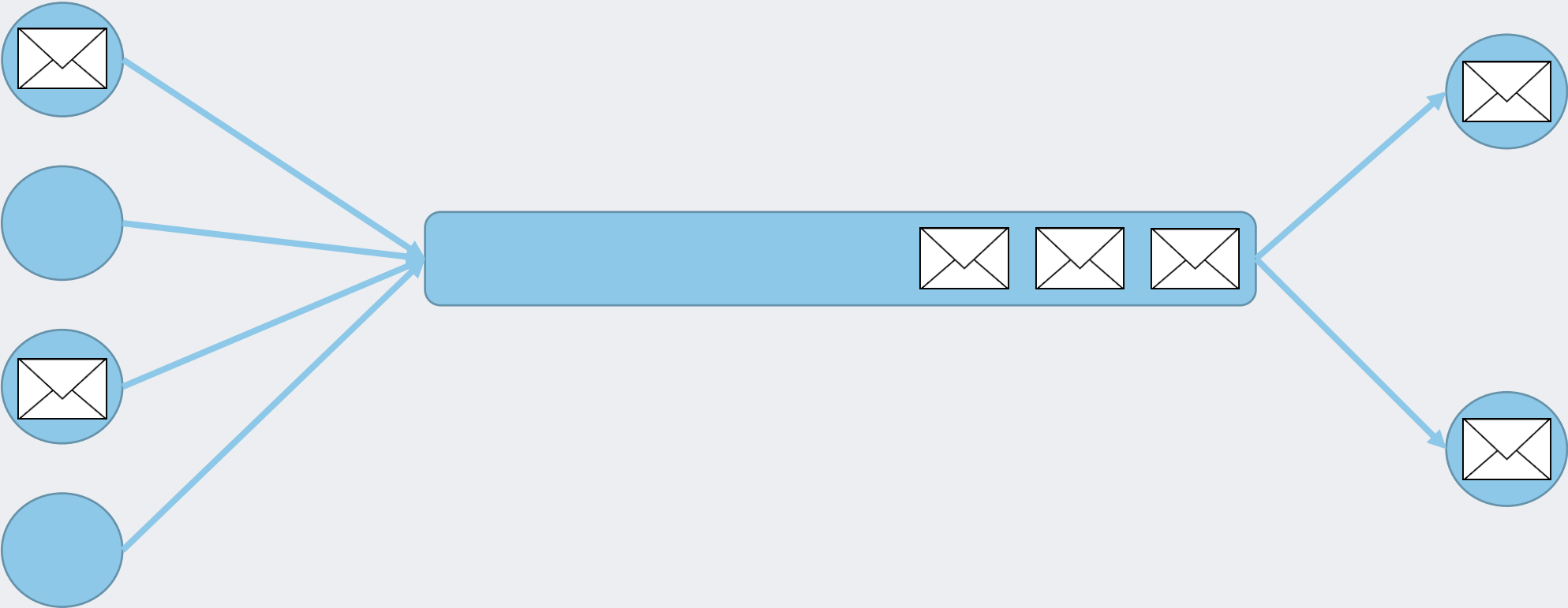




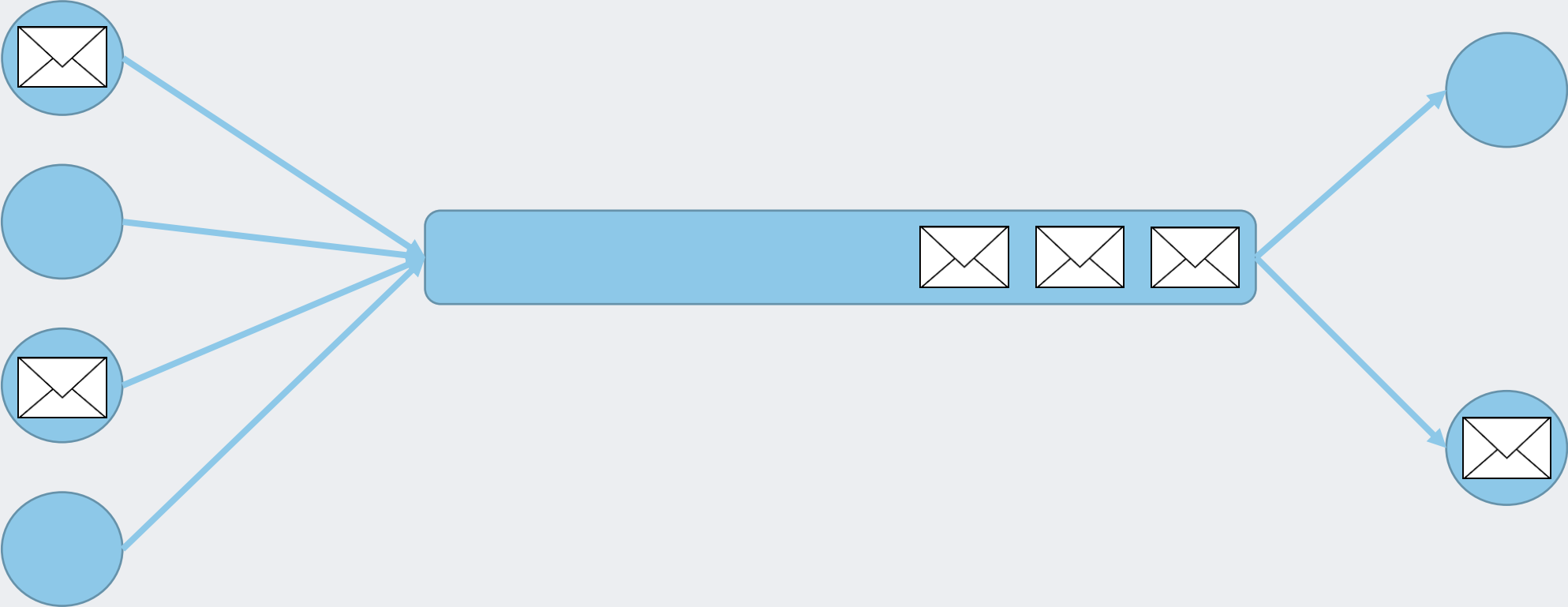
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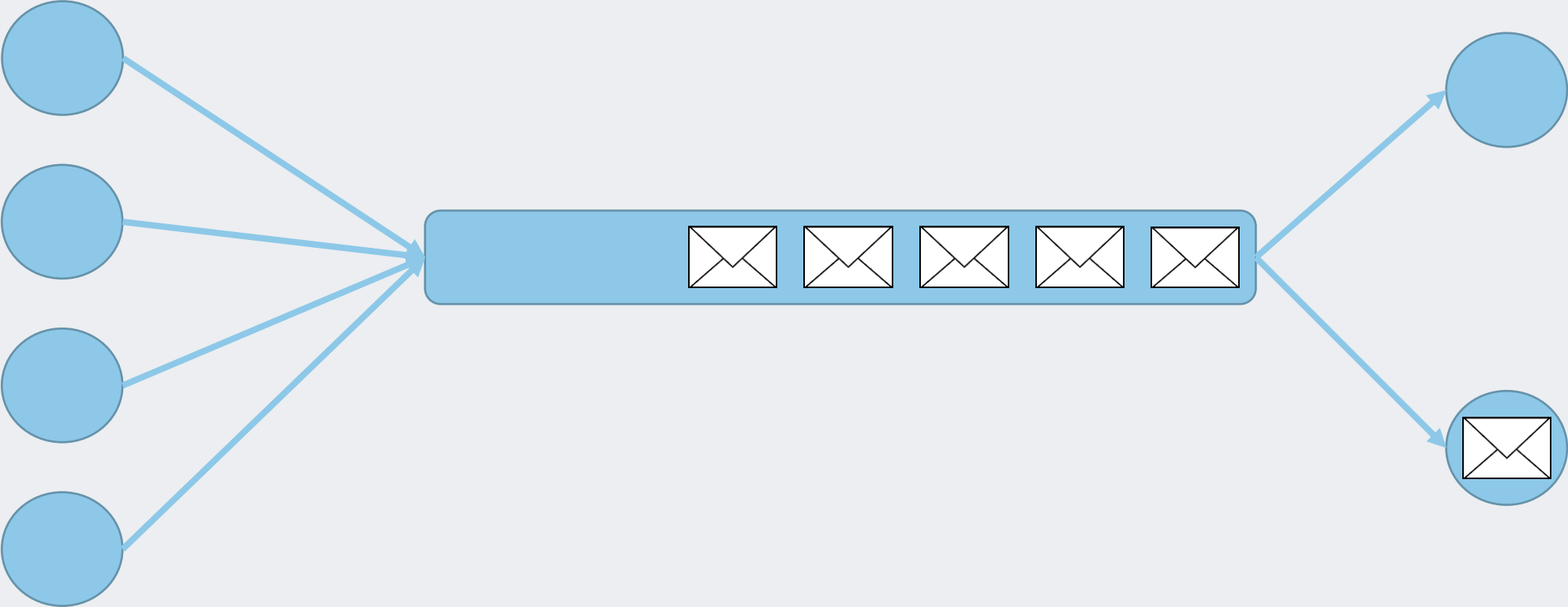
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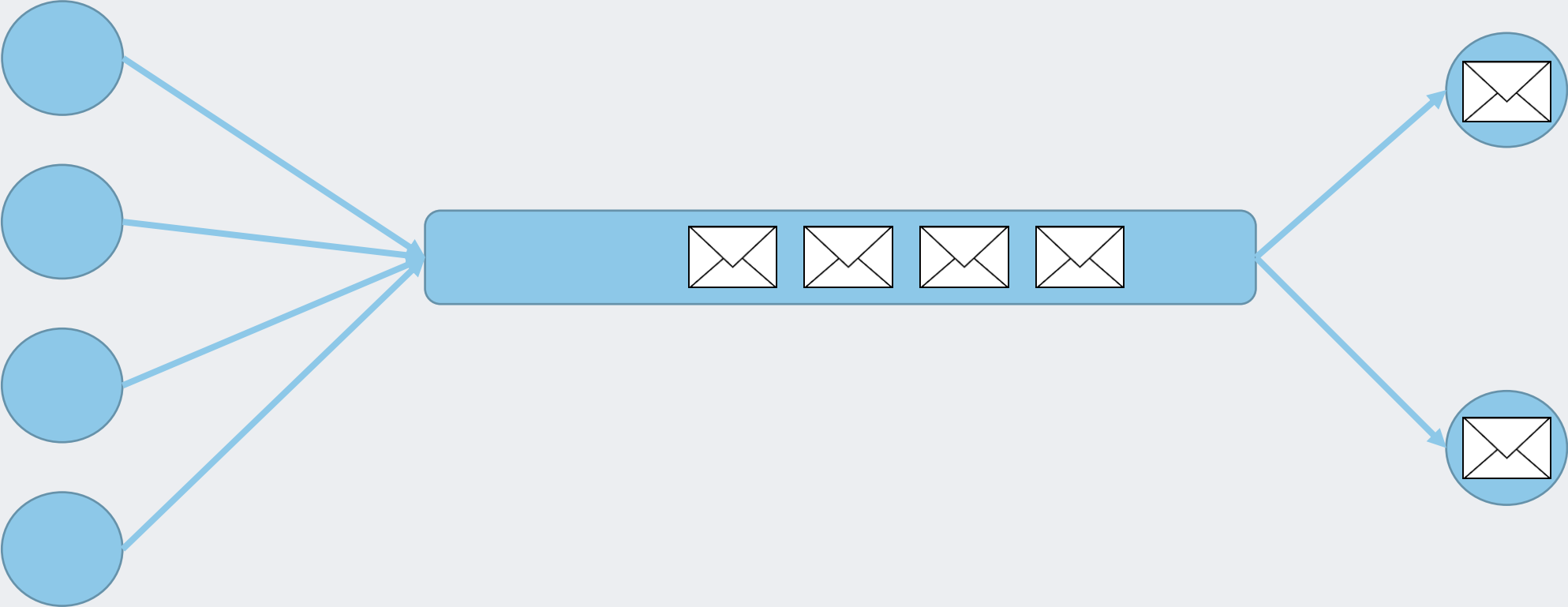
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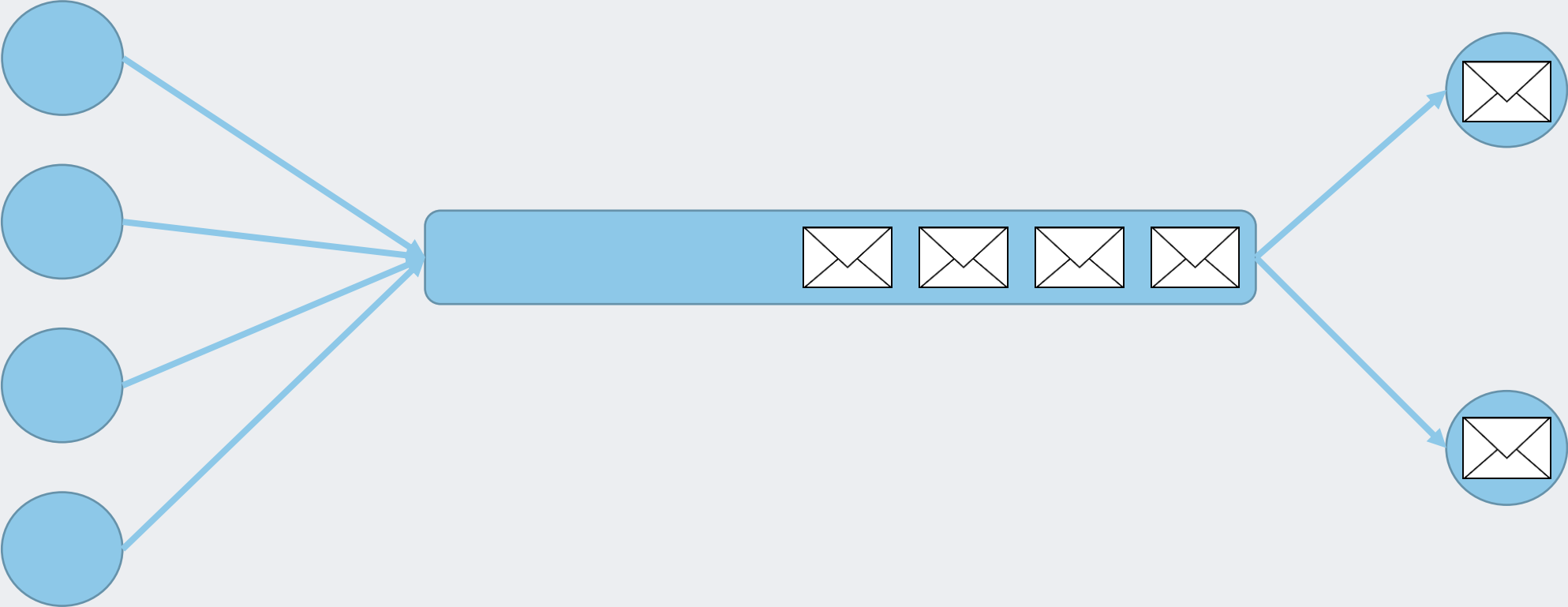
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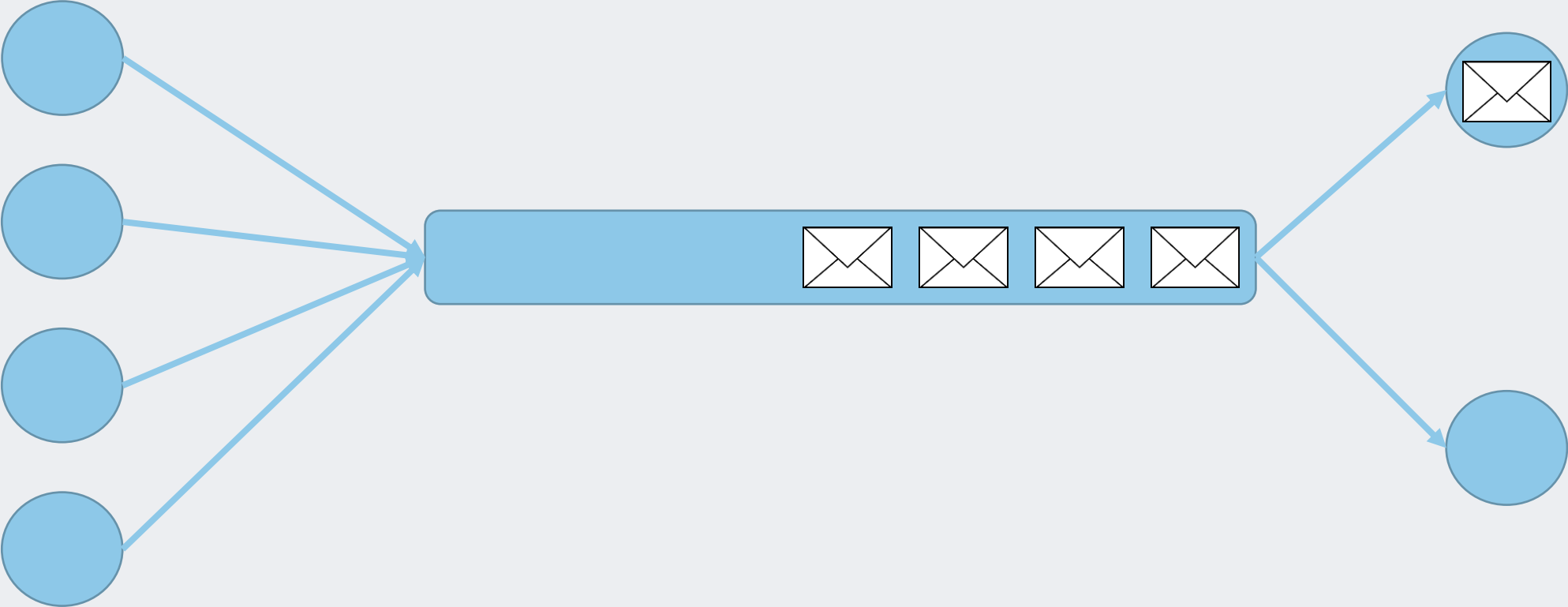
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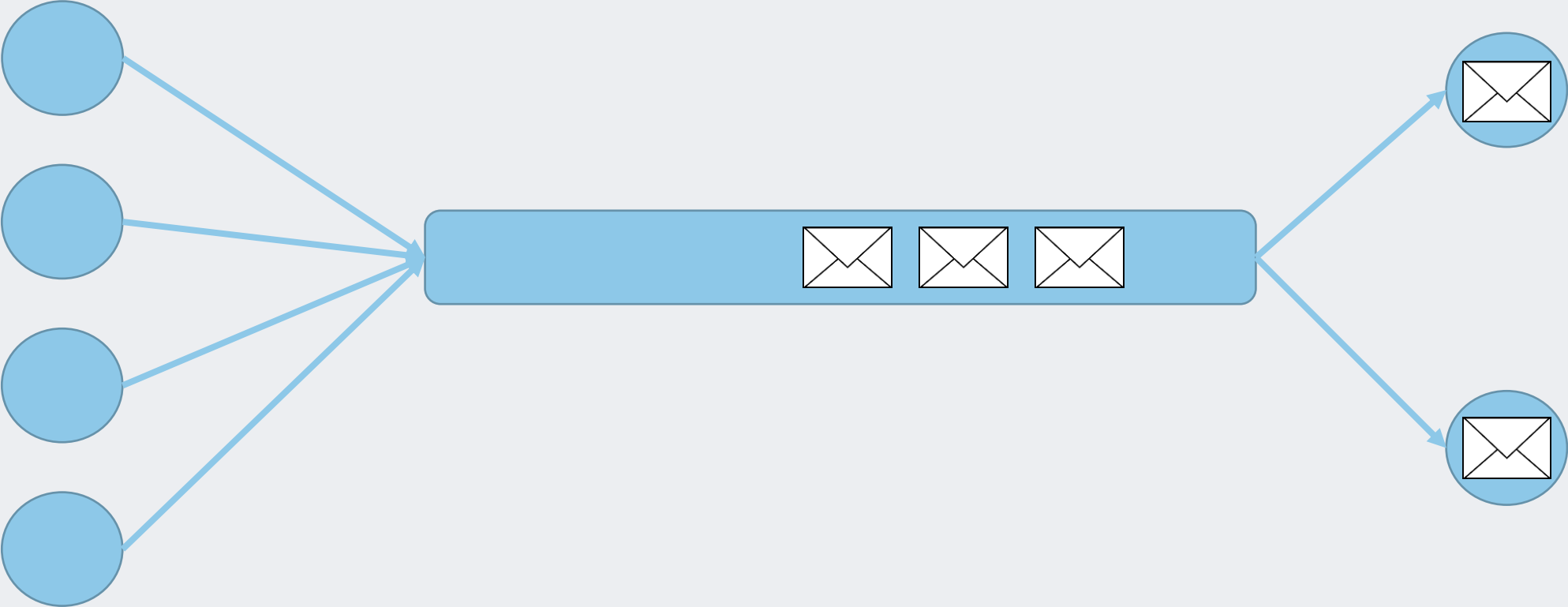
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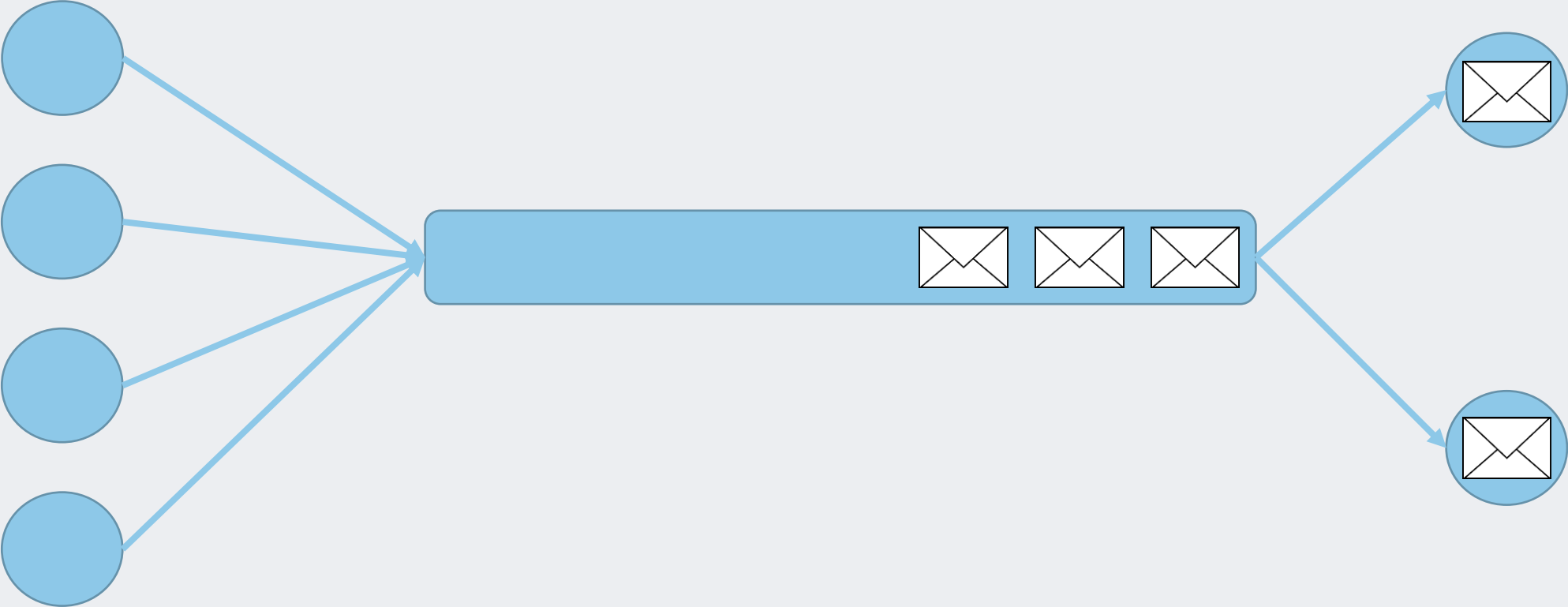


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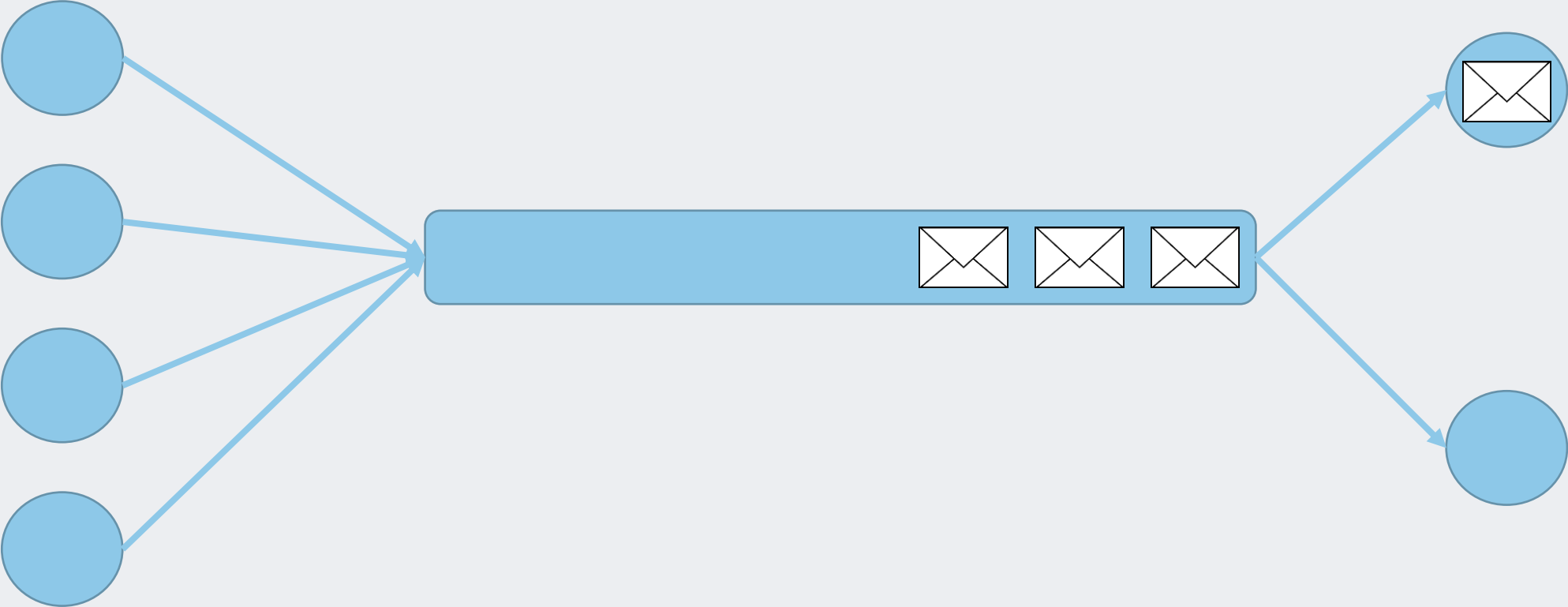




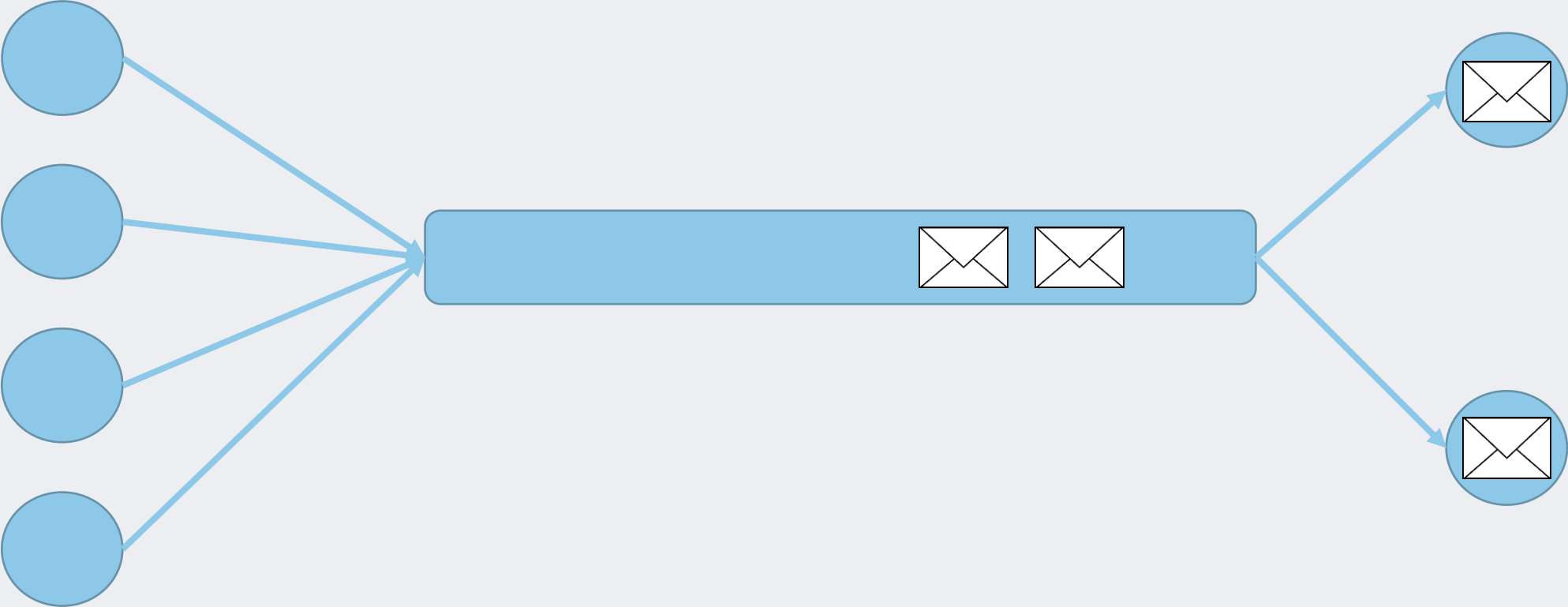
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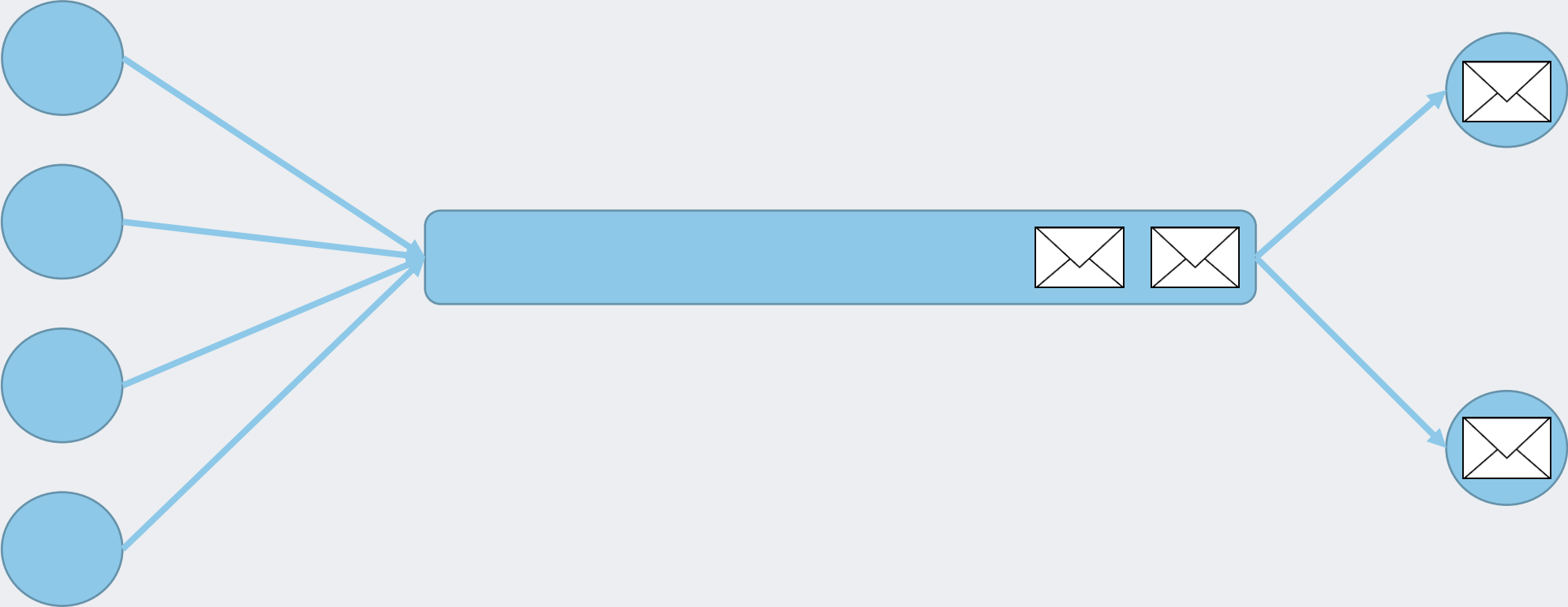
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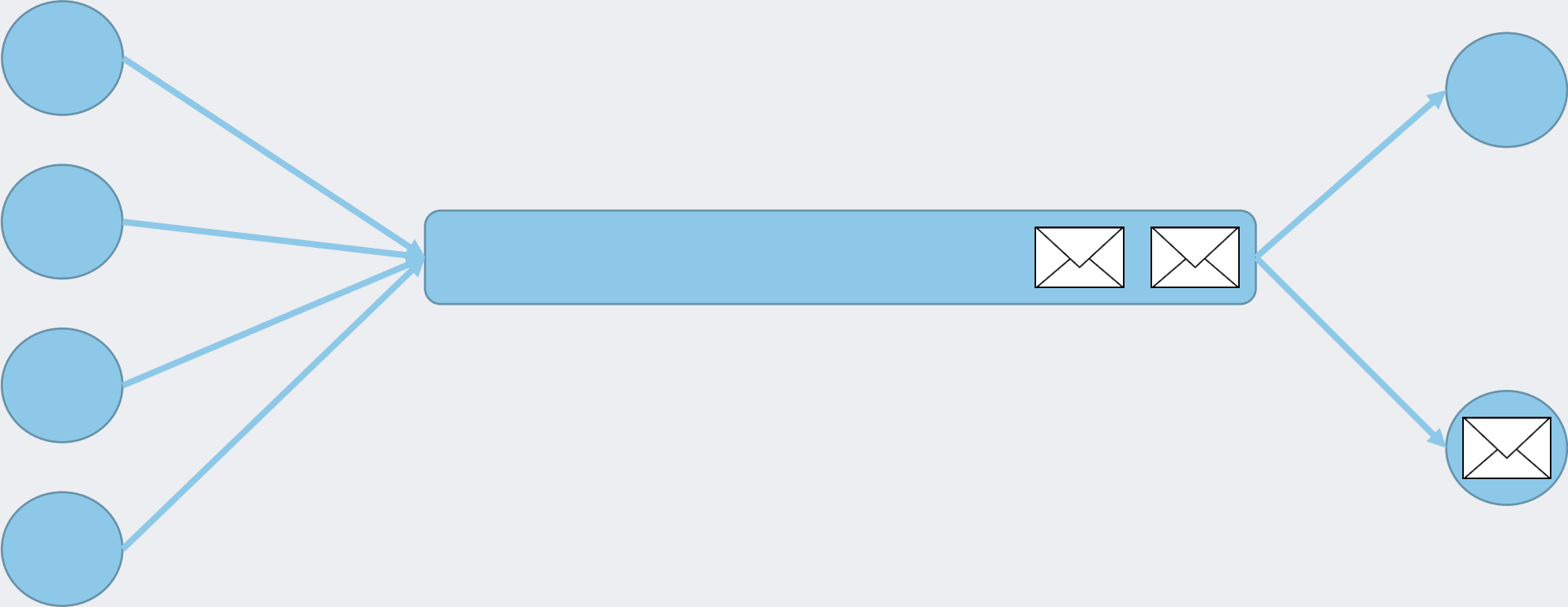
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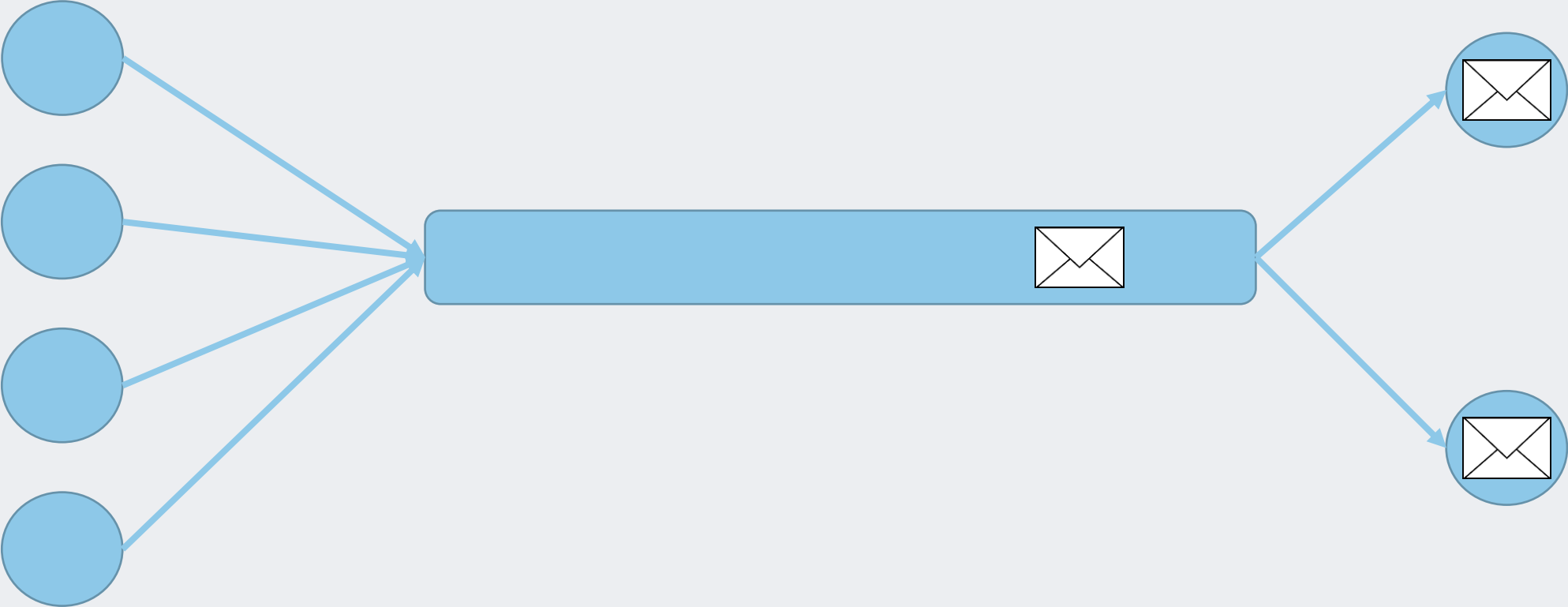
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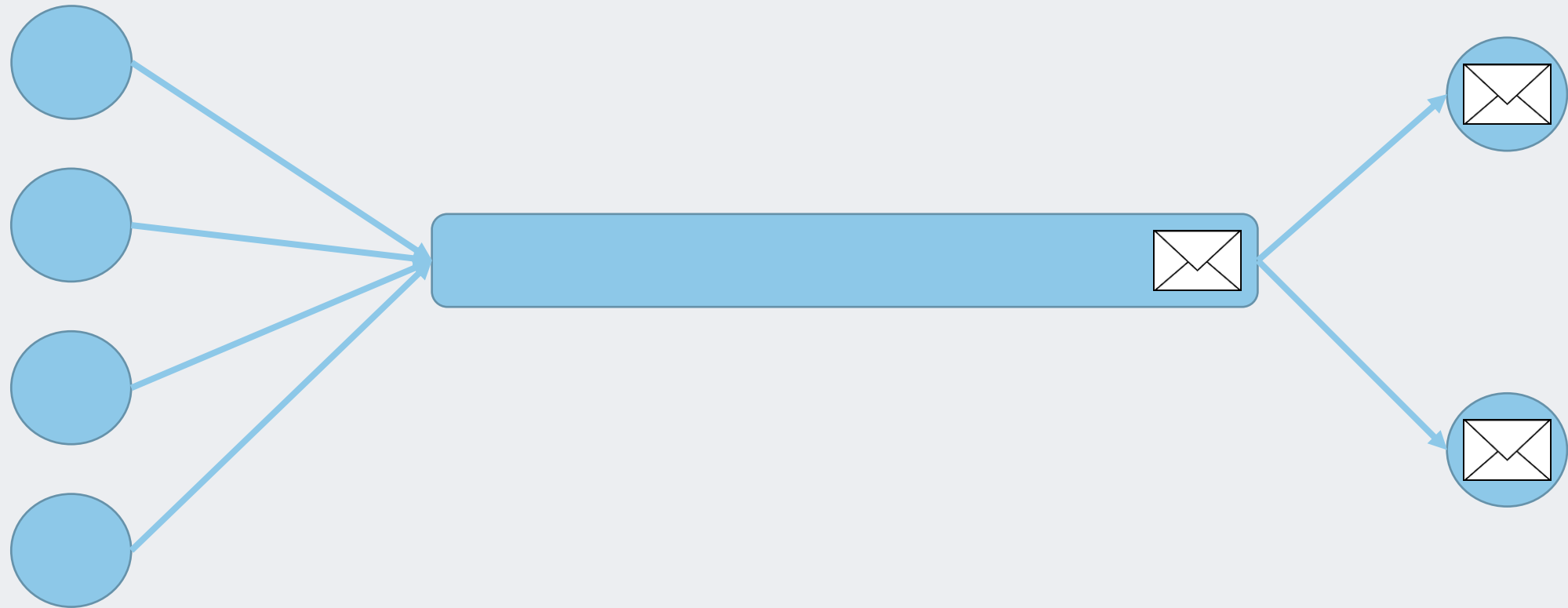
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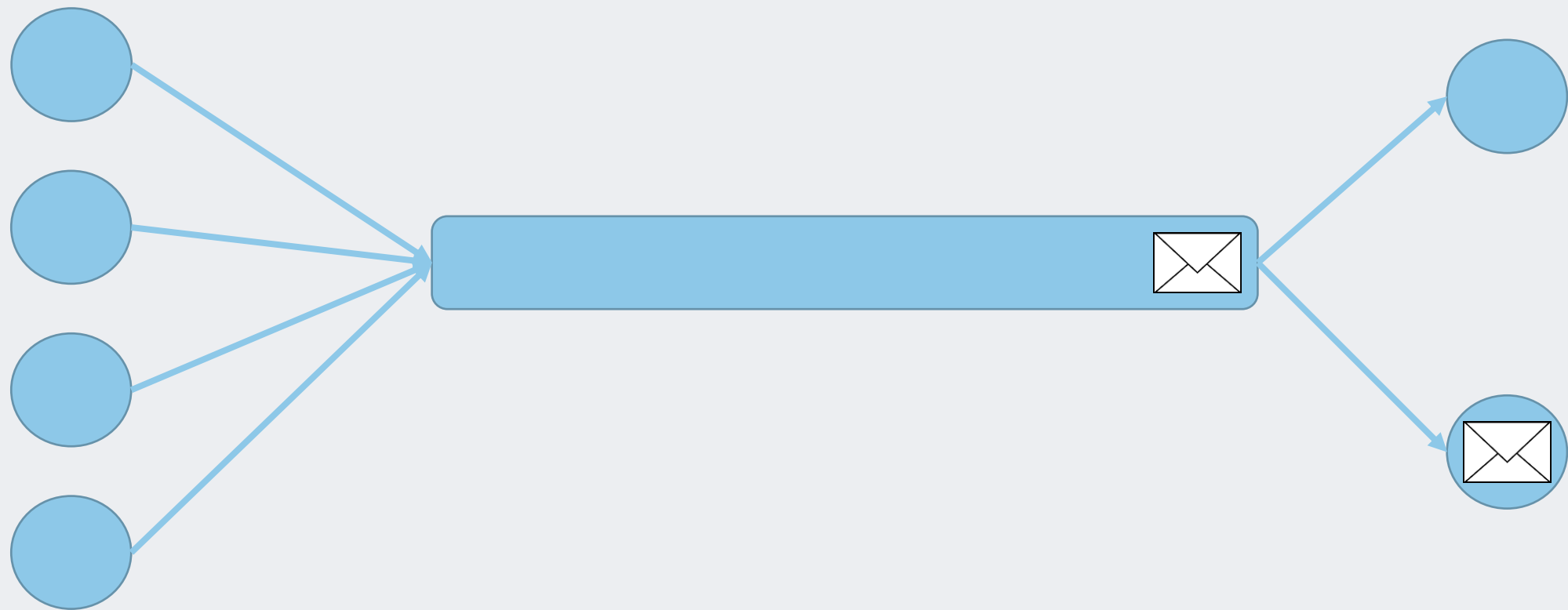
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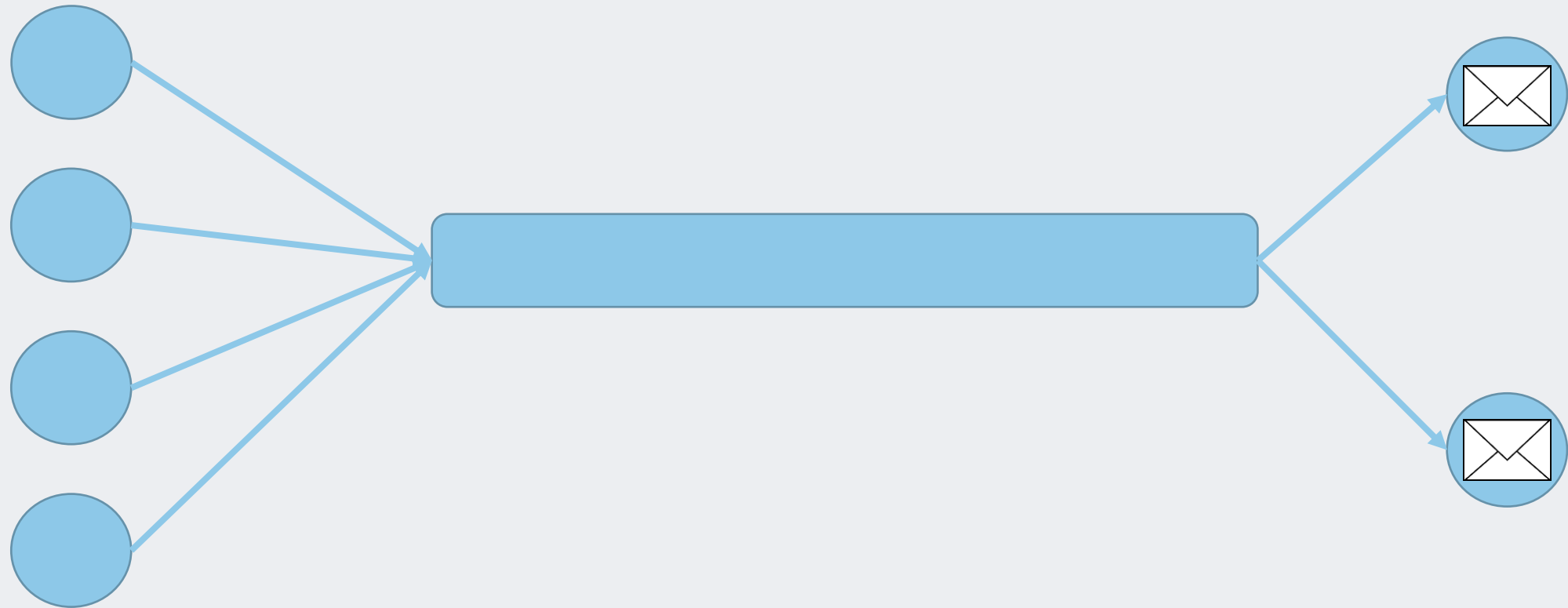


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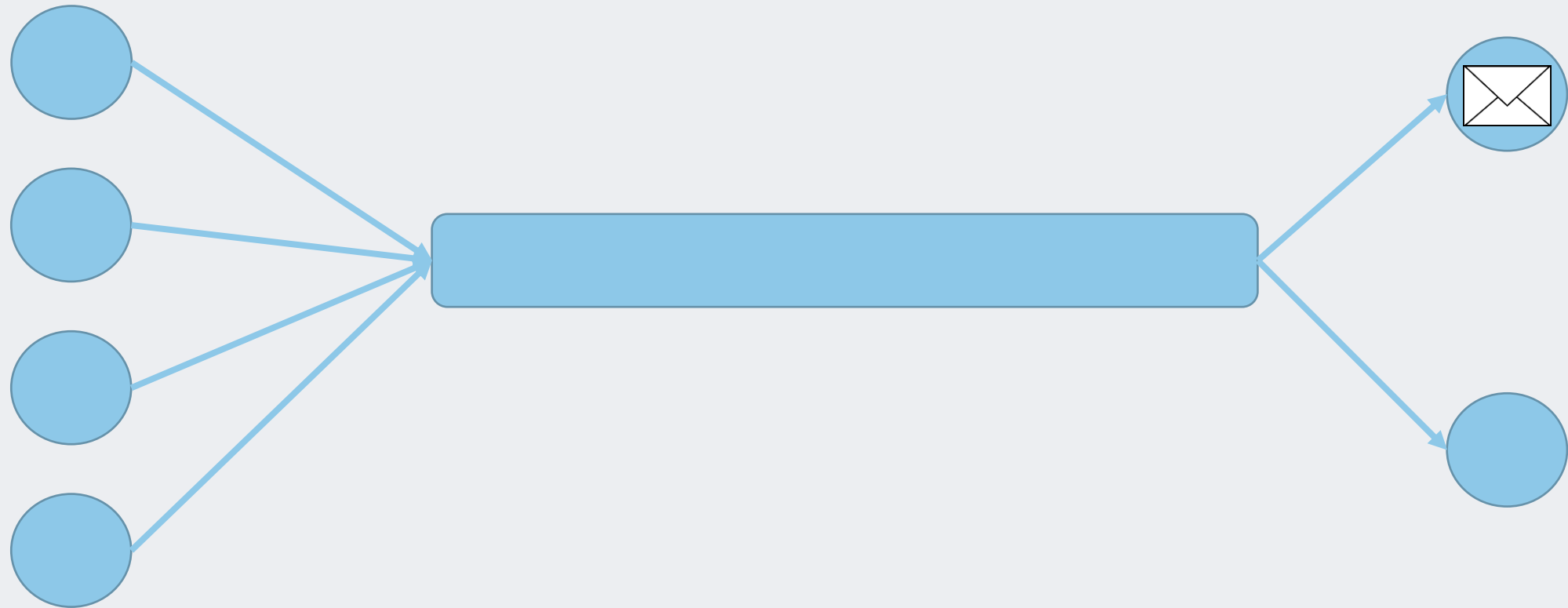




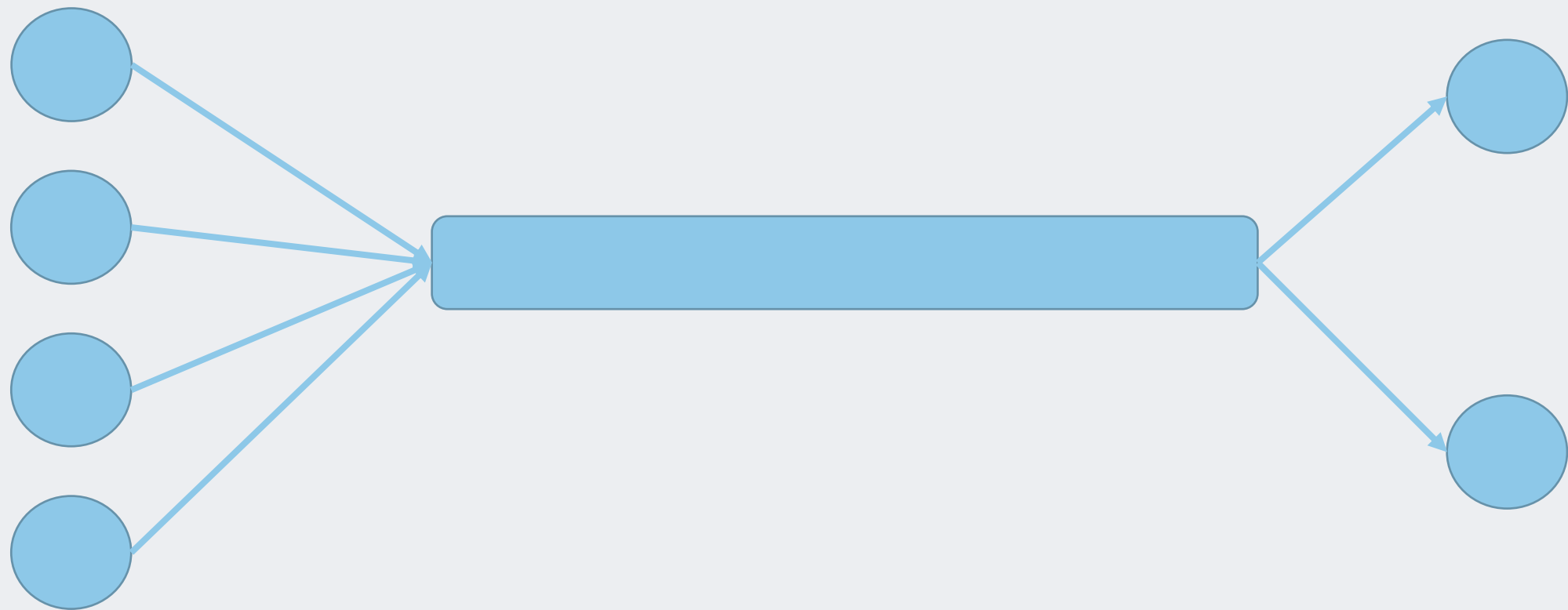
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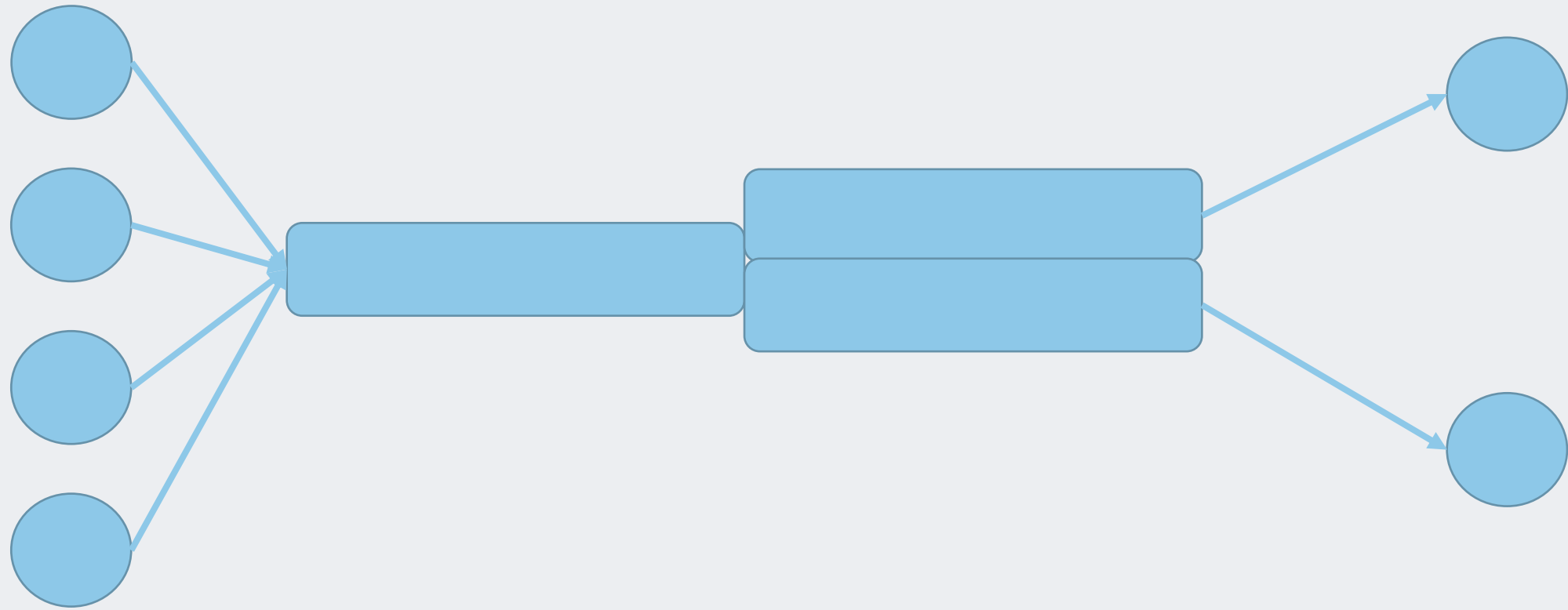




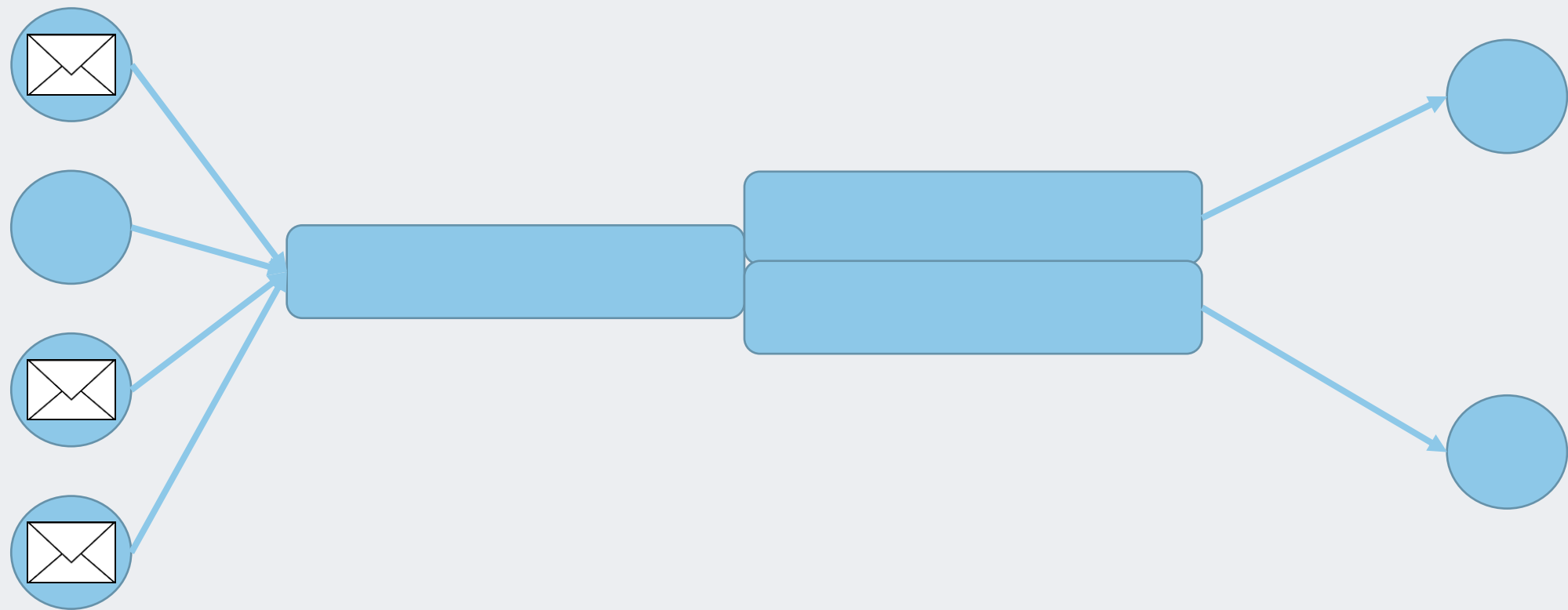
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<https://docs.microsoft.com/en-us/azure/architecture/patterns/publisher-subscriber>

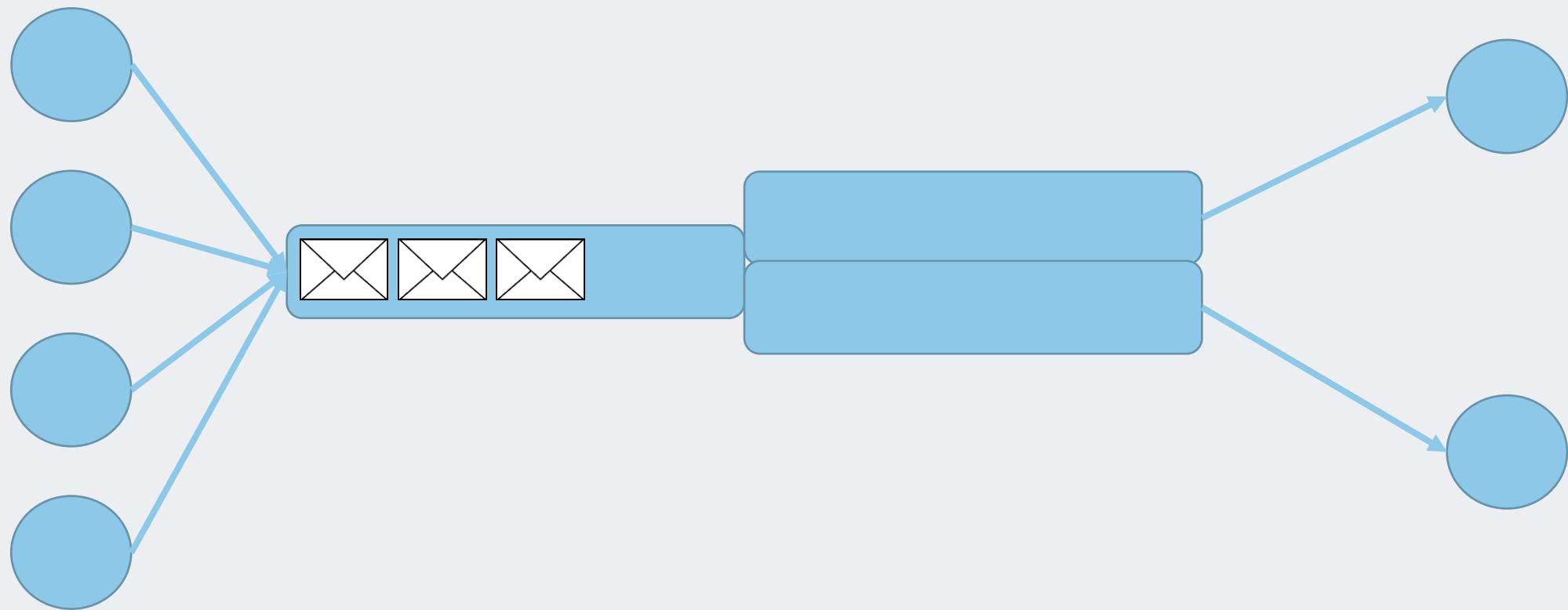
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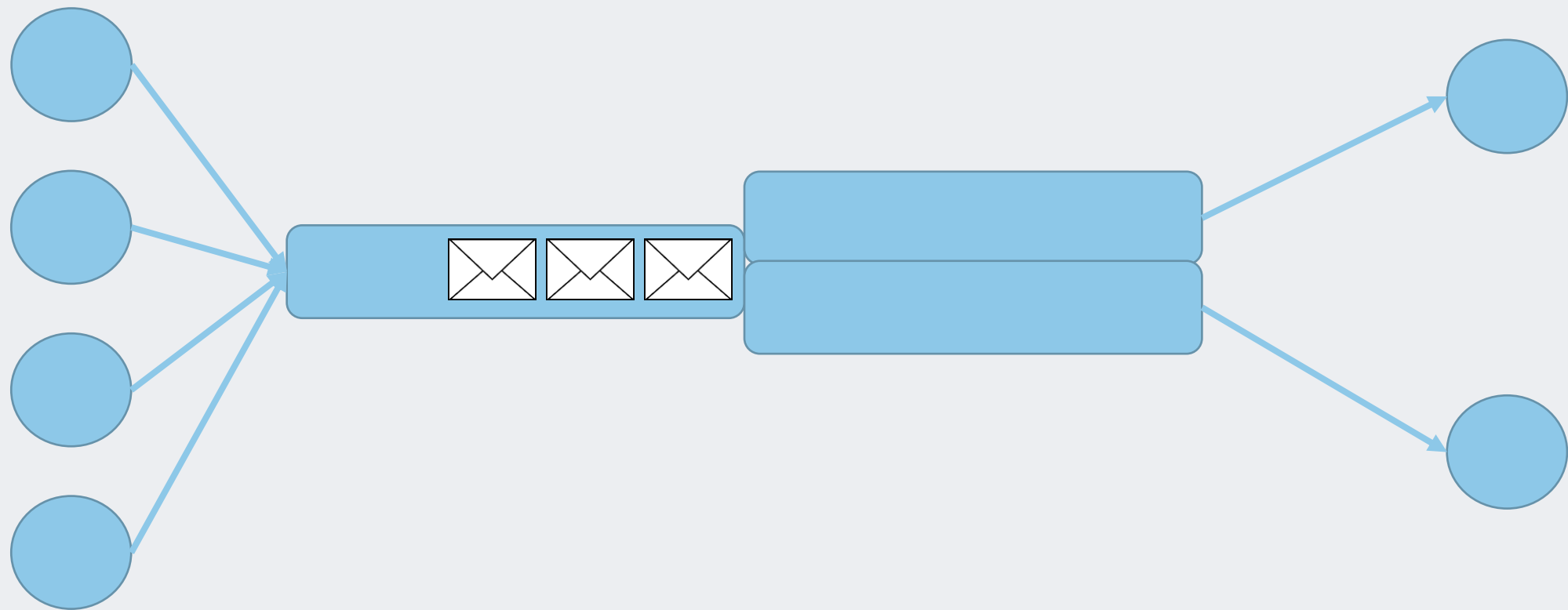
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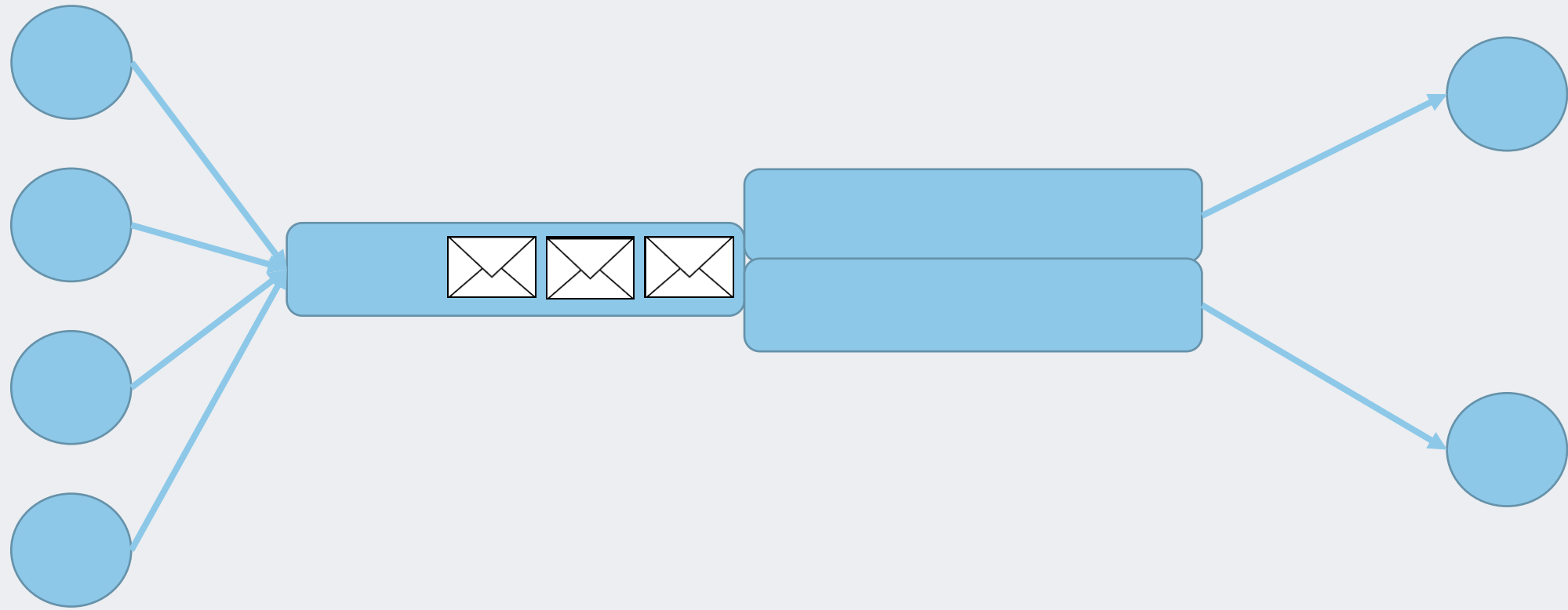


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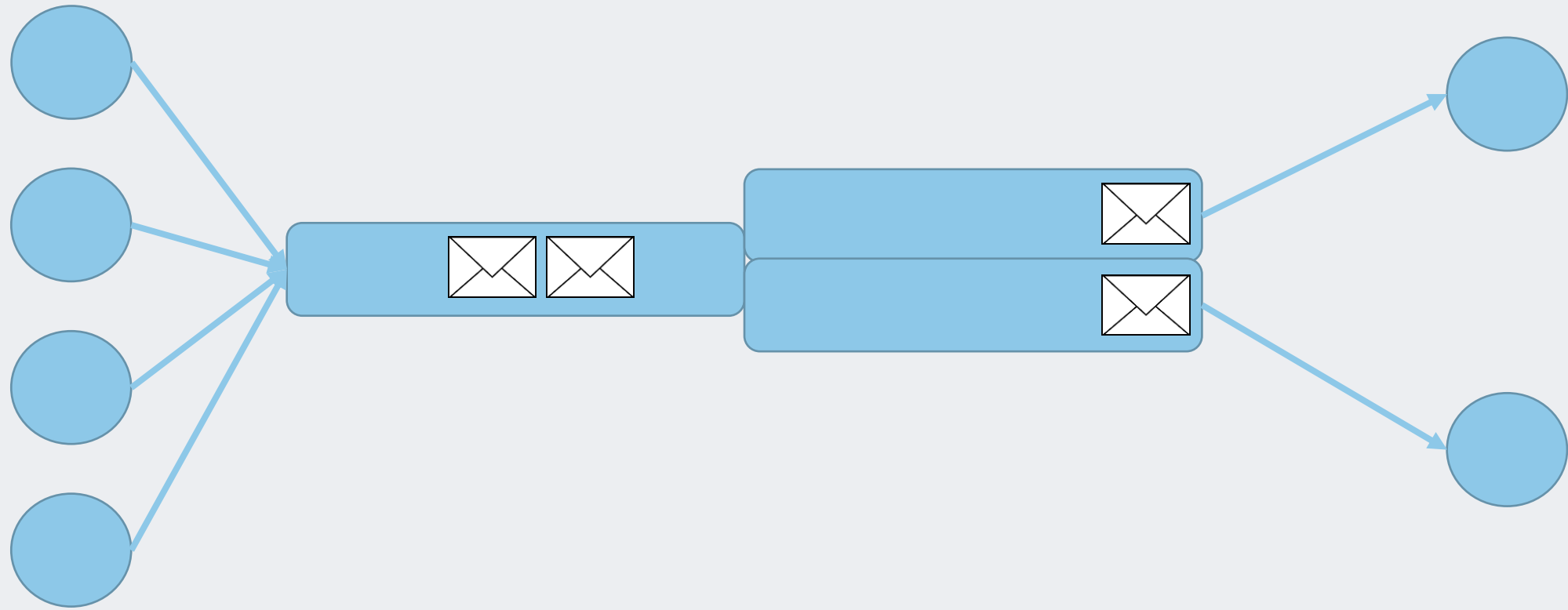




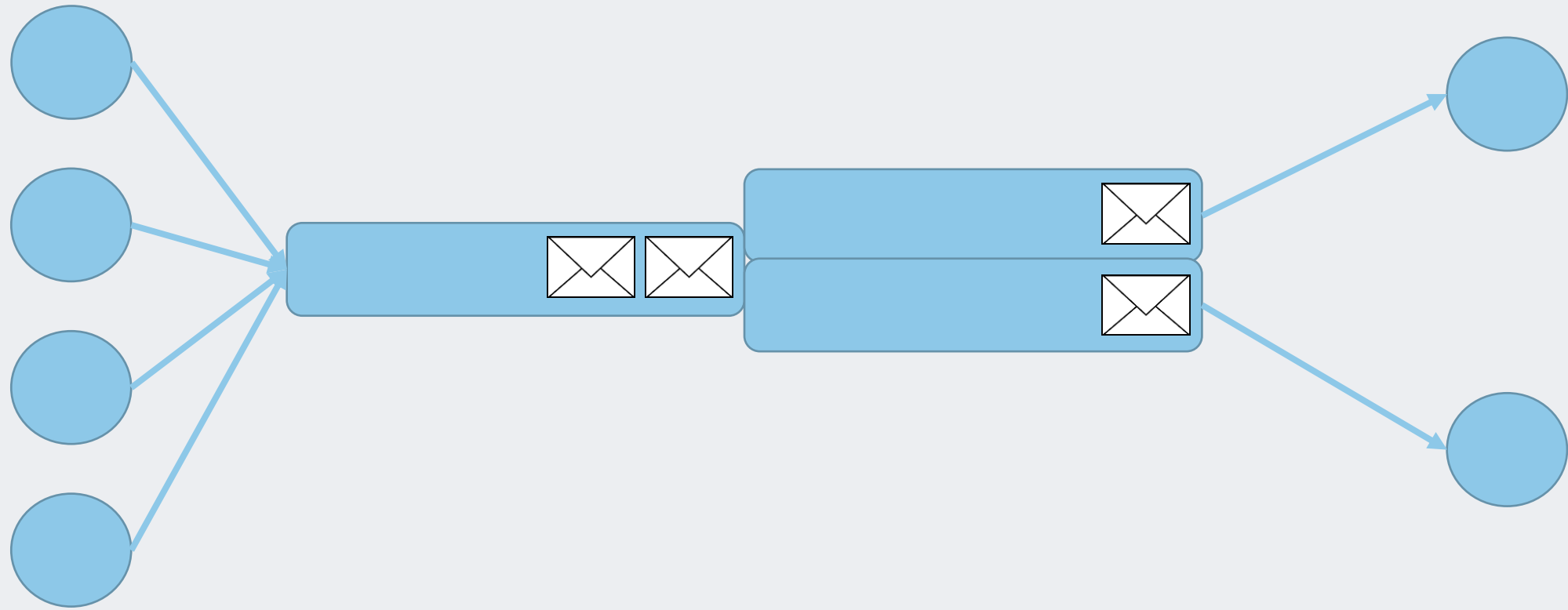
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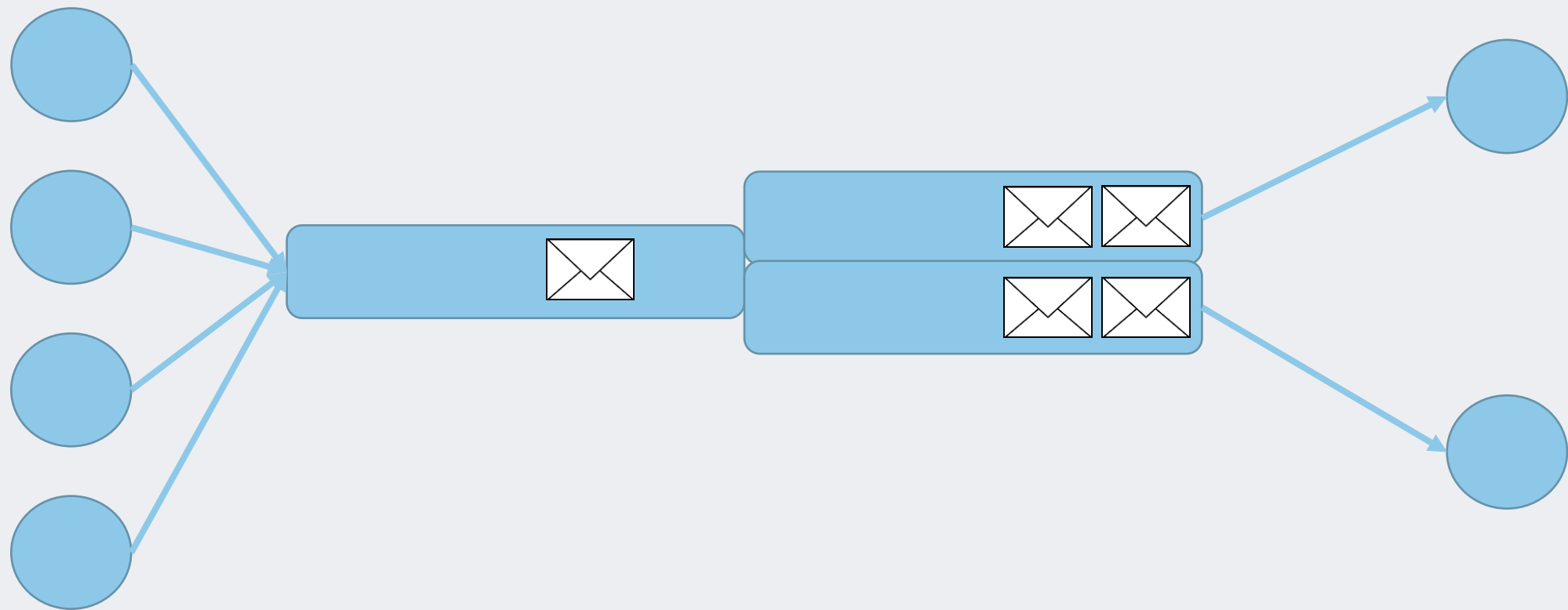
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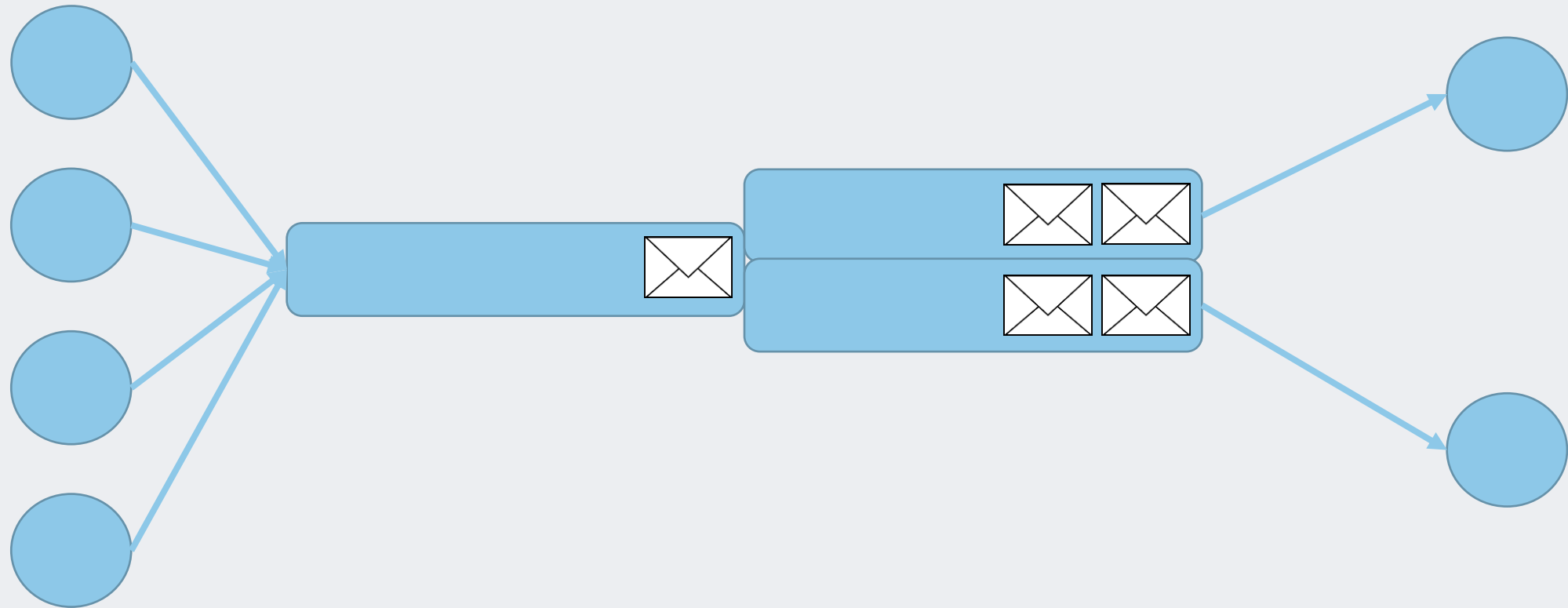
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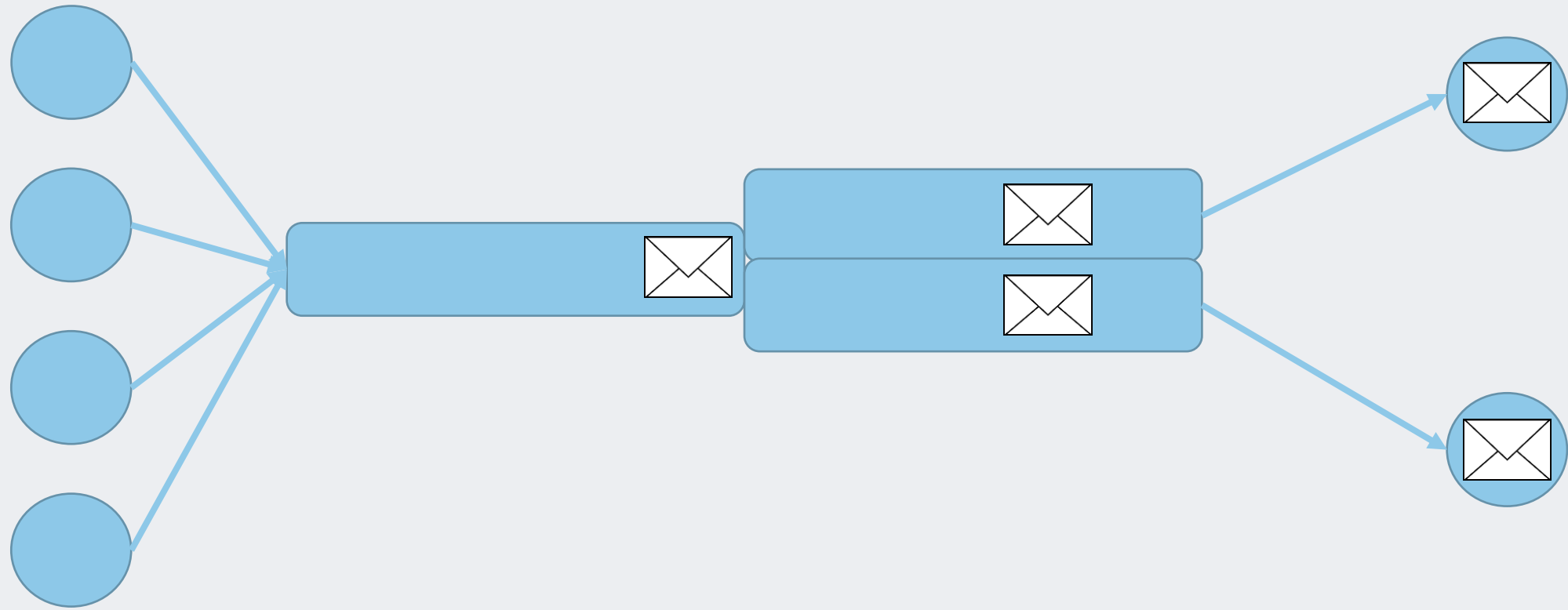
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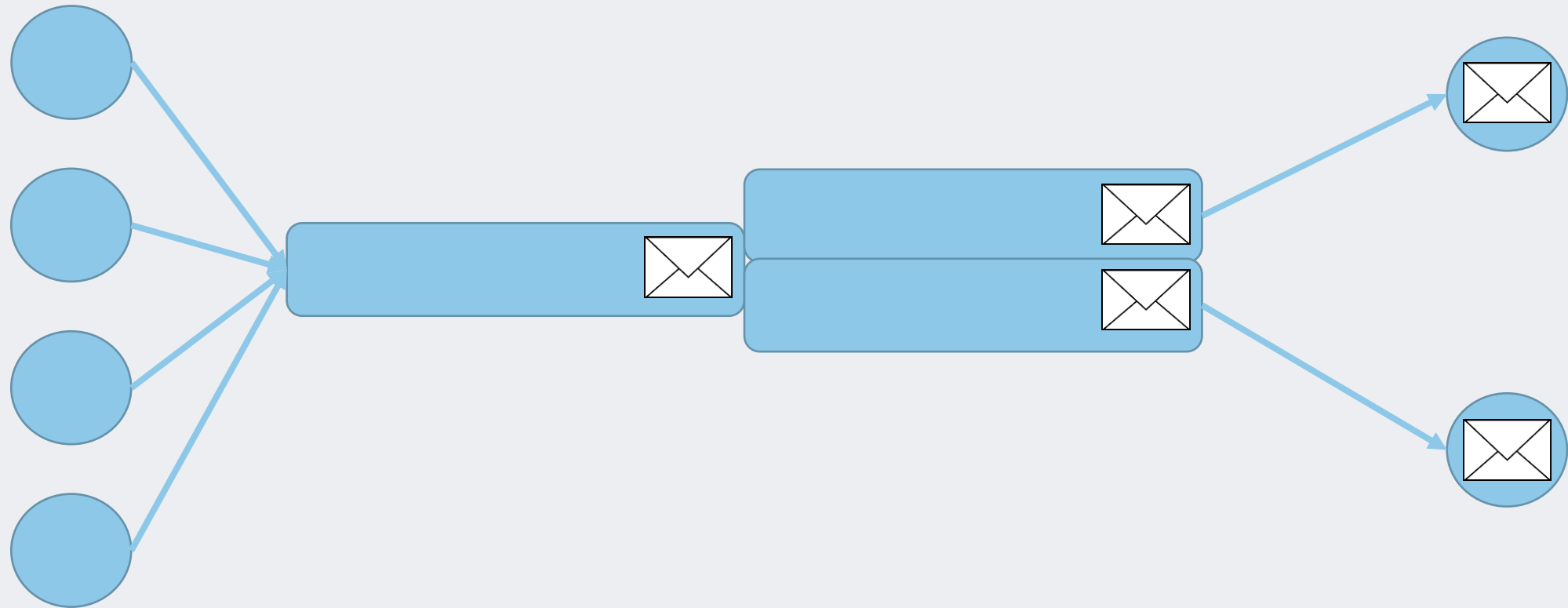
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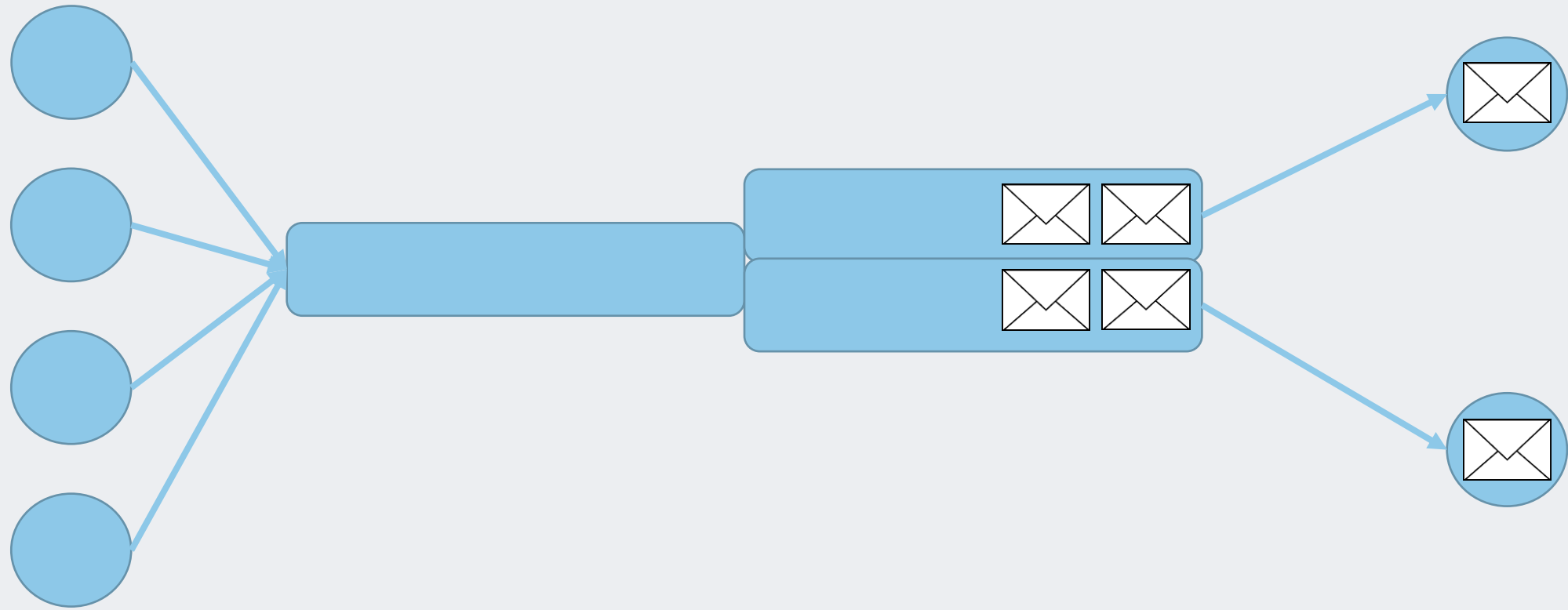
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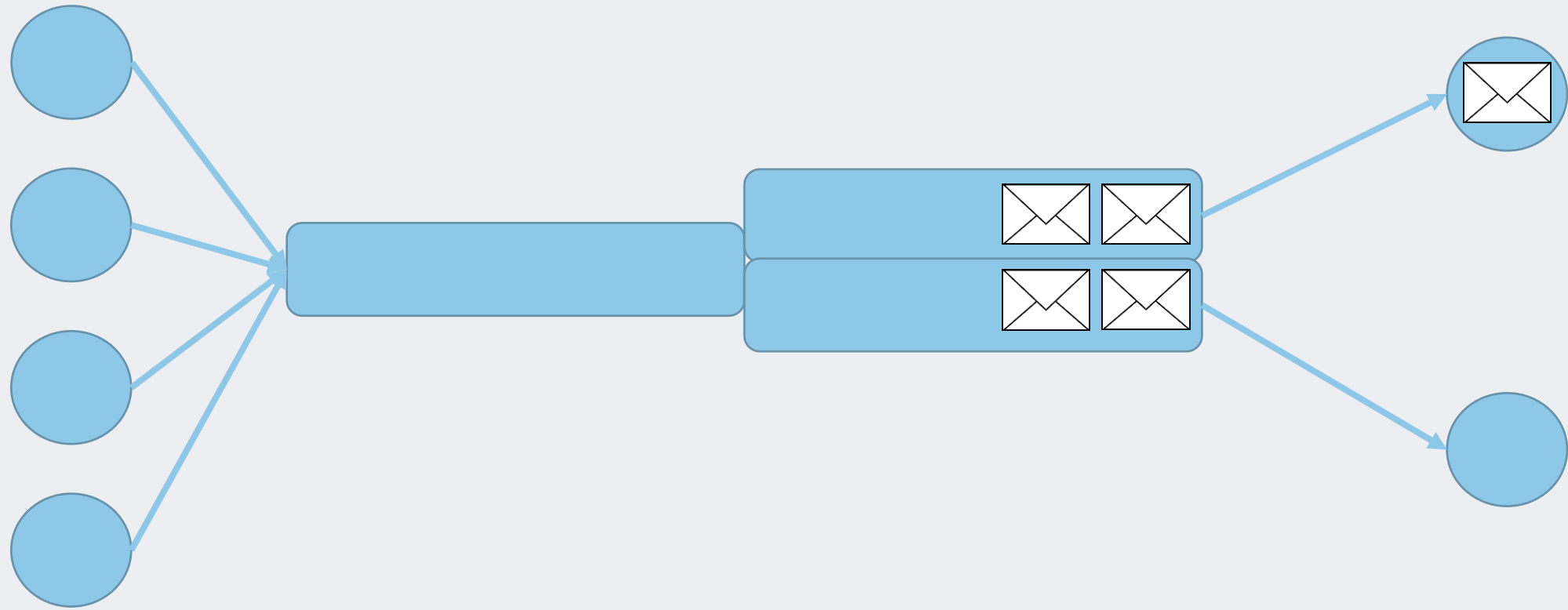


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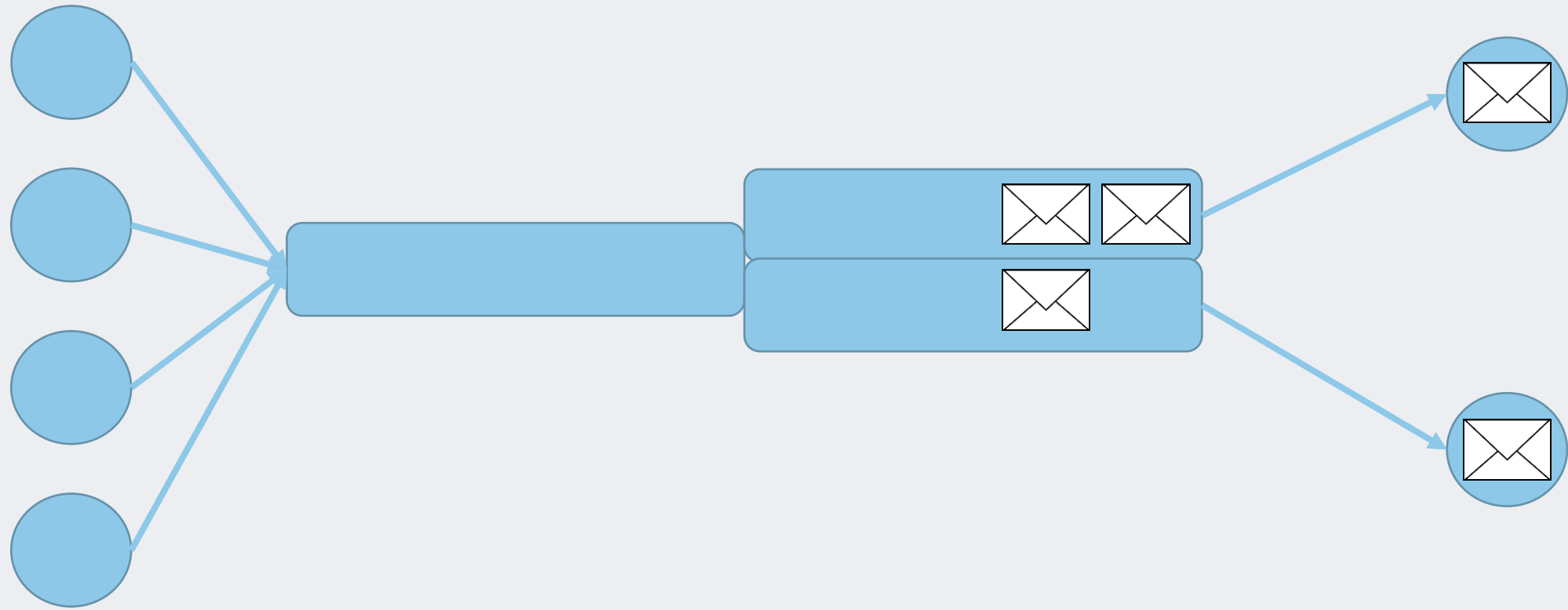




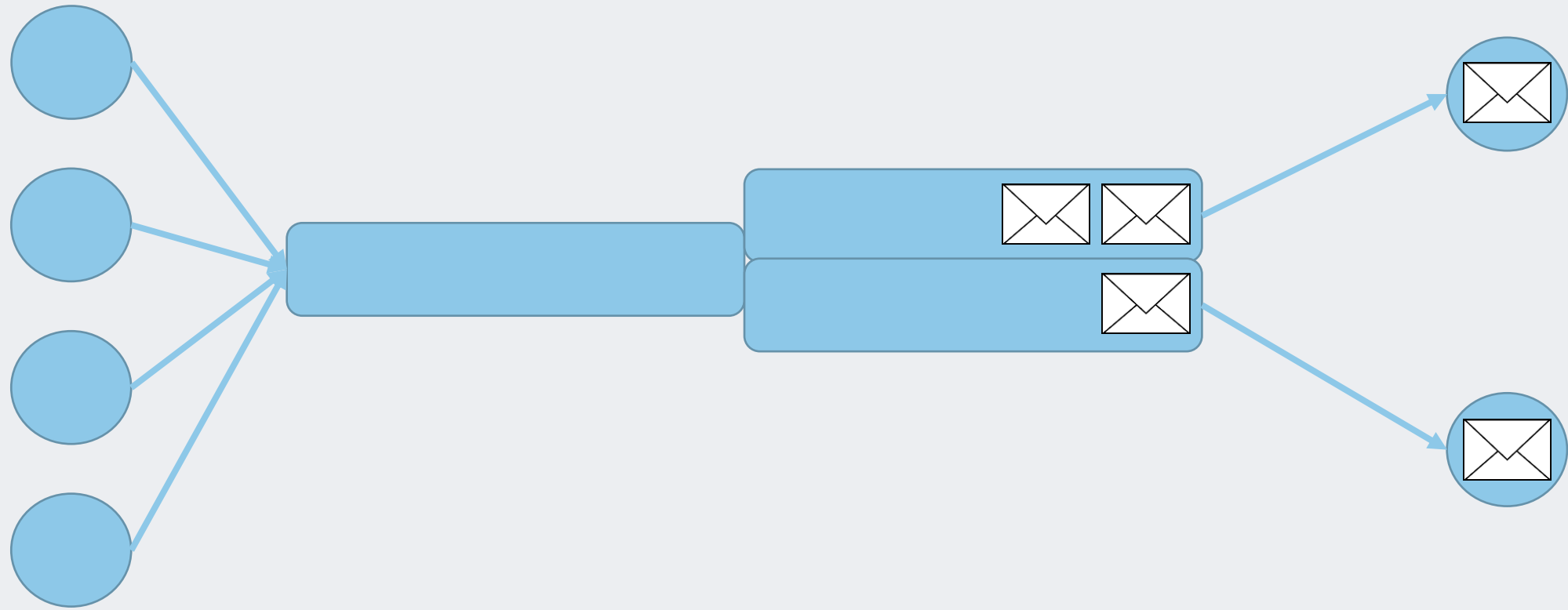
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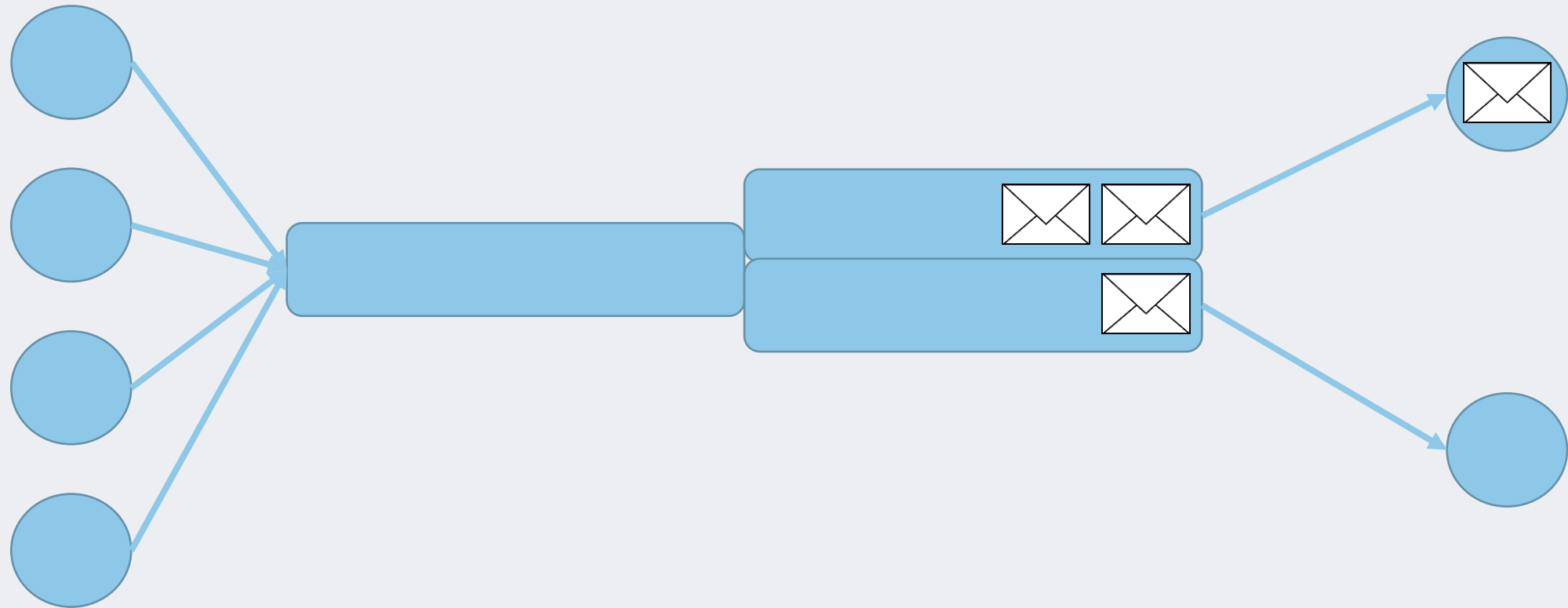
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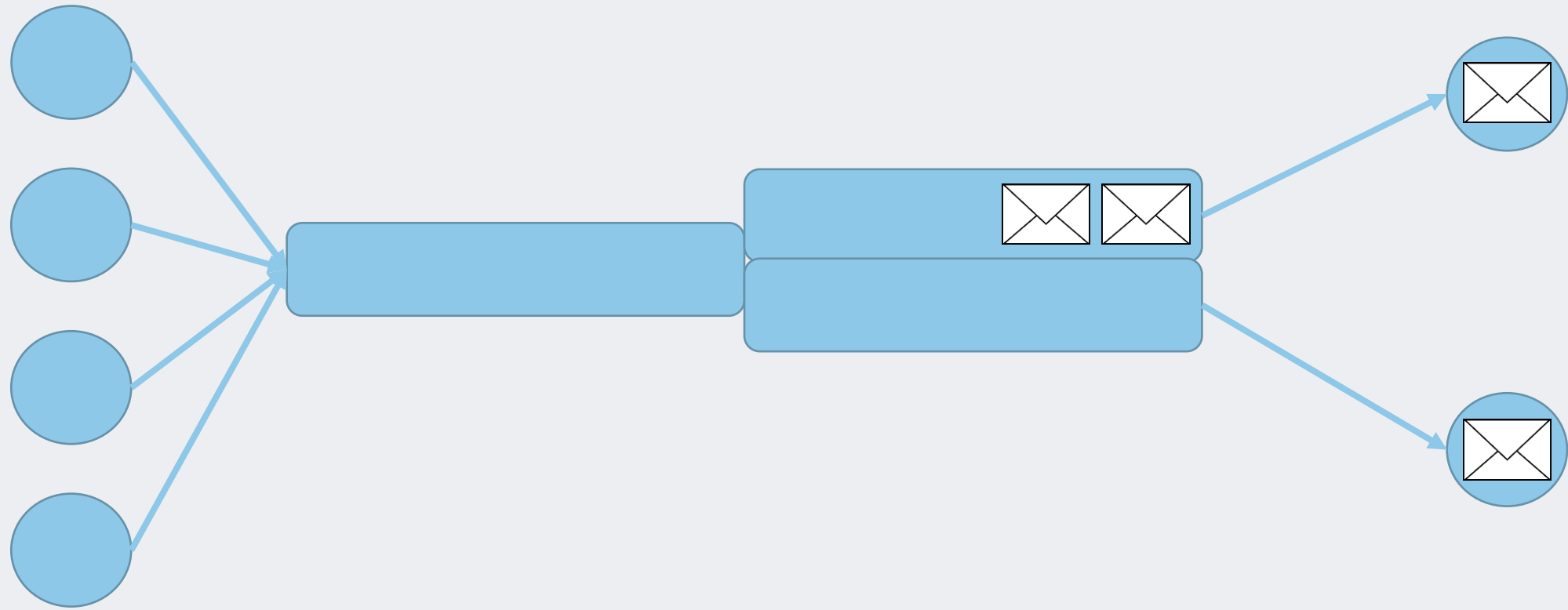
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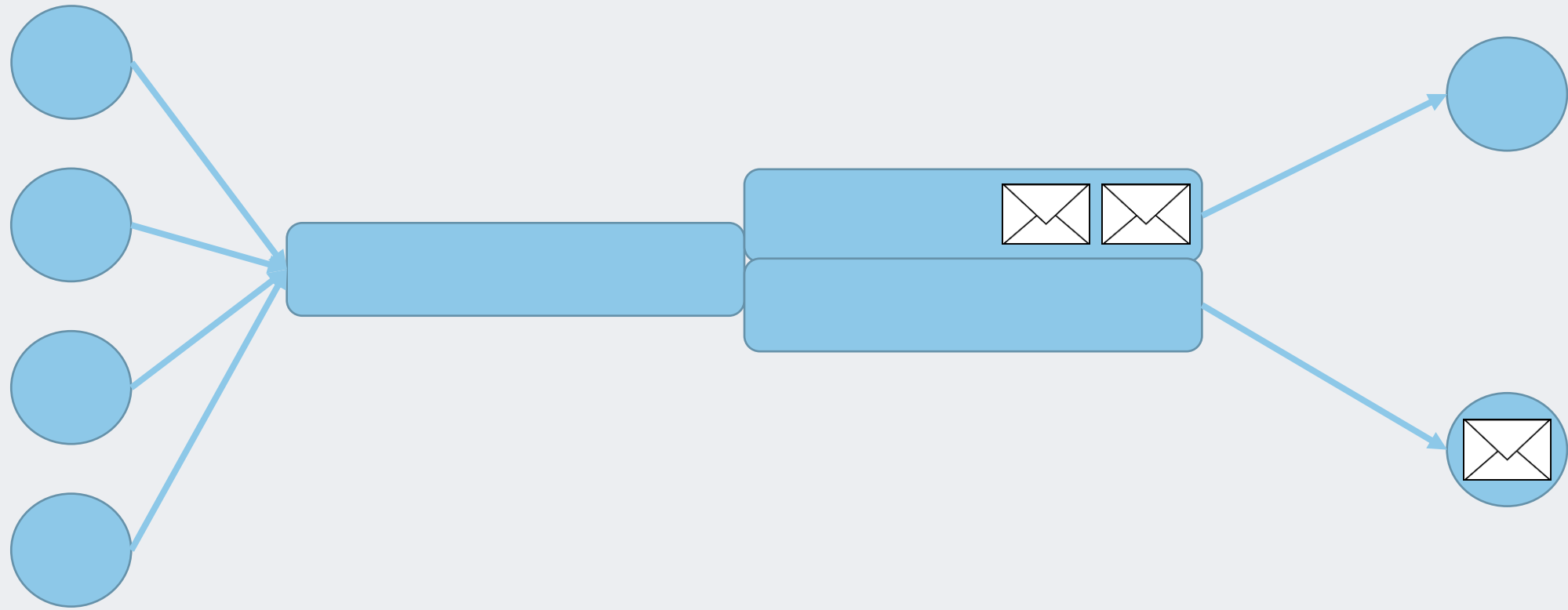
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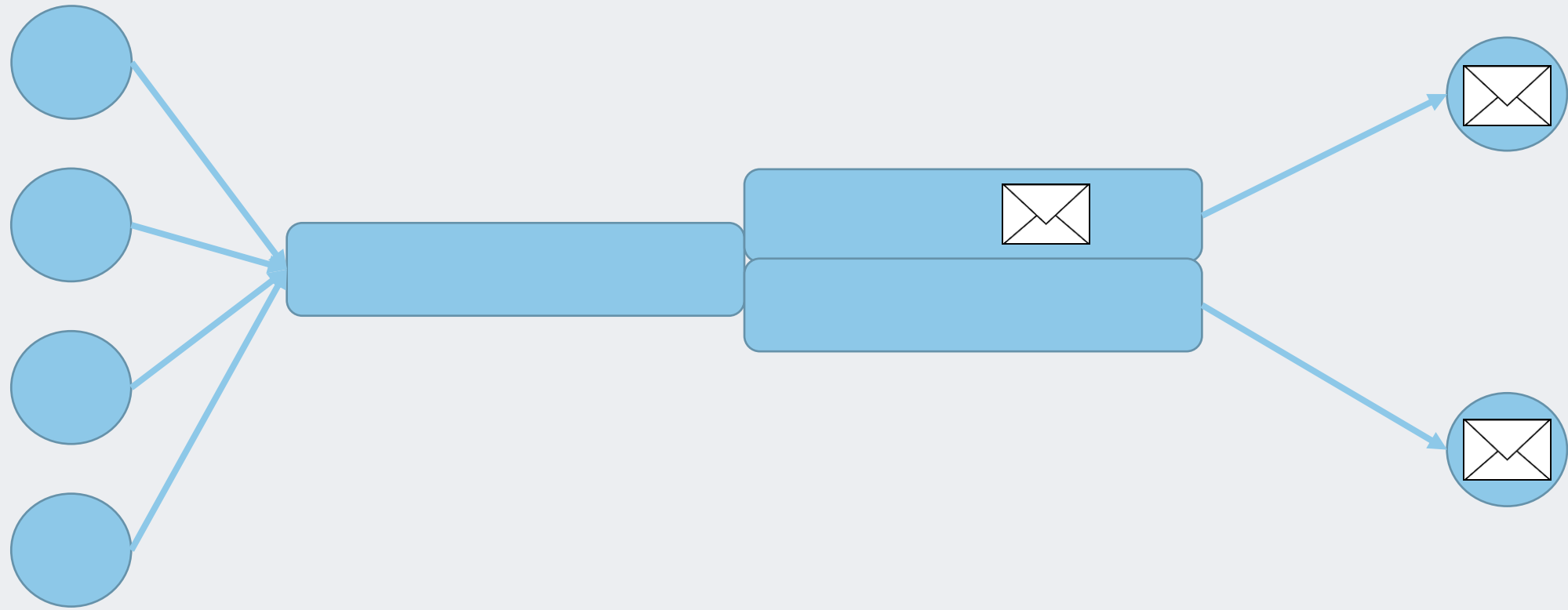
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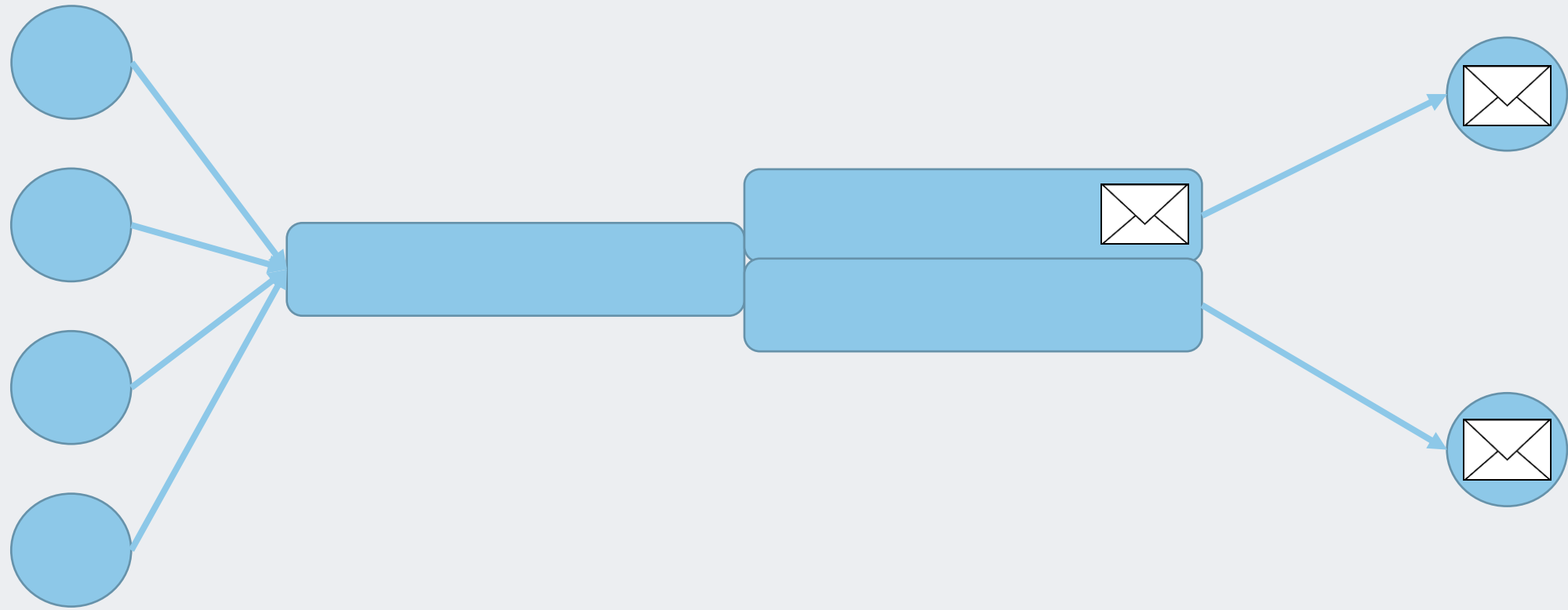
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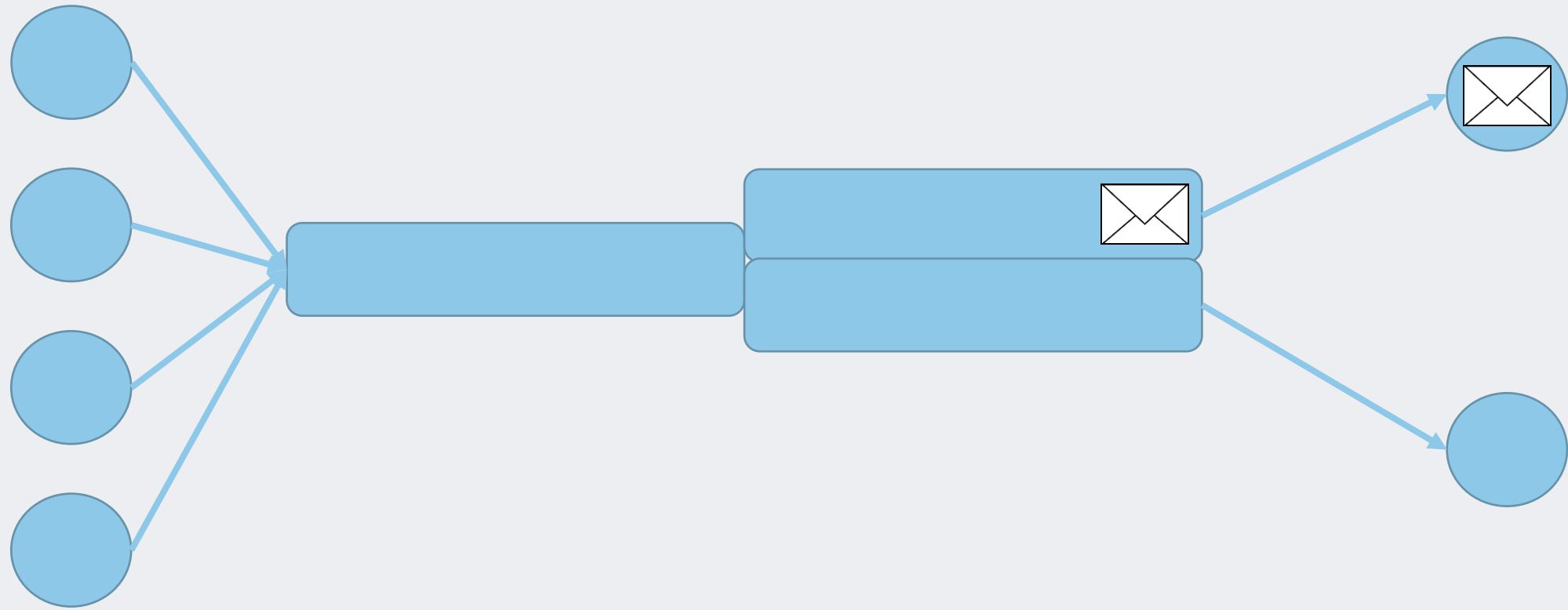


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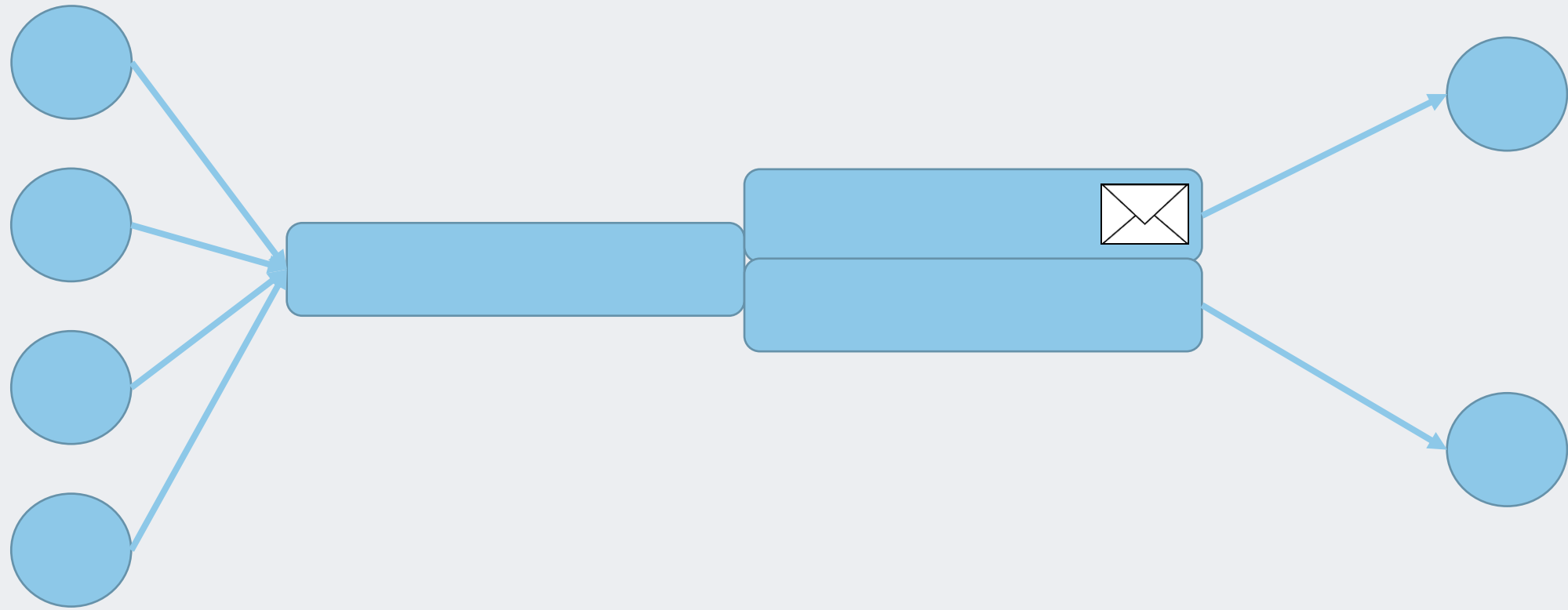




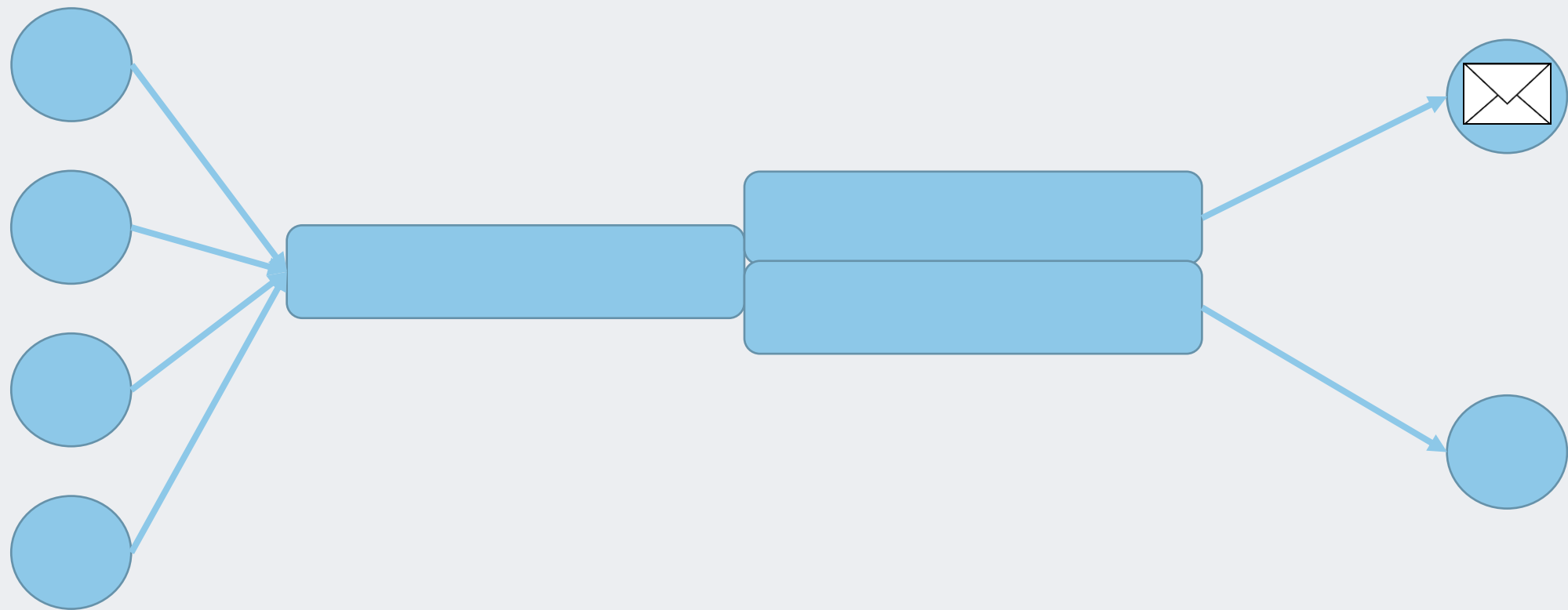
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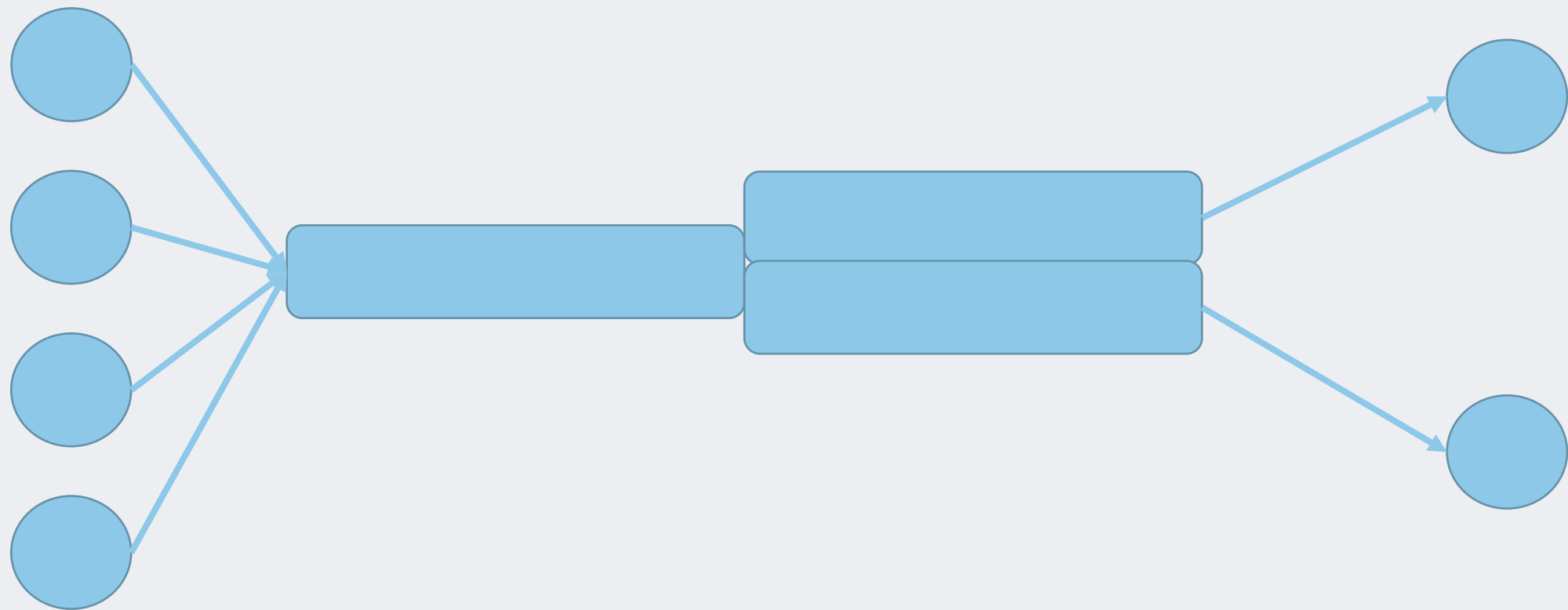
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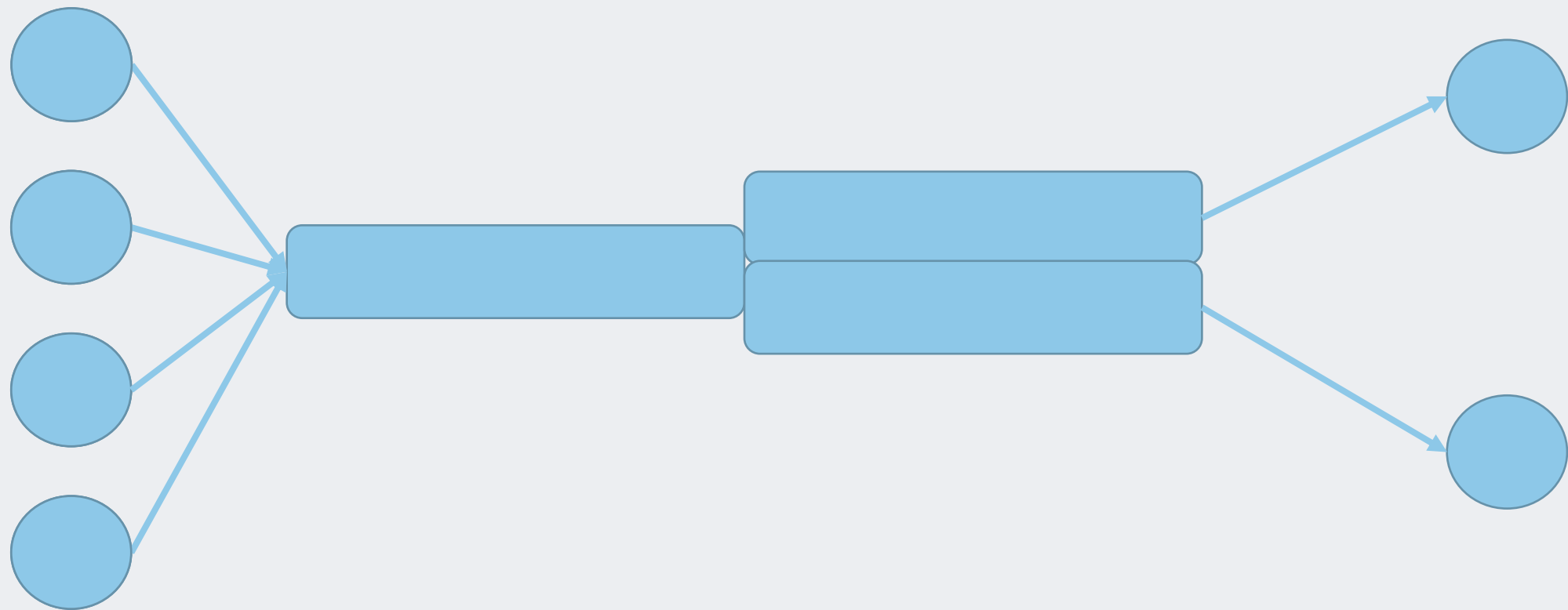




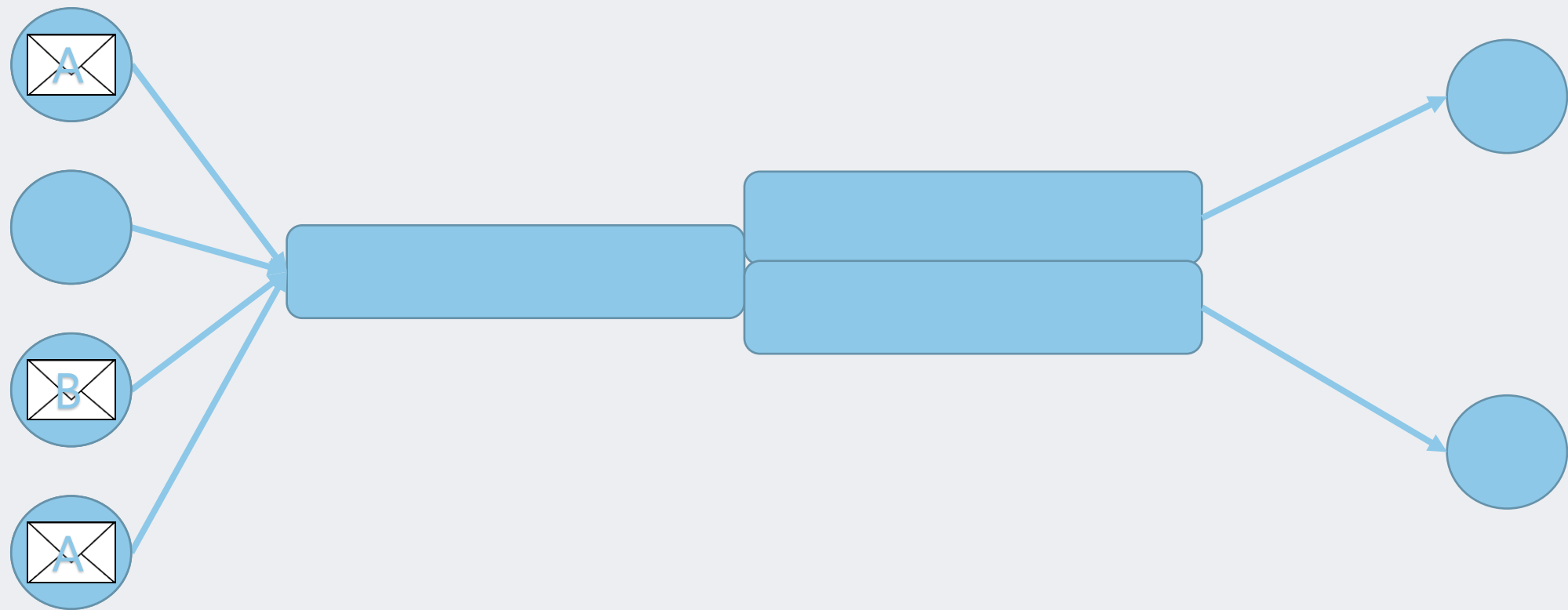
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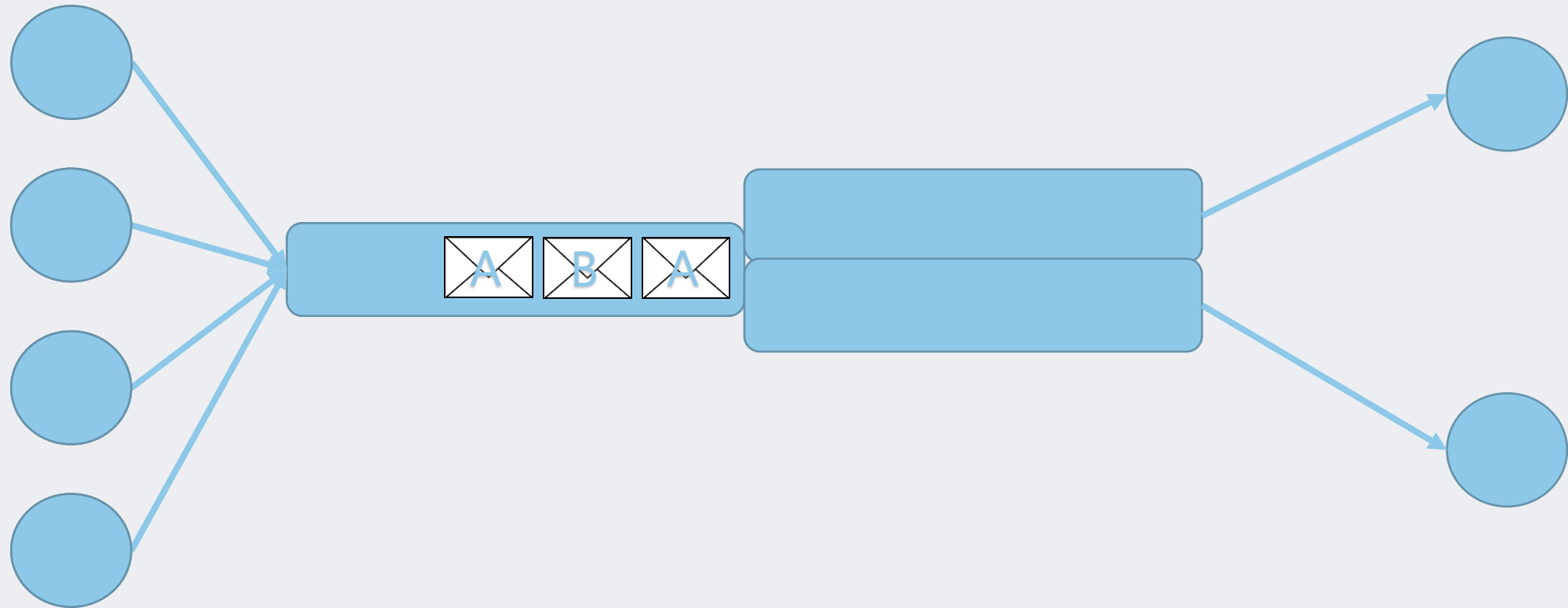
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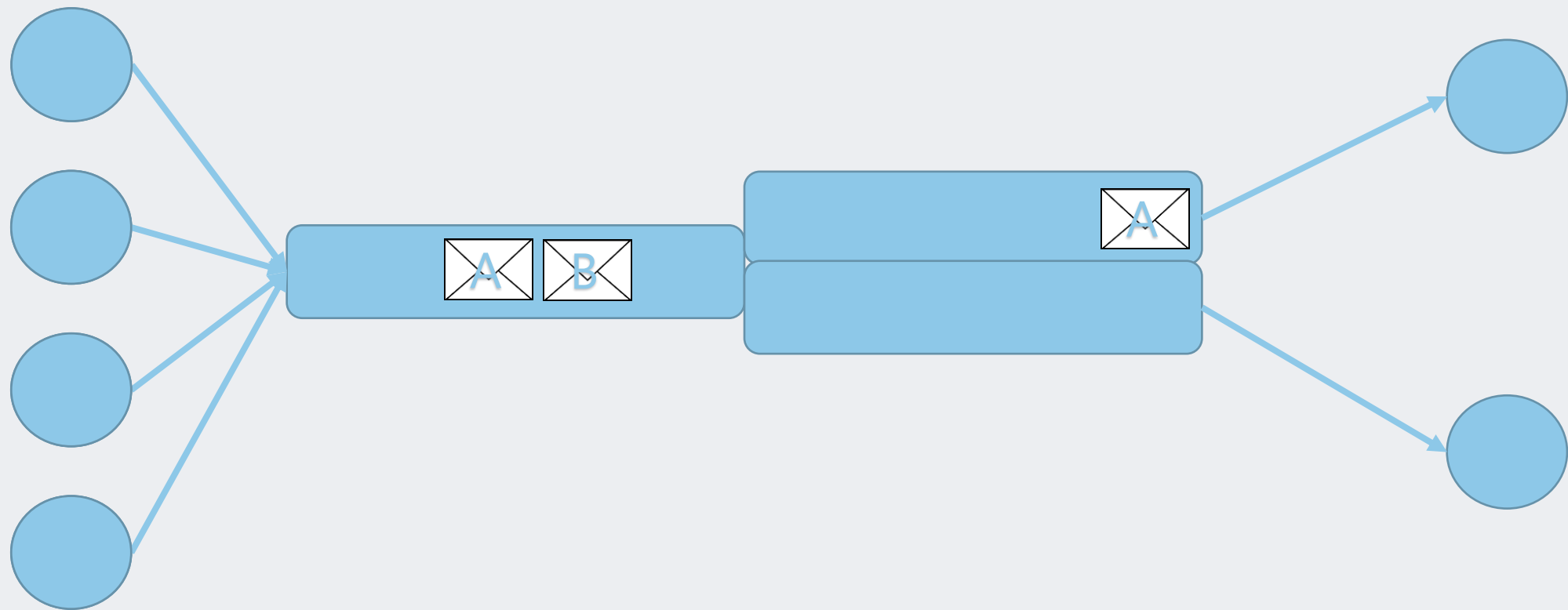


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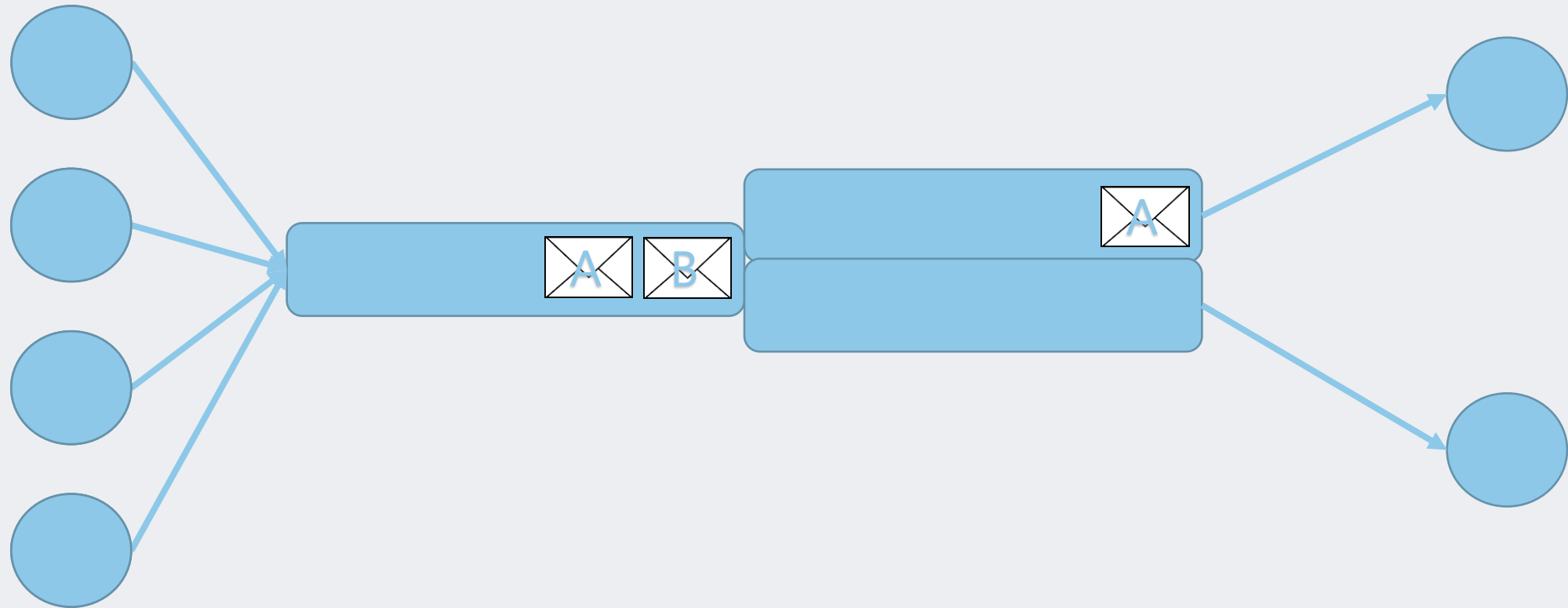




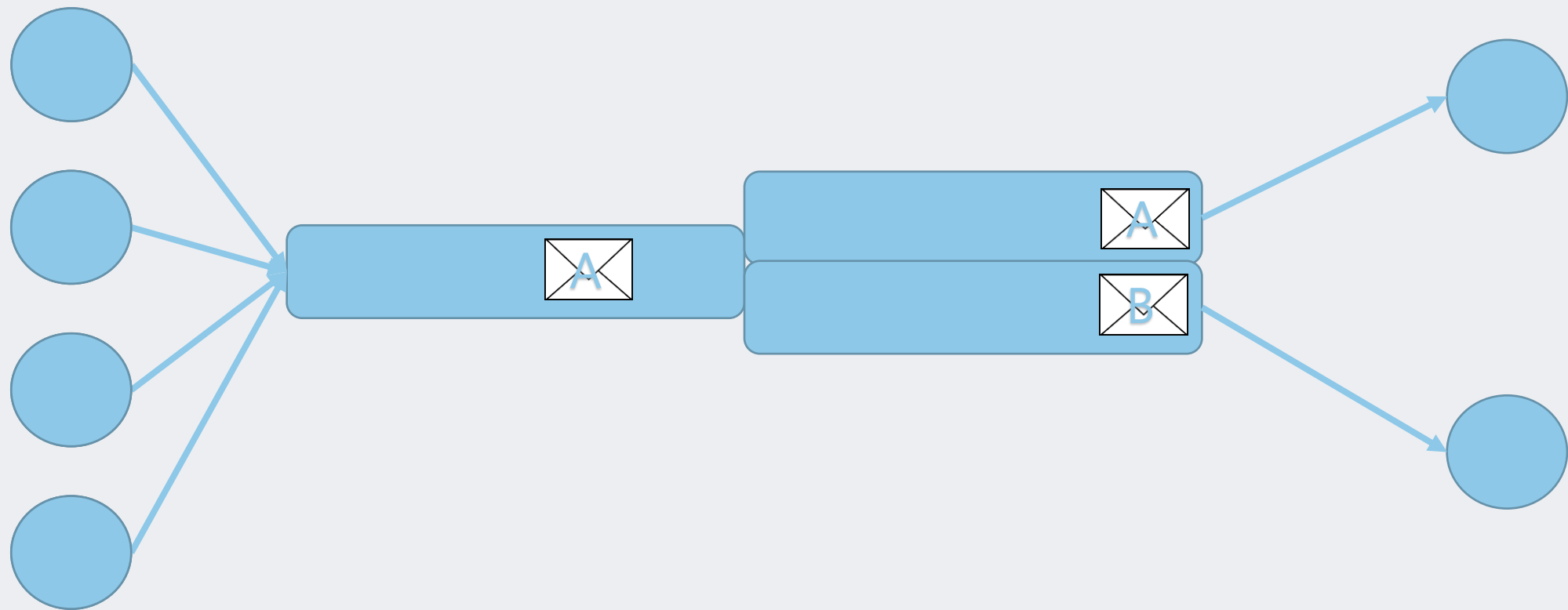
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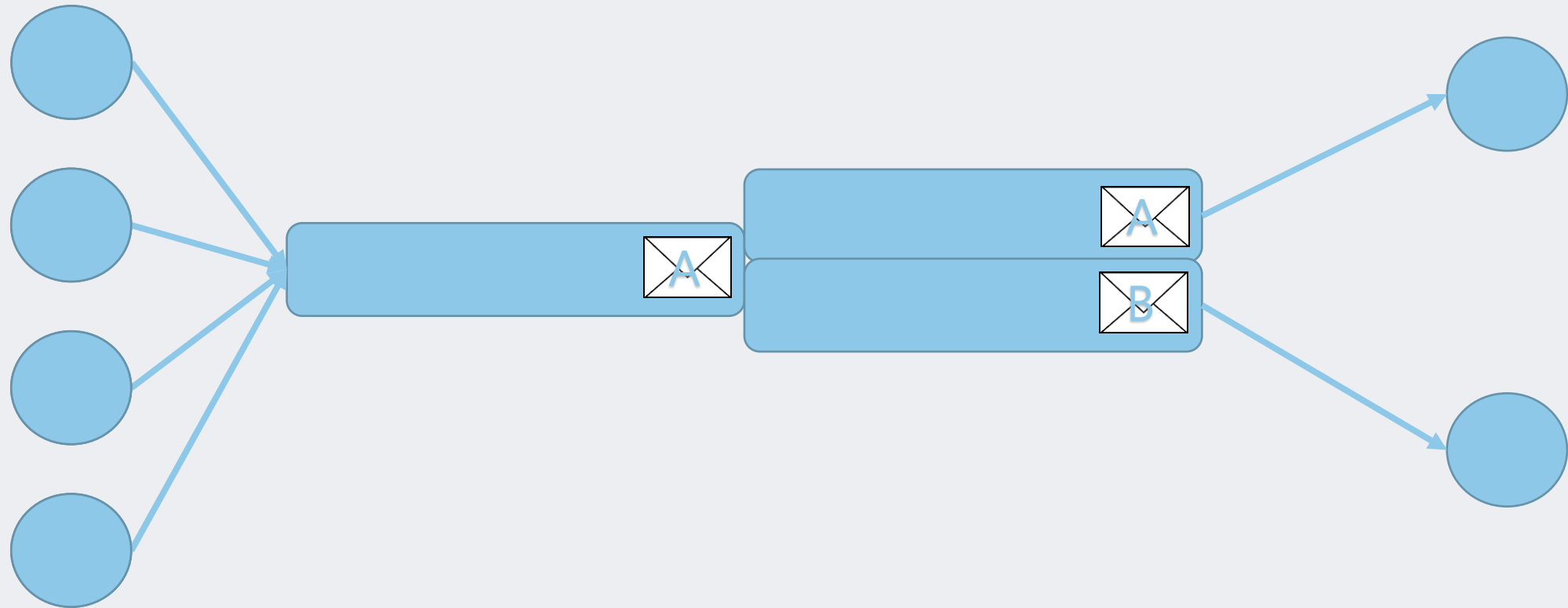
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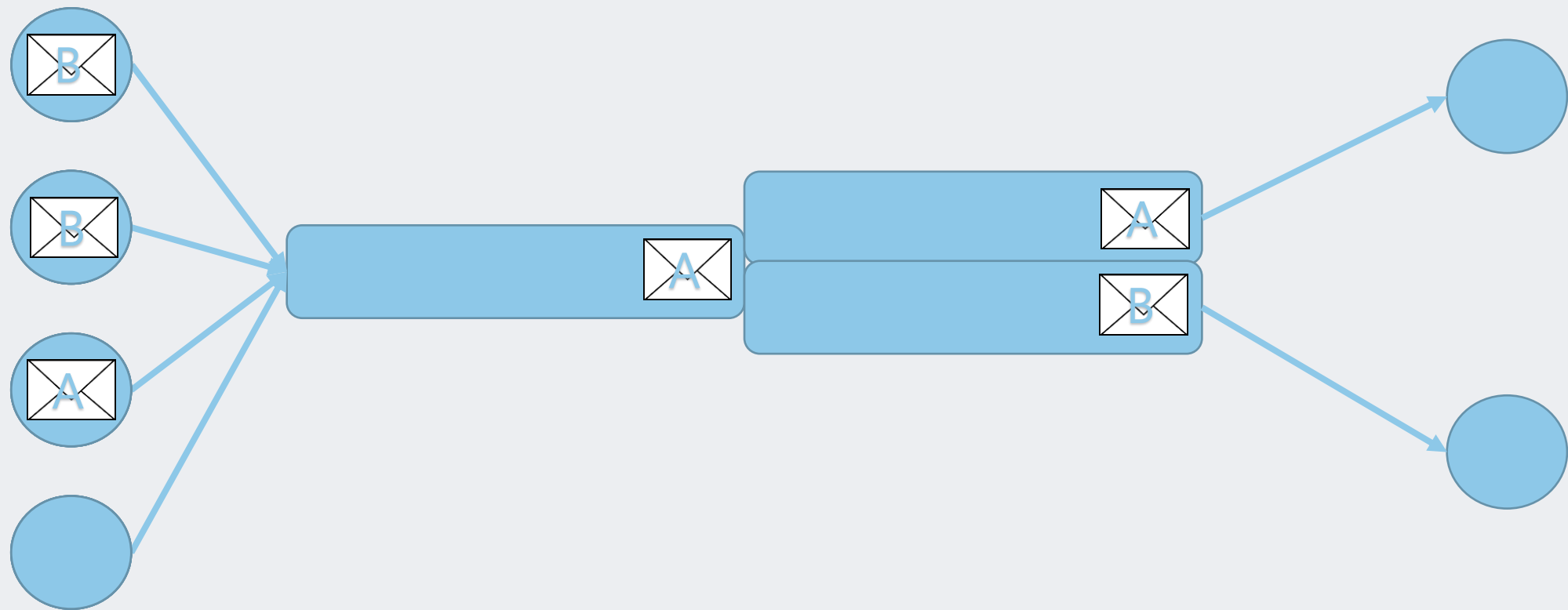
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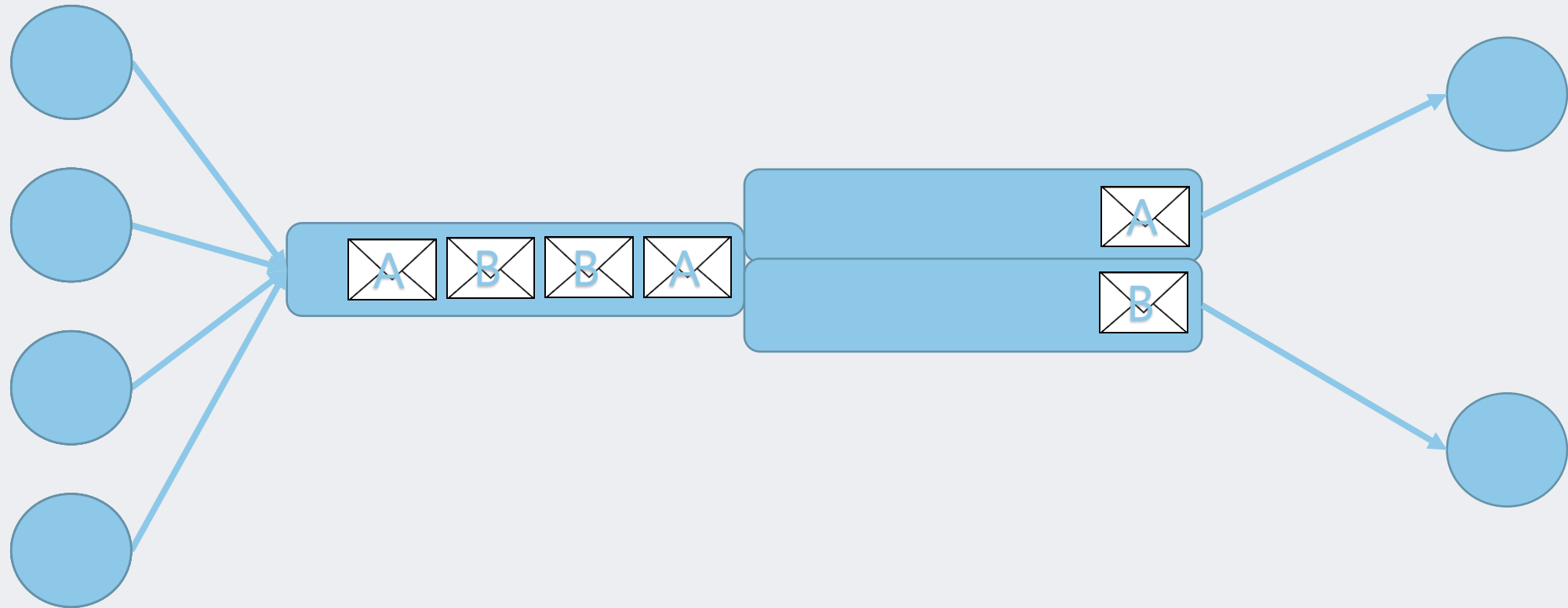
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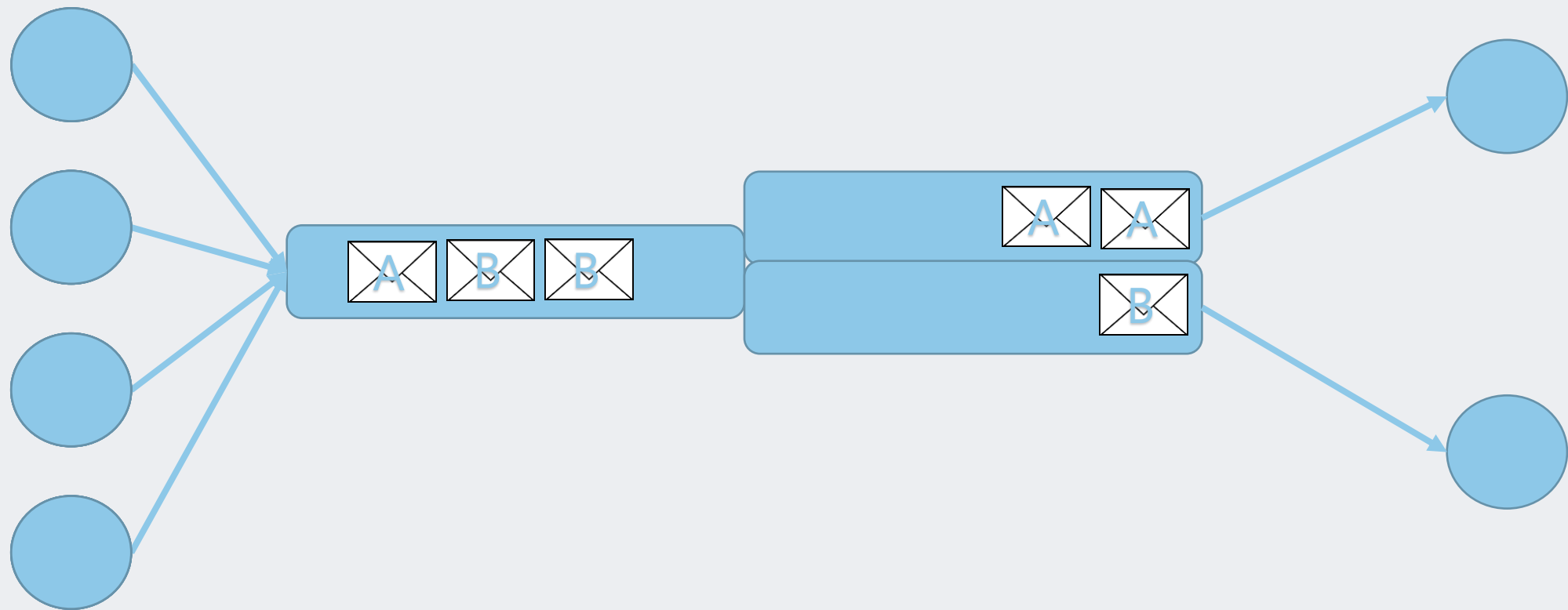
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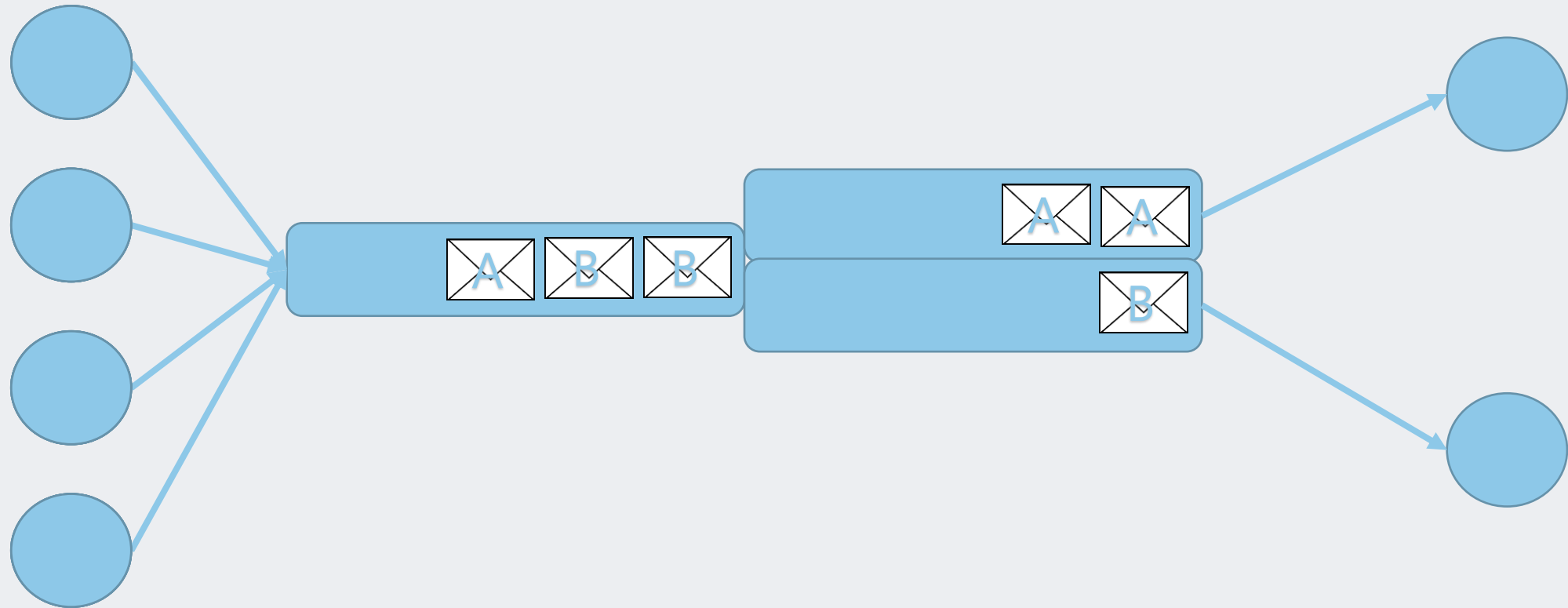
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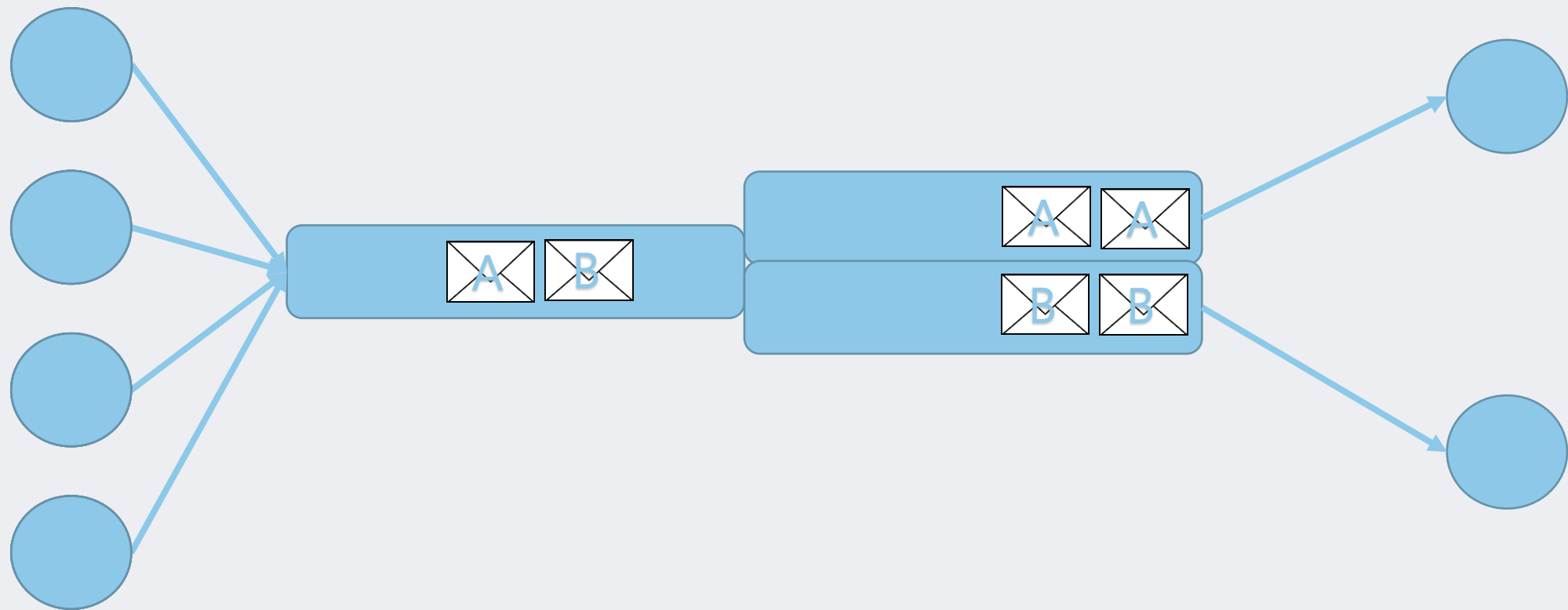


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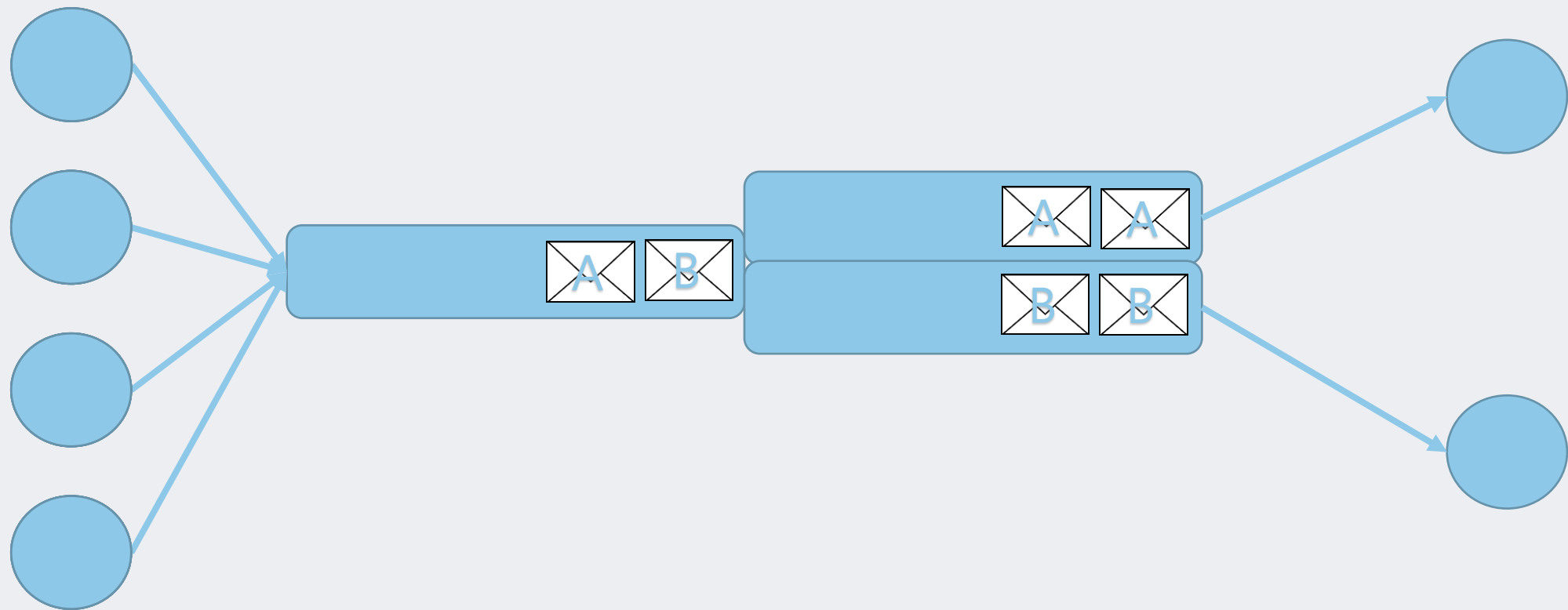




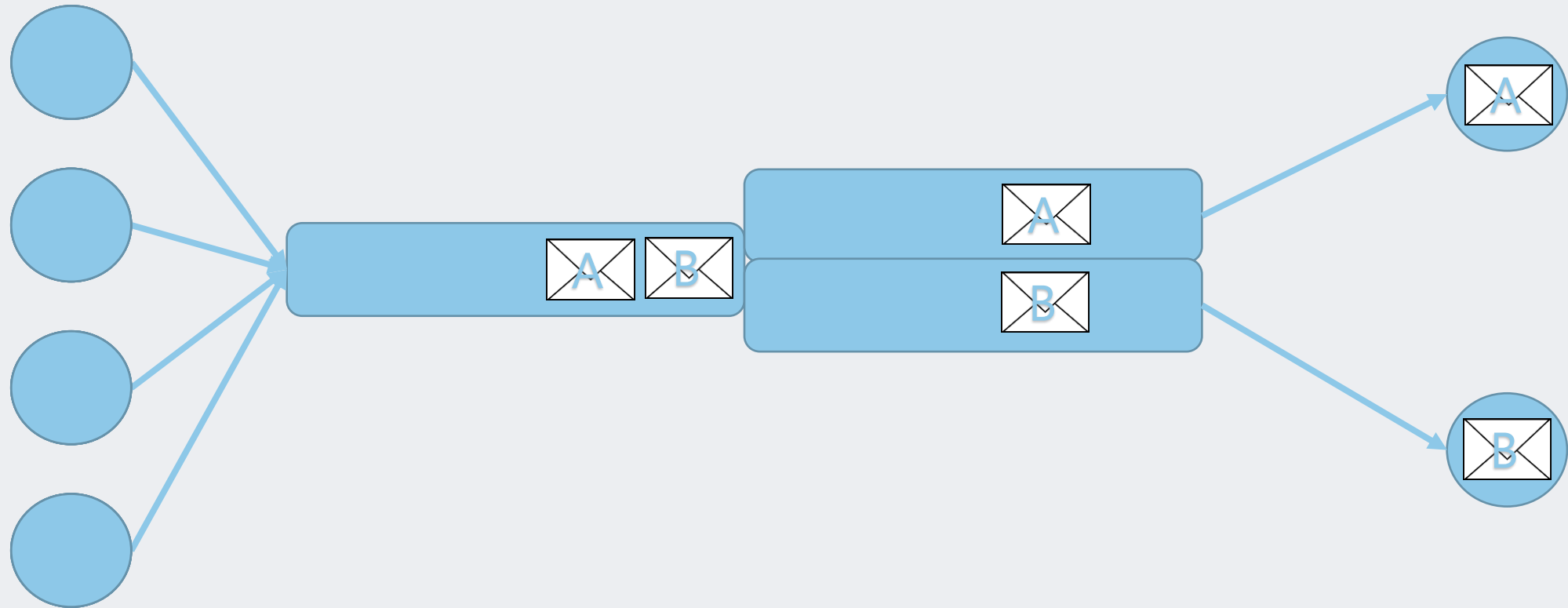
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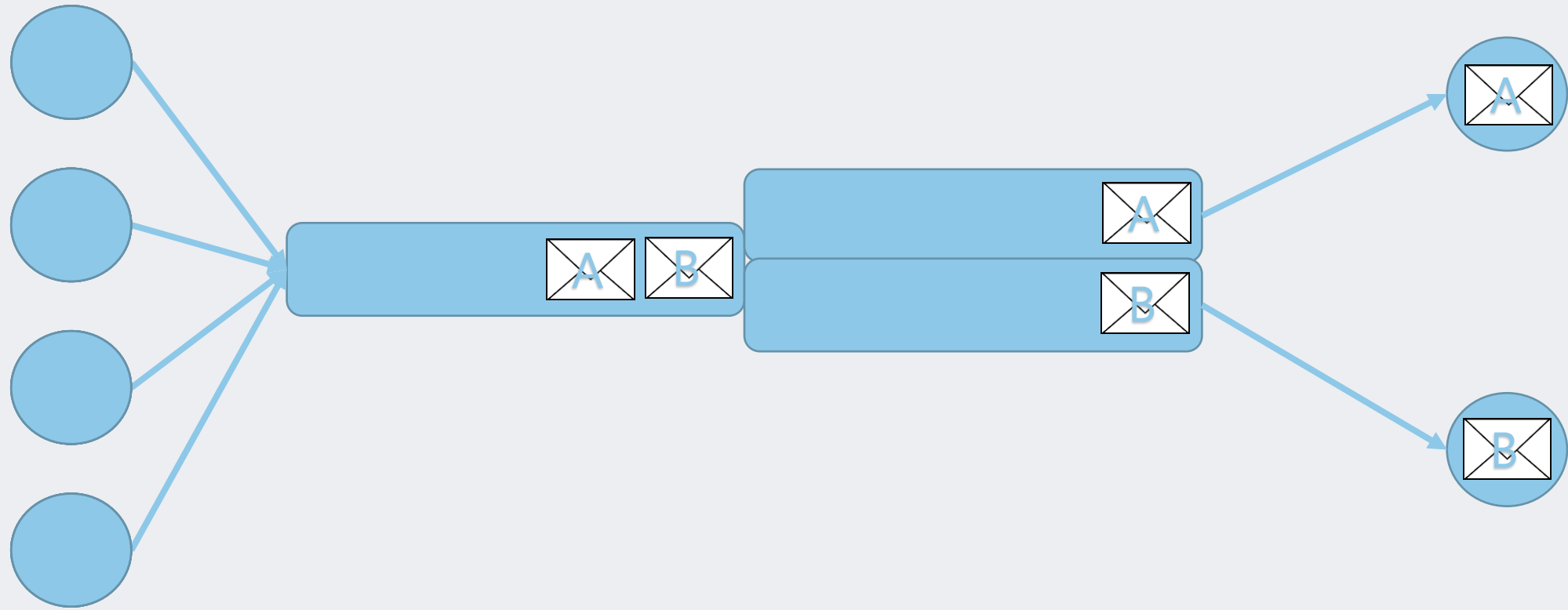
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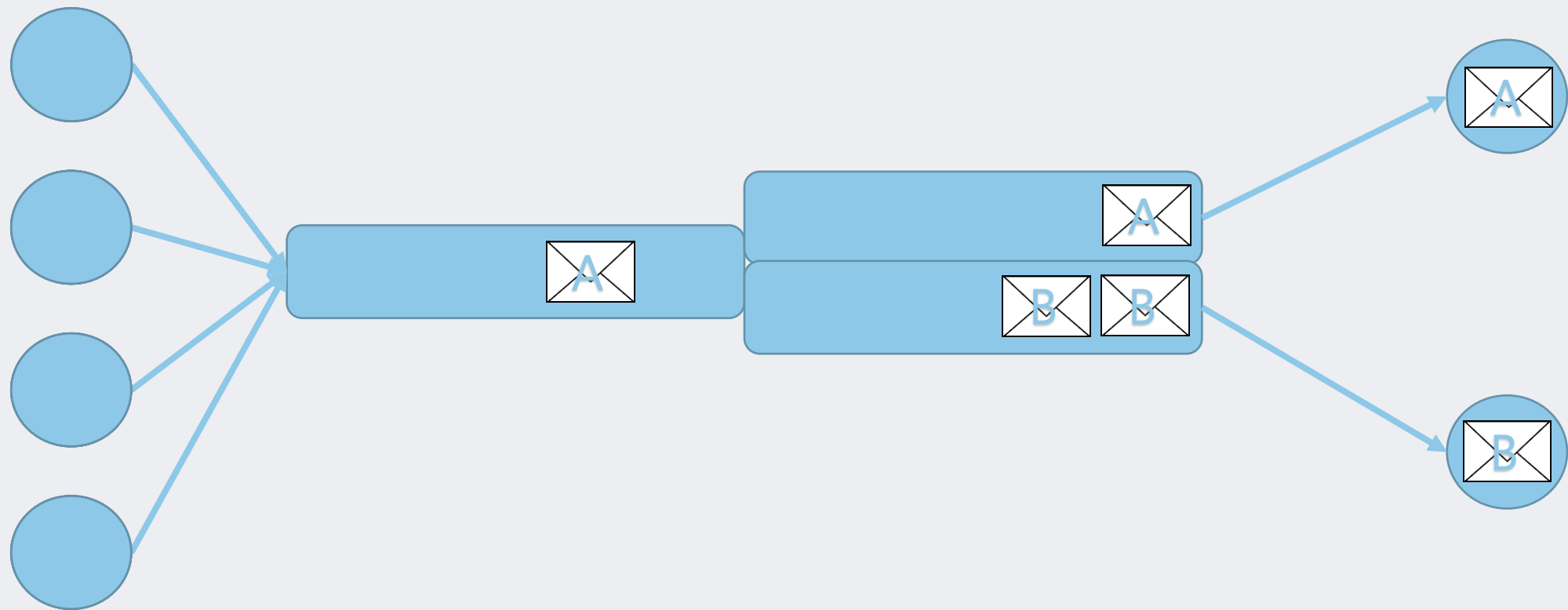
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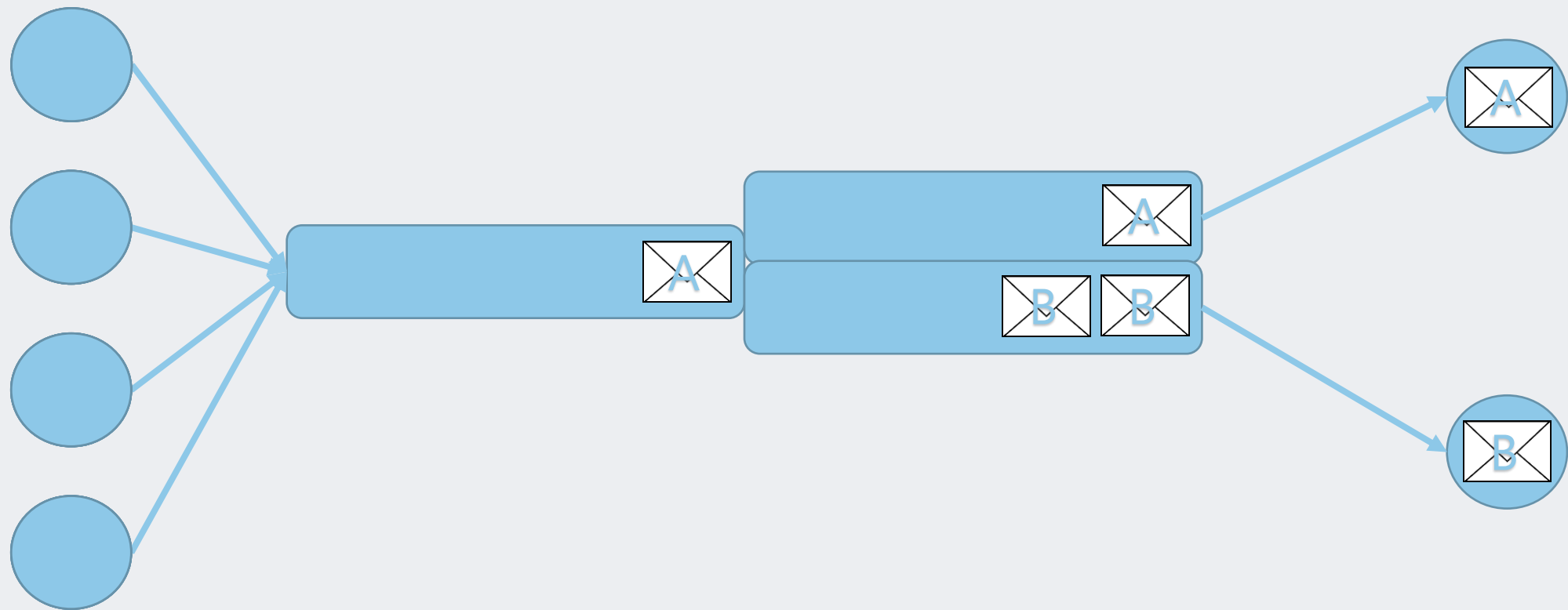
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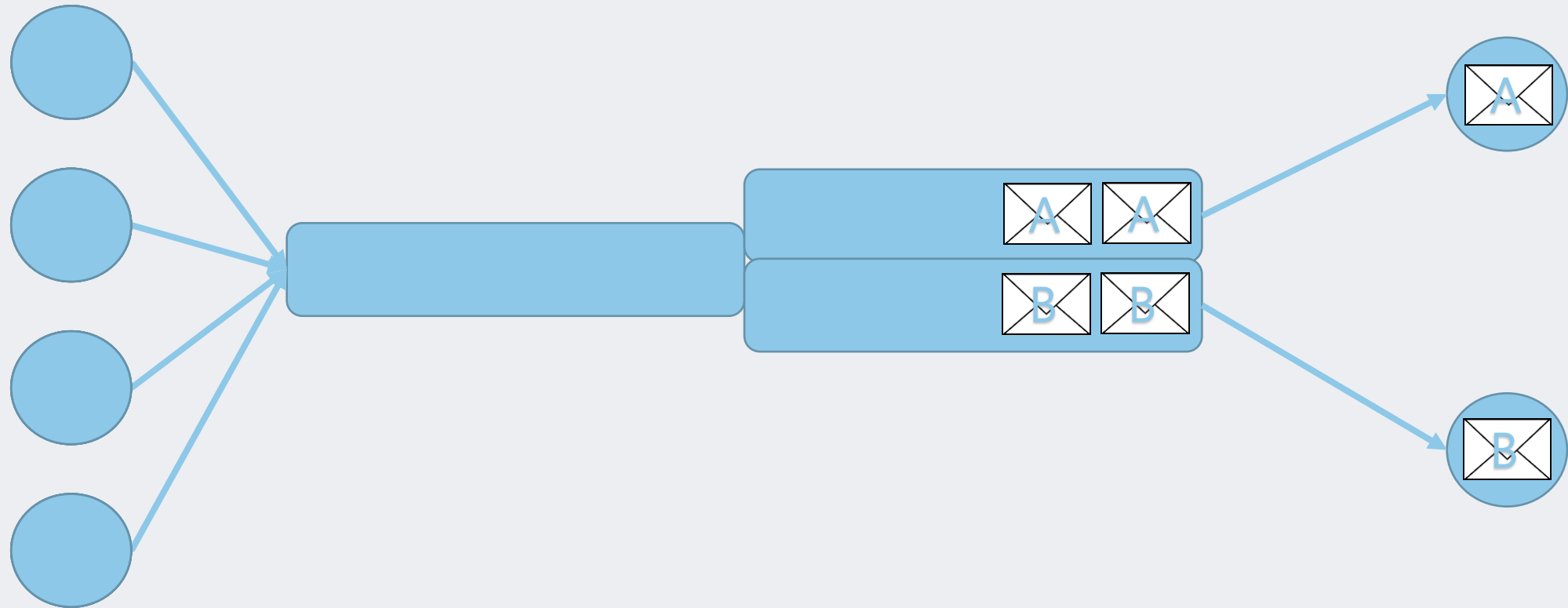
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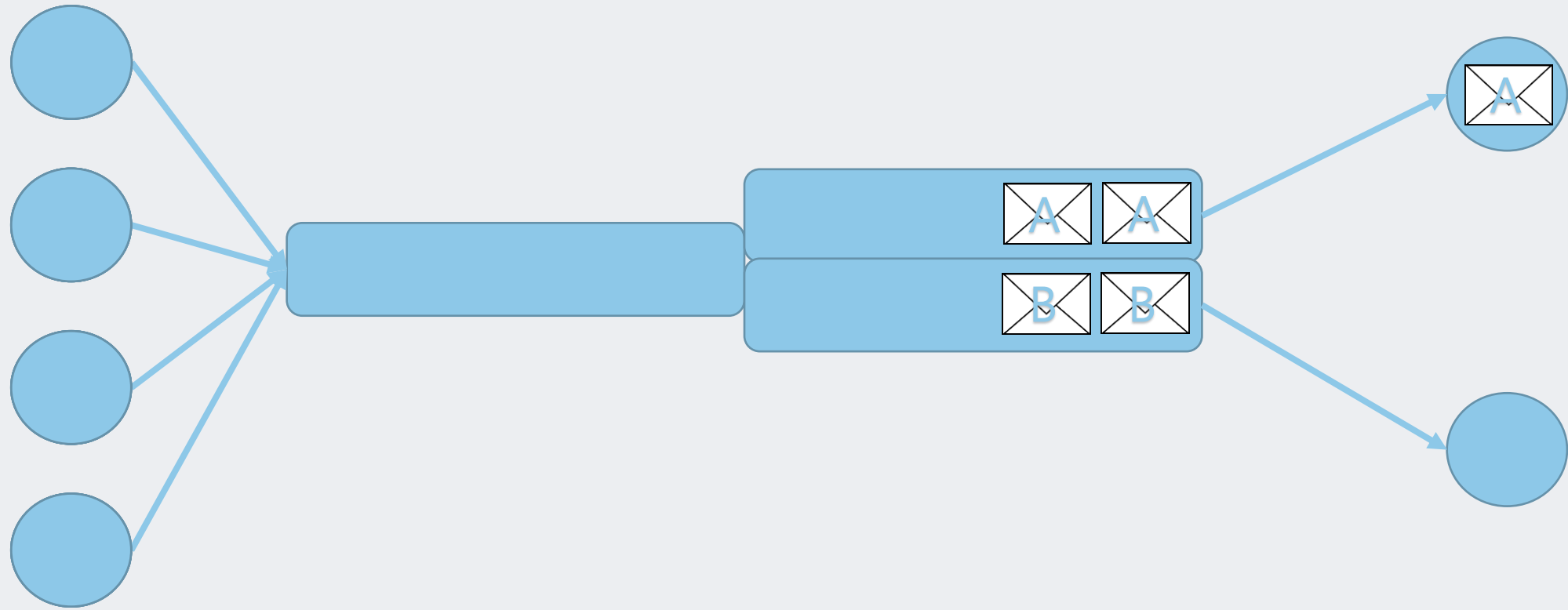
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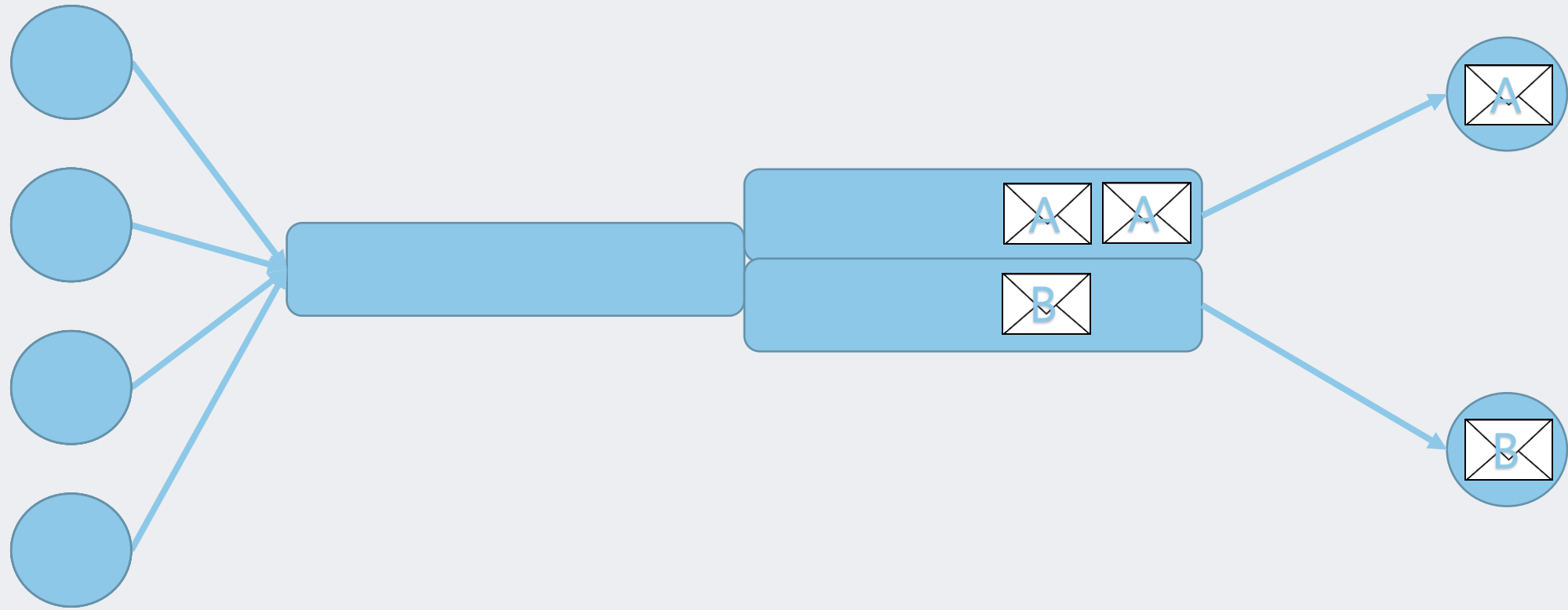


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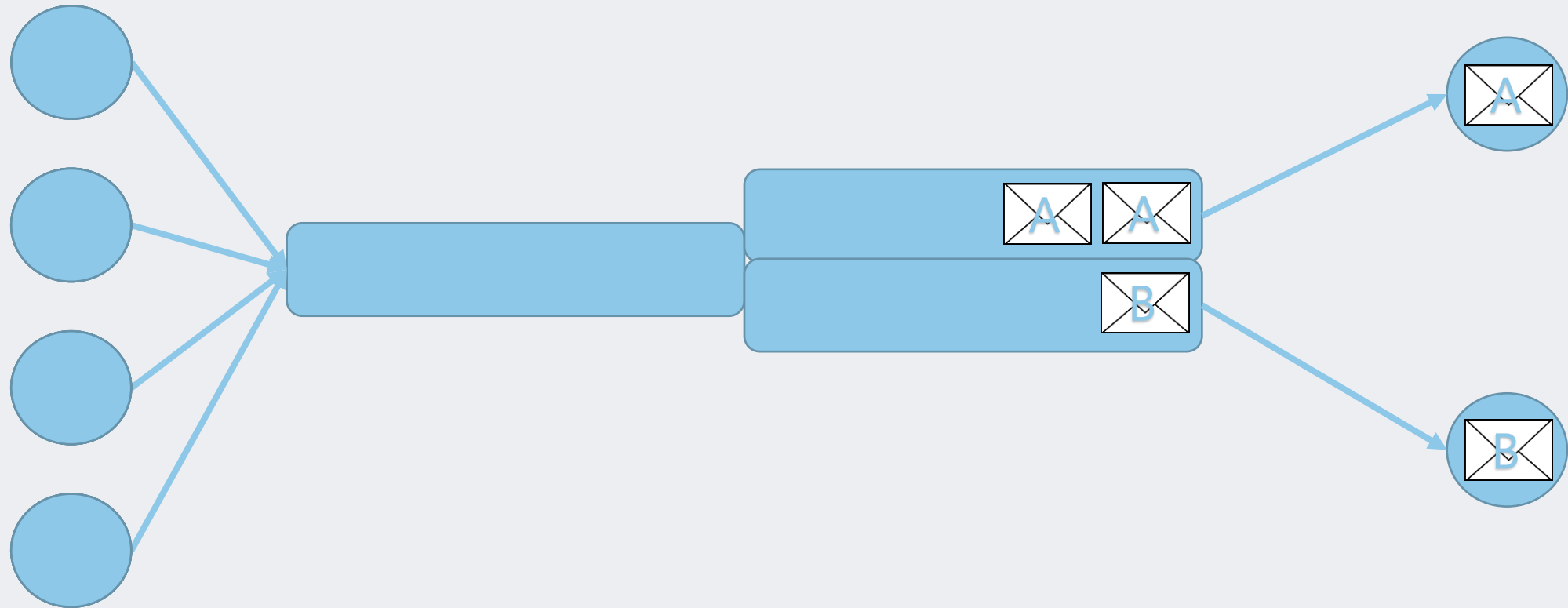




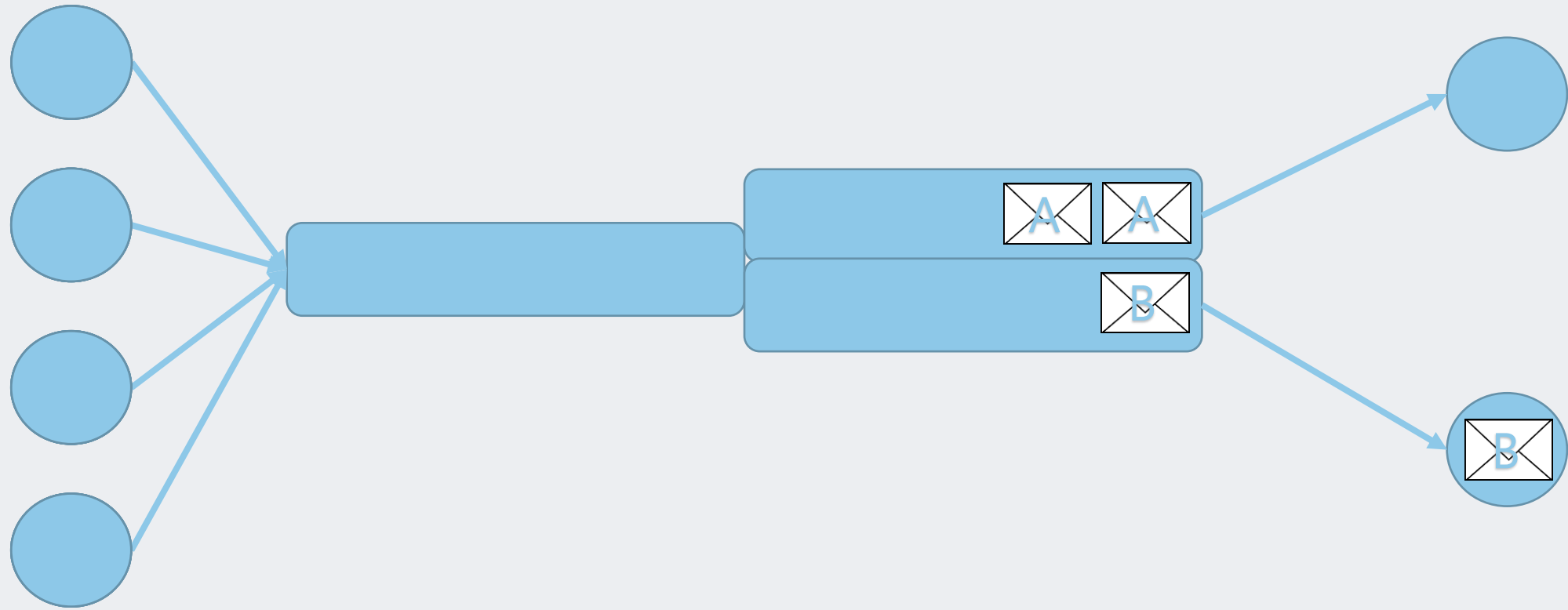
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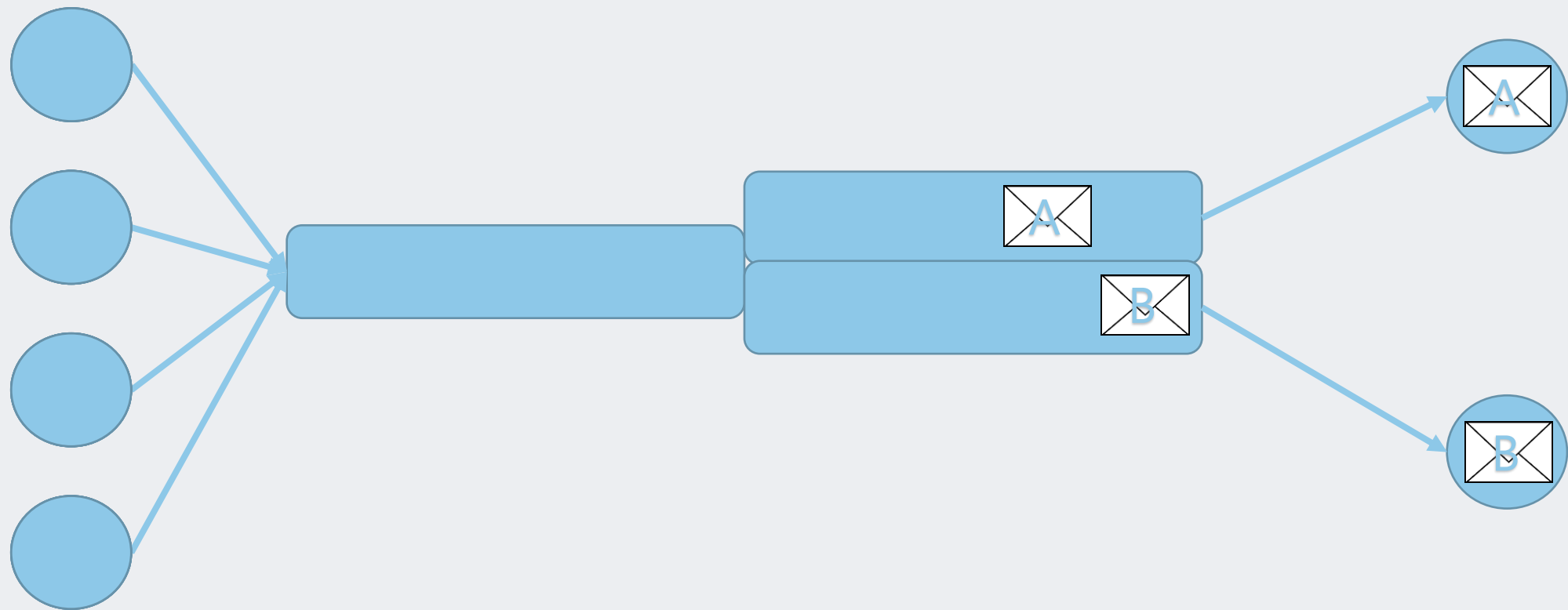
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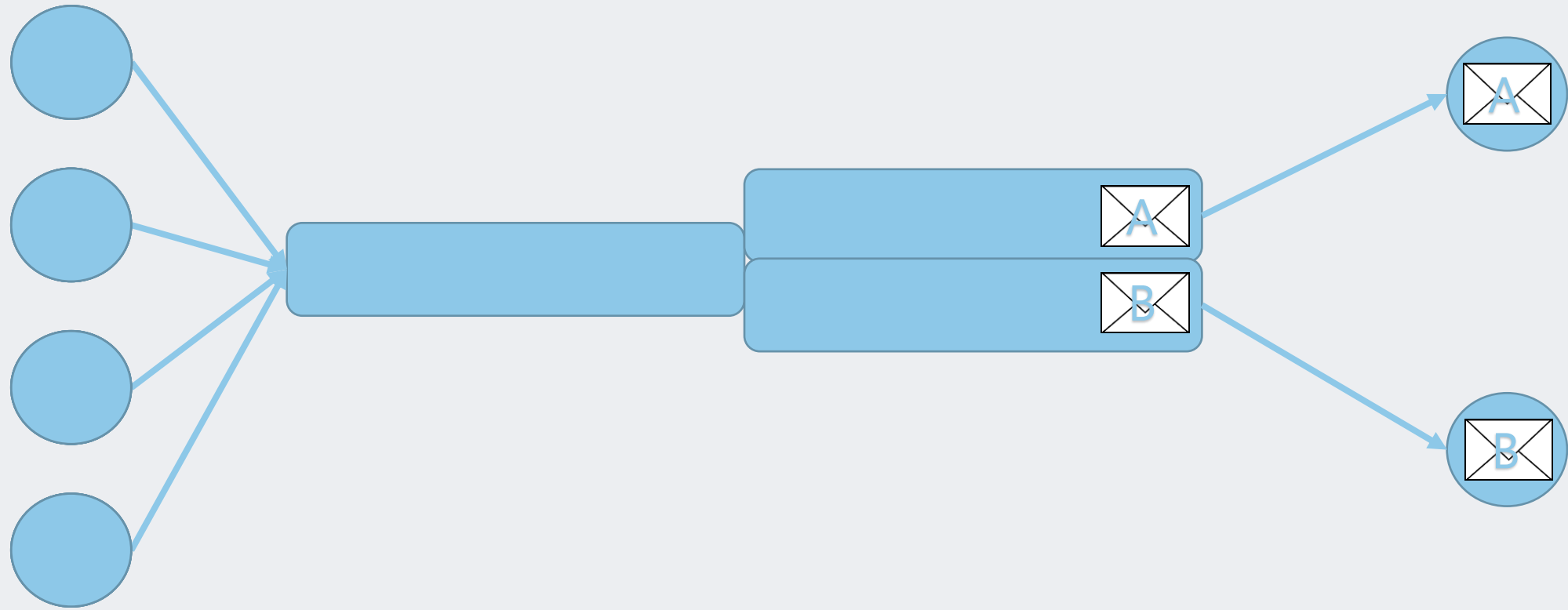
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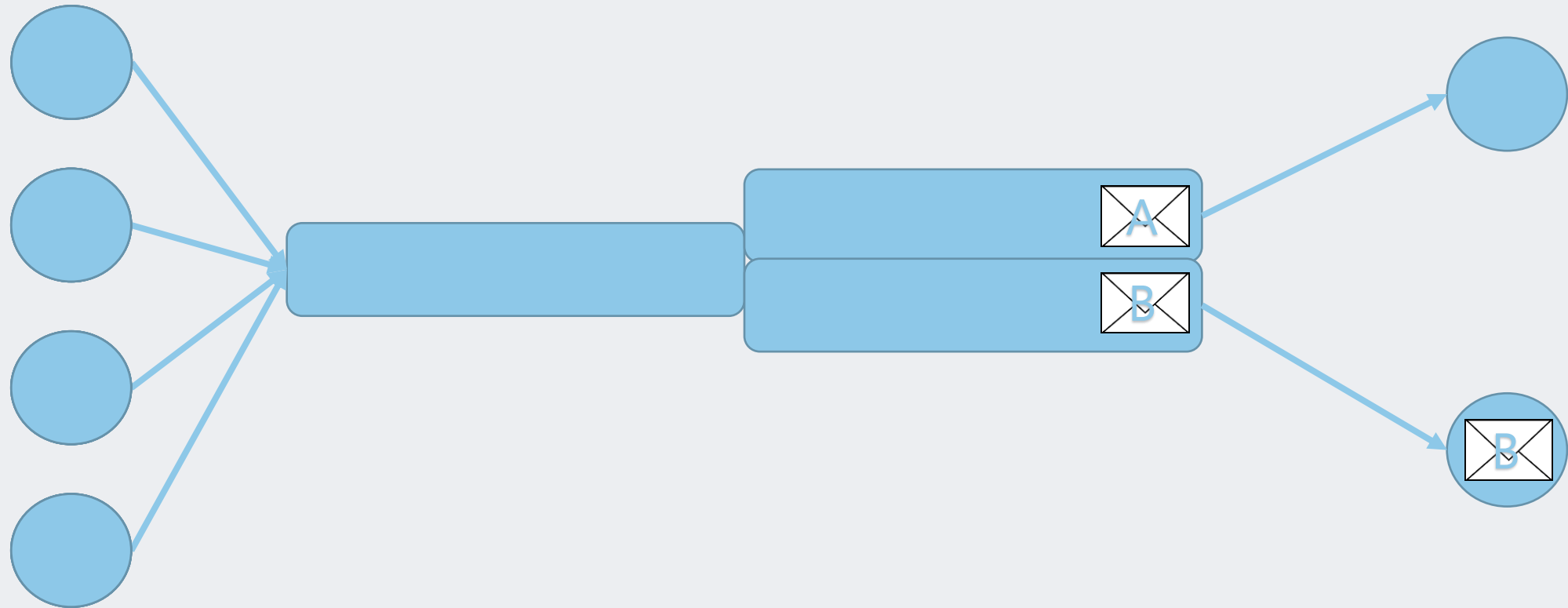
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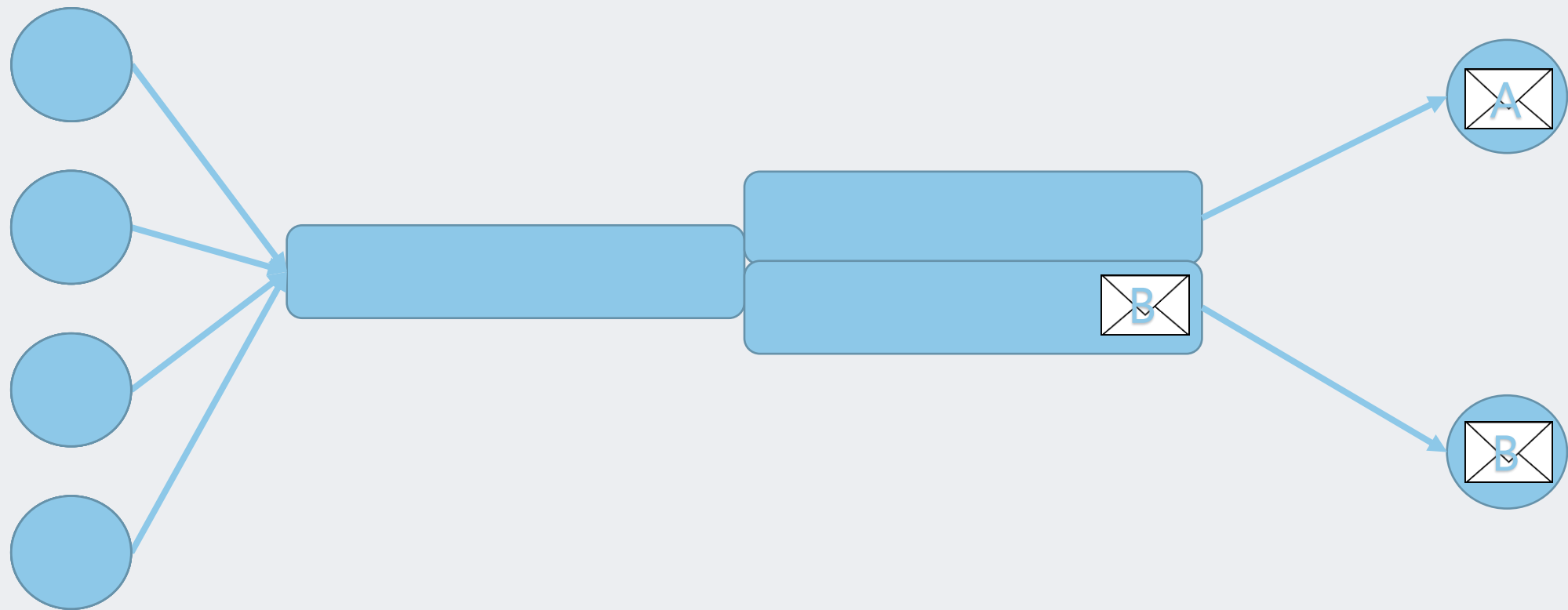
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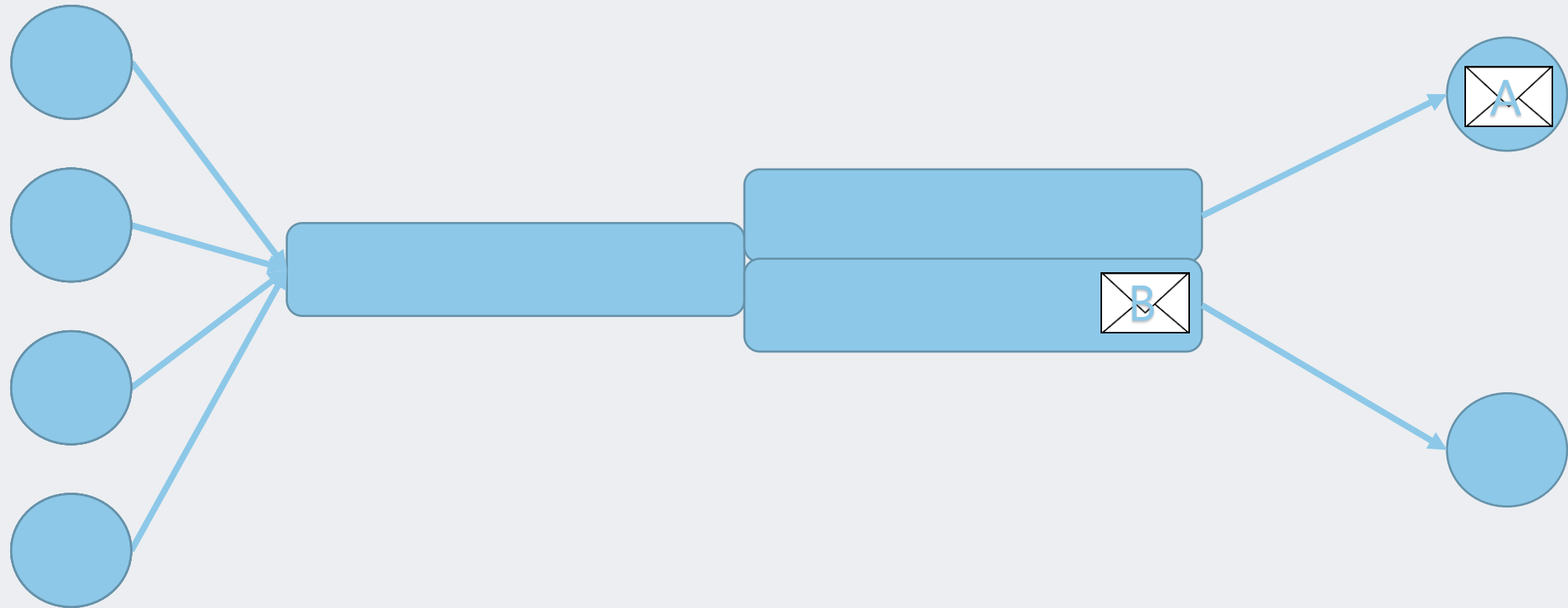
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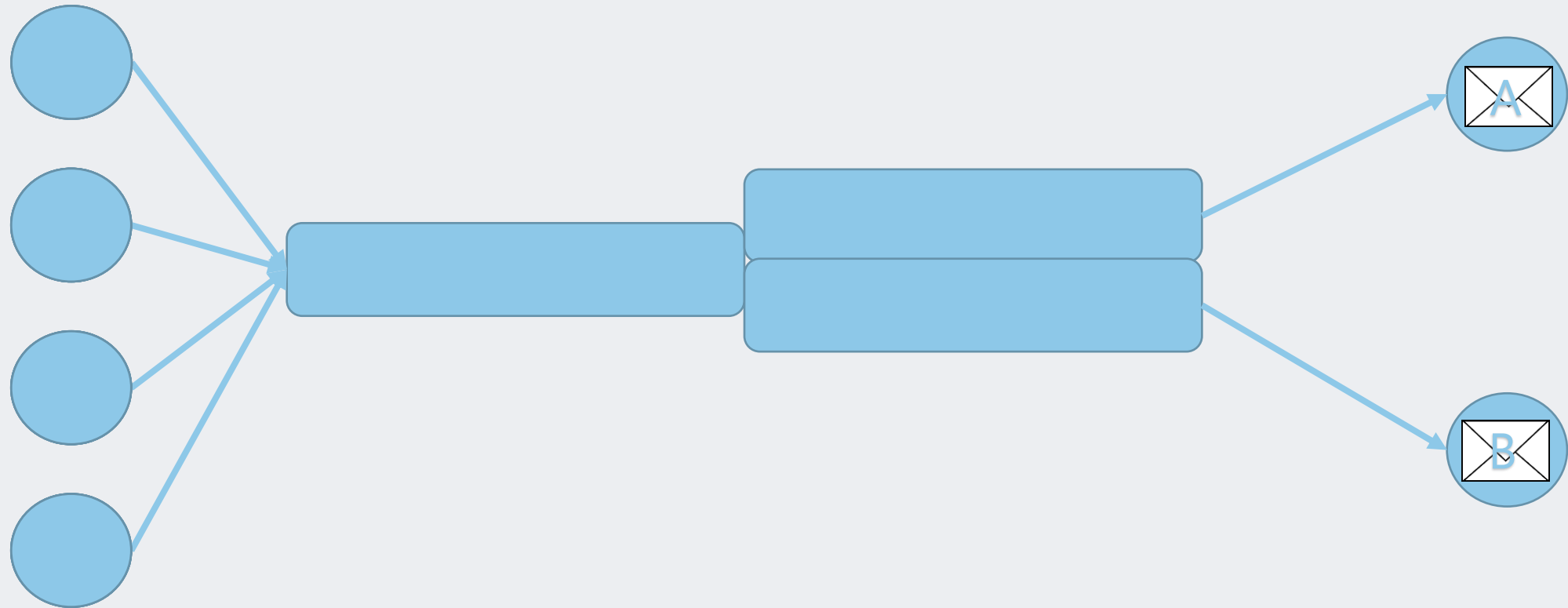


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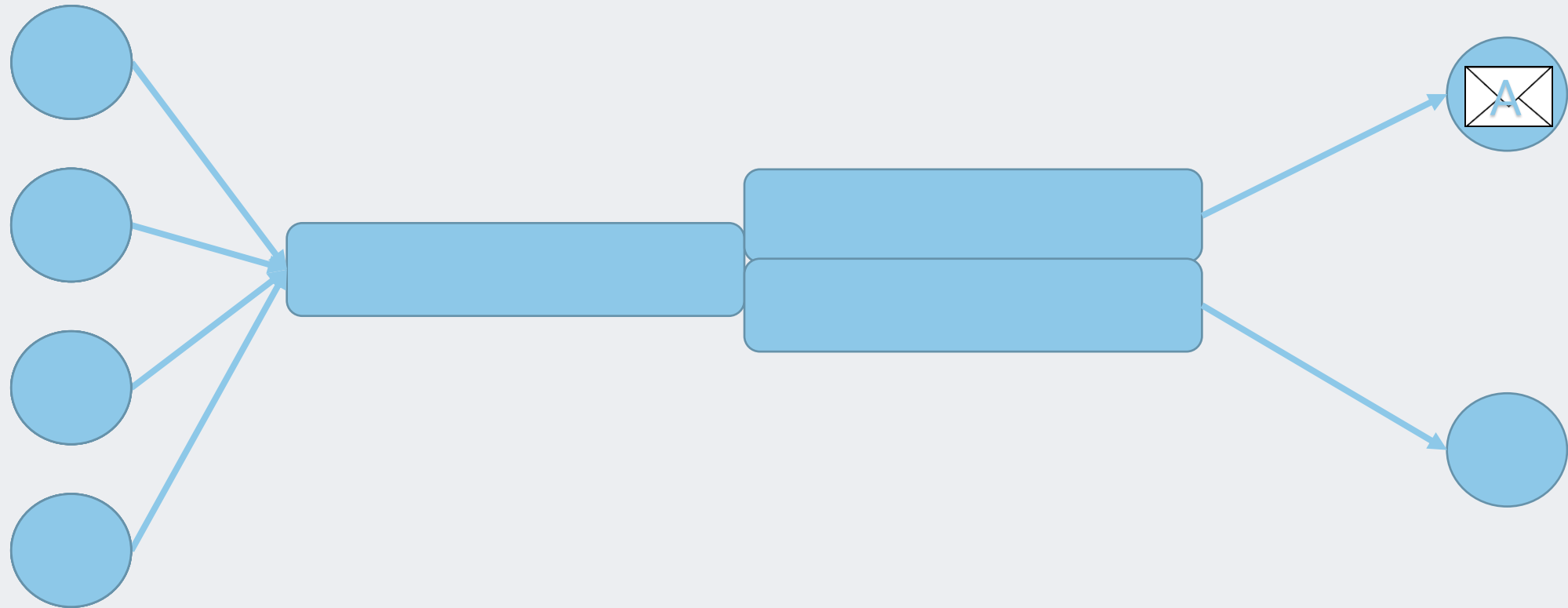




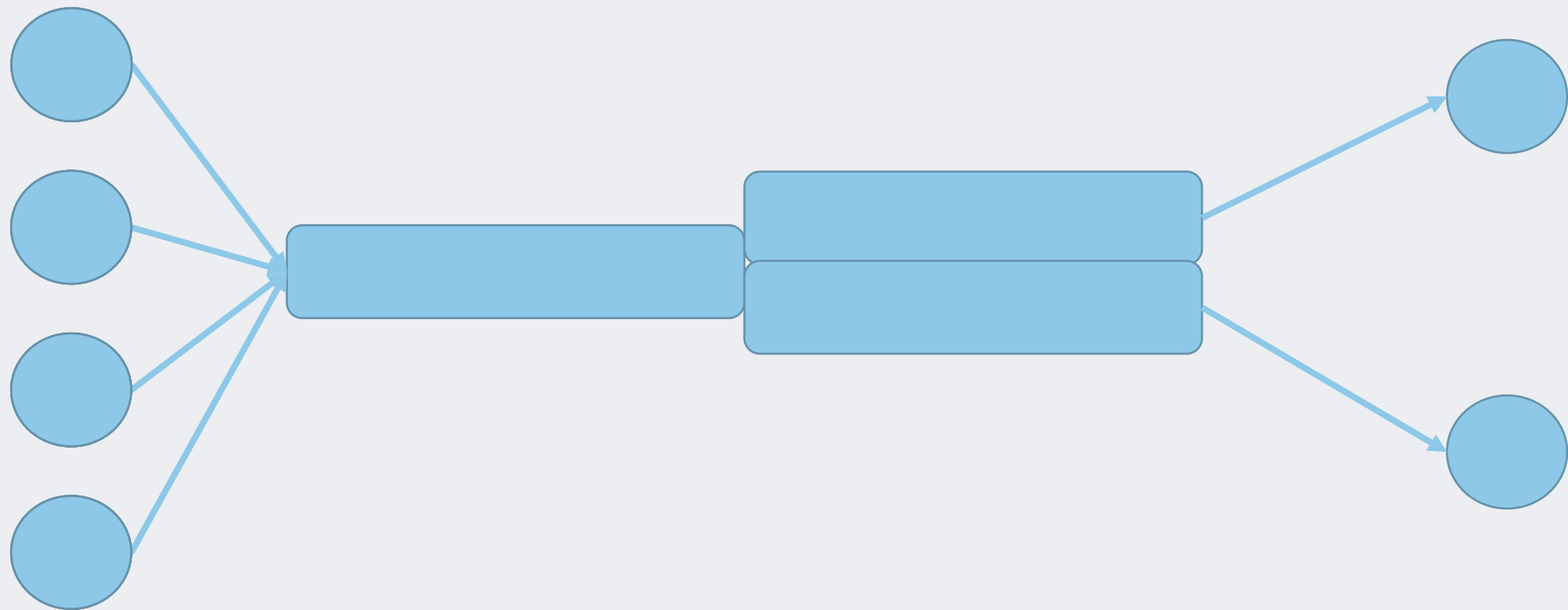
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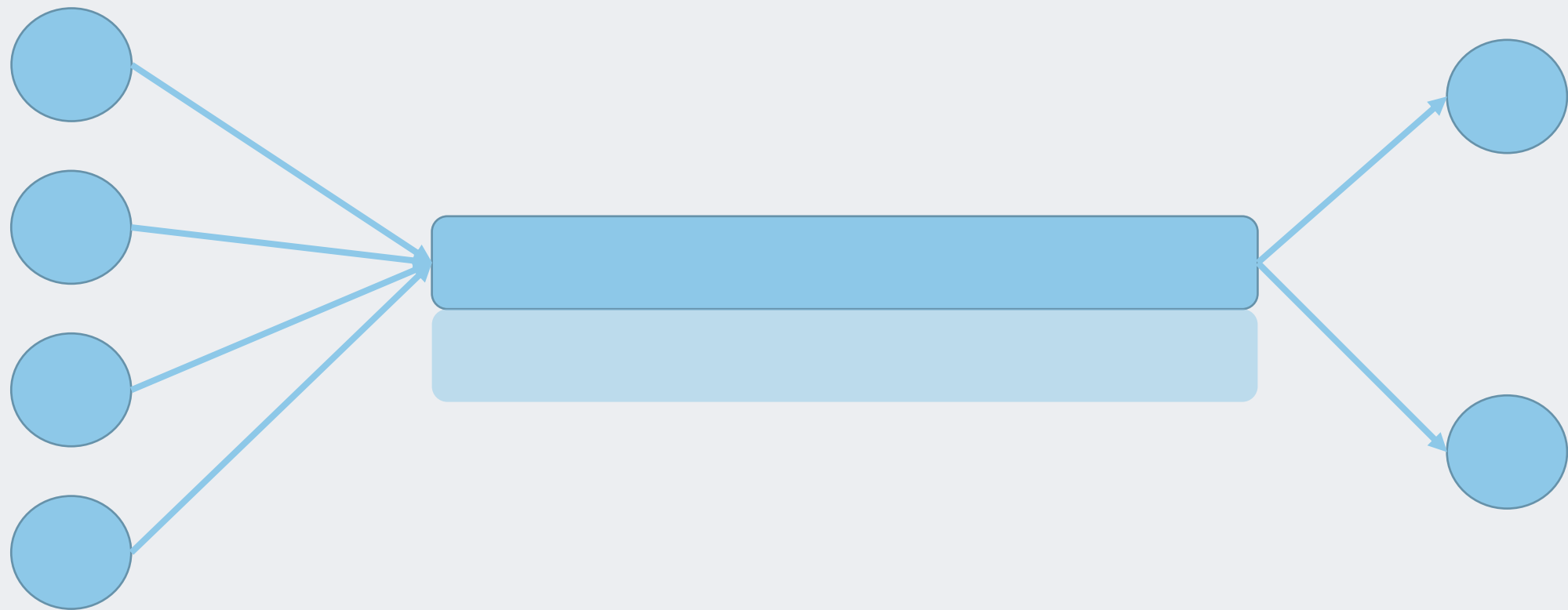
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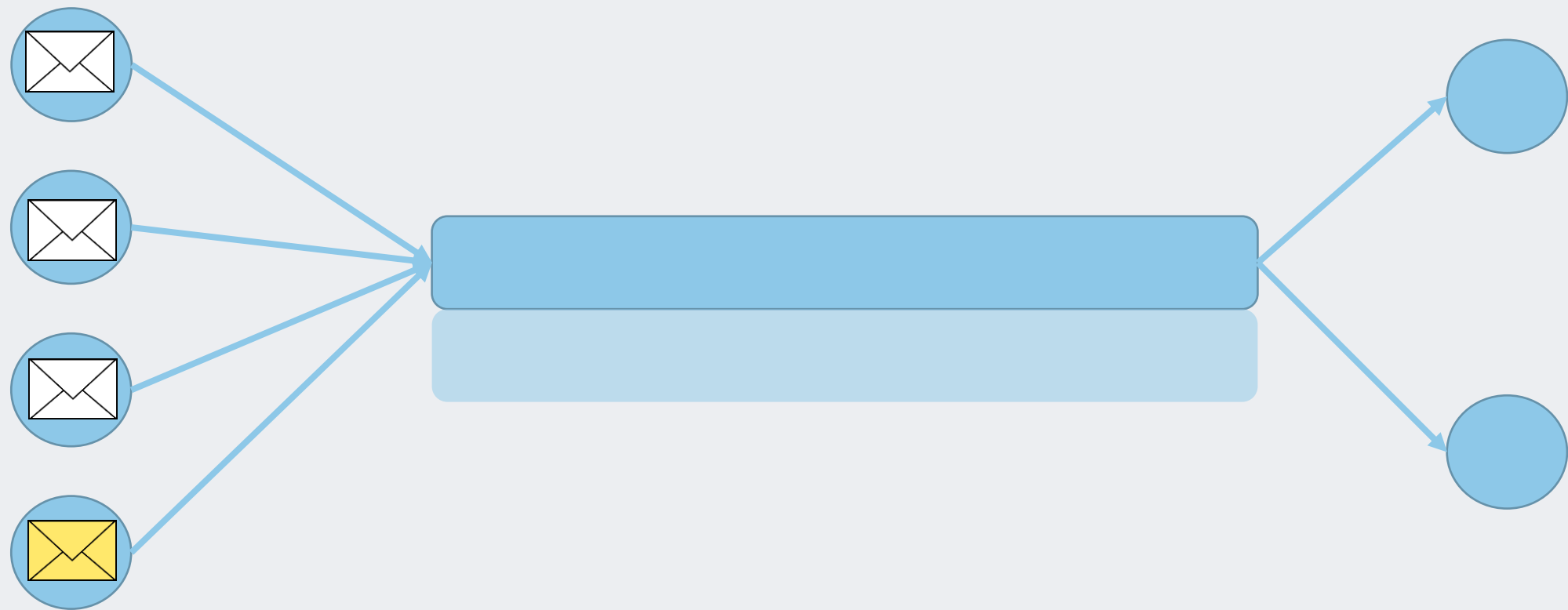
# Message Poisoning

[https://en.wikipedia.org/wiki/Poison\\_message](https://en.wikipedia.org/wiki/Poison_message)

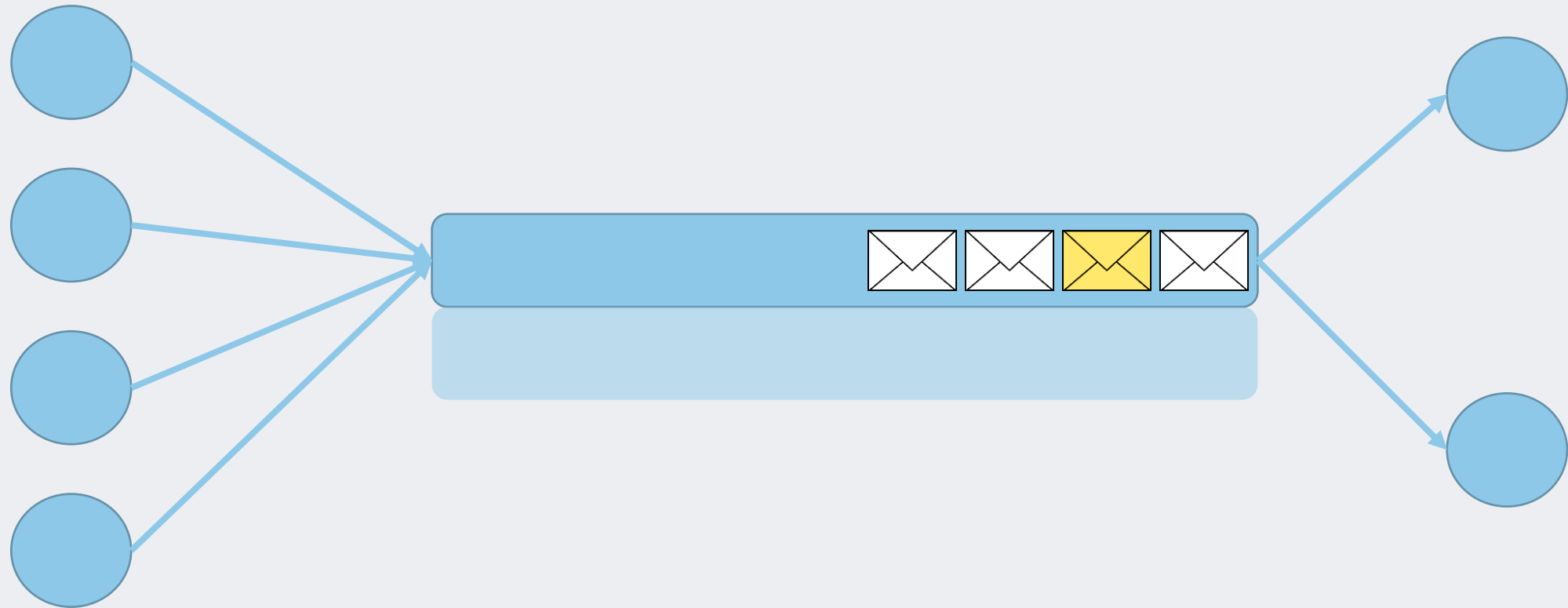
# Message Poisoning



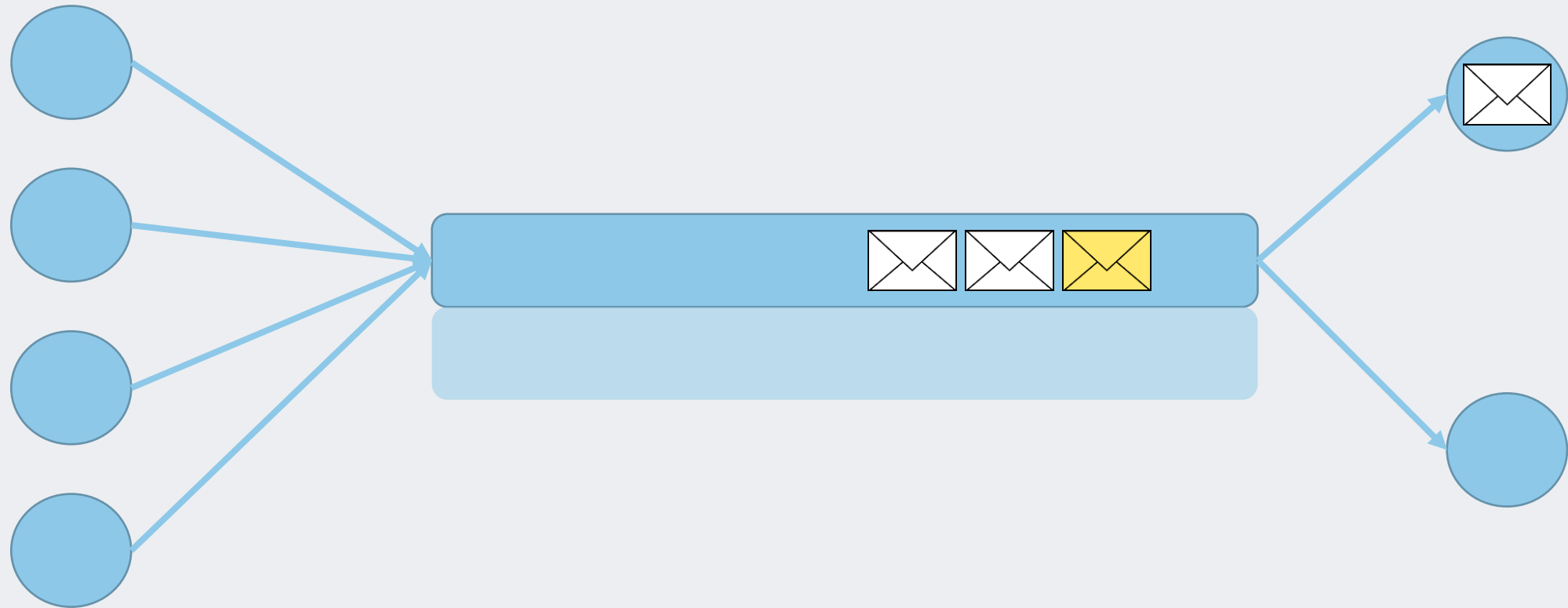
# Message Poisoning



# Message Poisoning

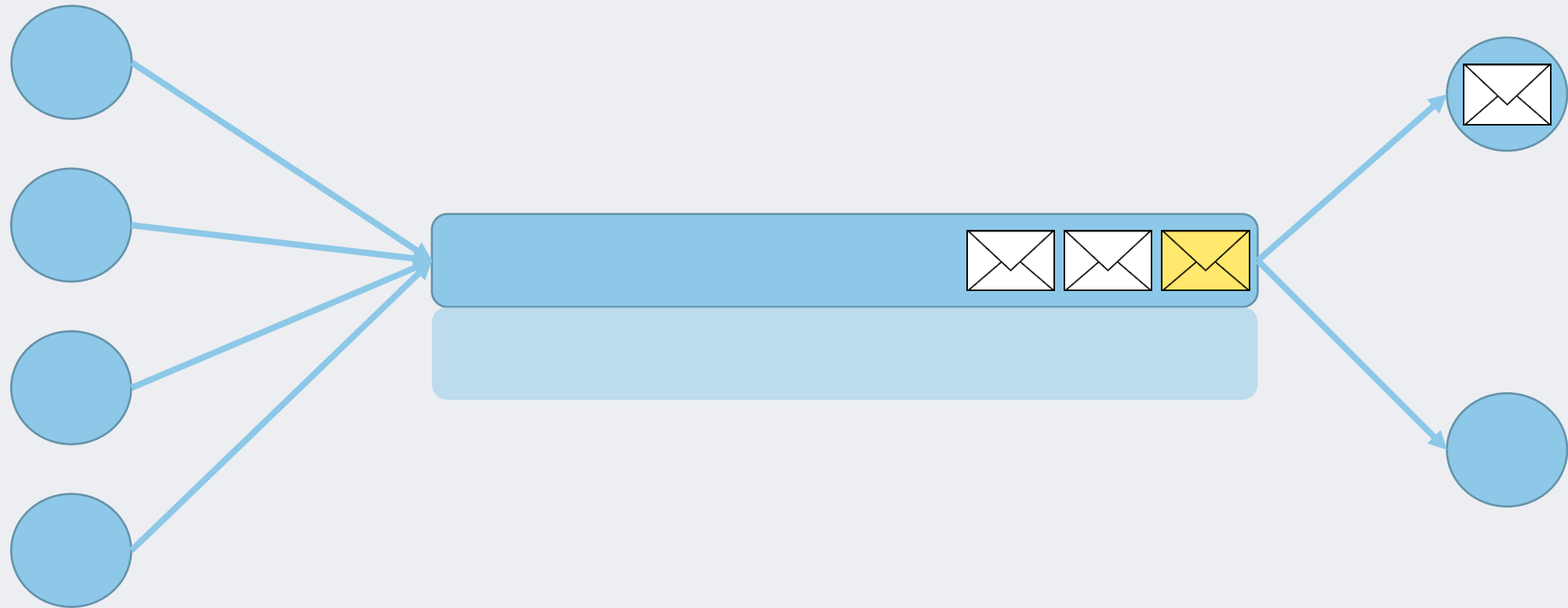


# Message Poisoning

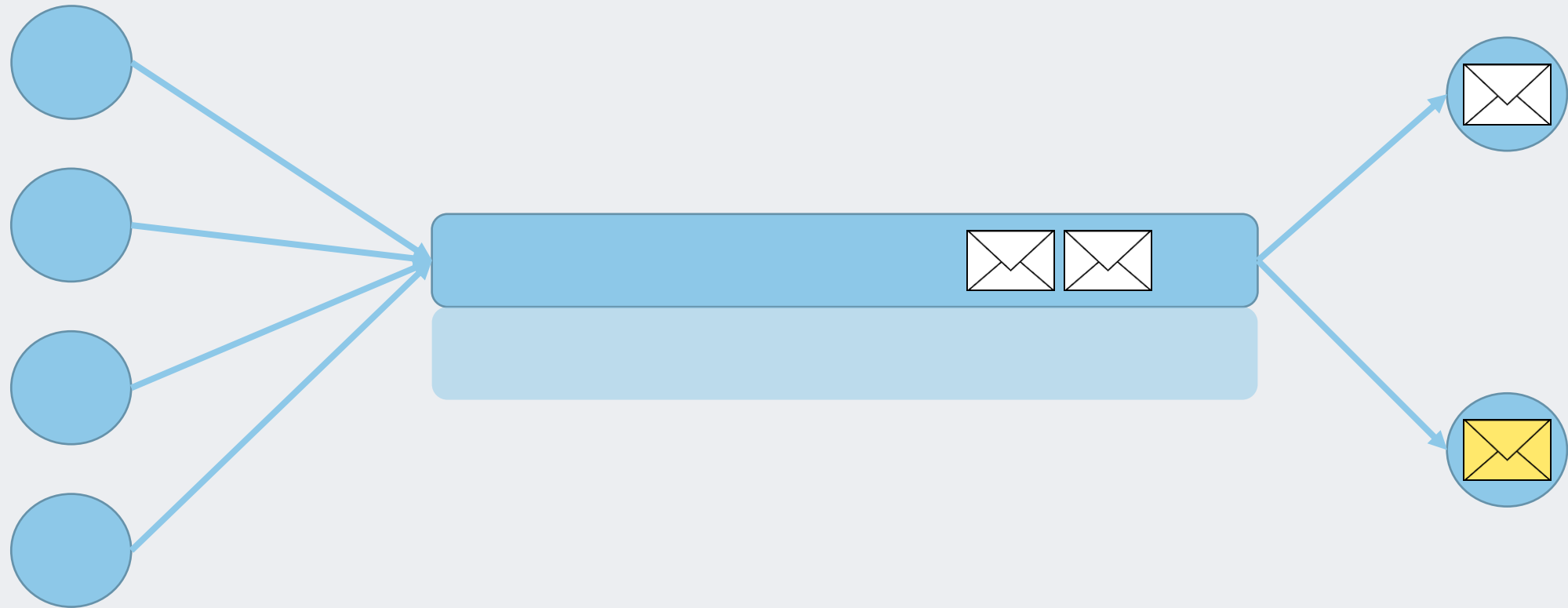




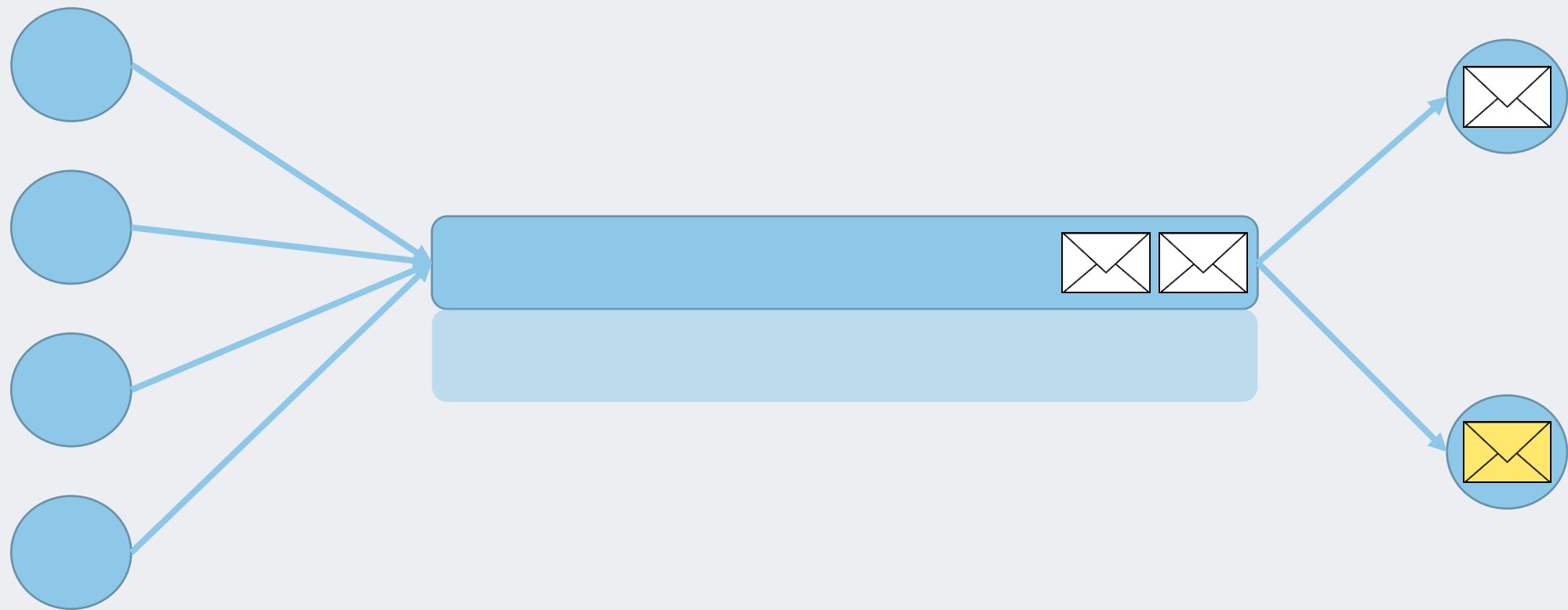
# Message Poisoning



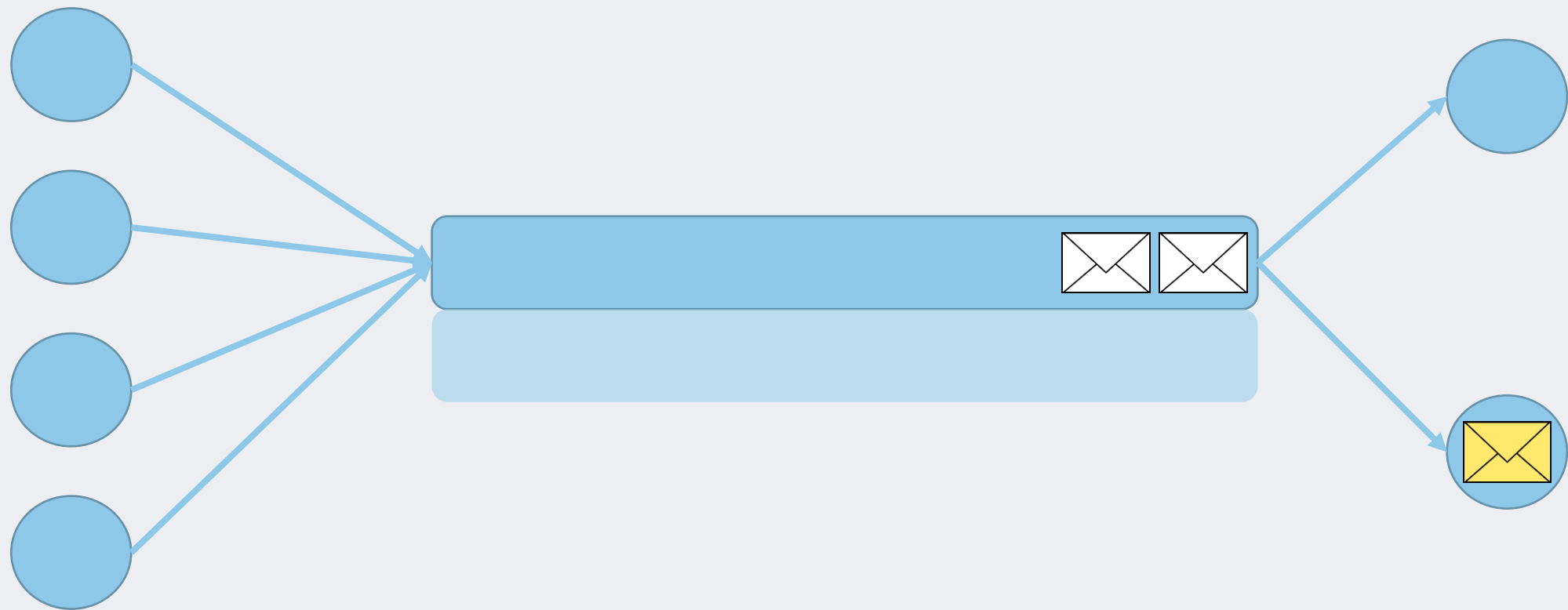
# Message Poisoning



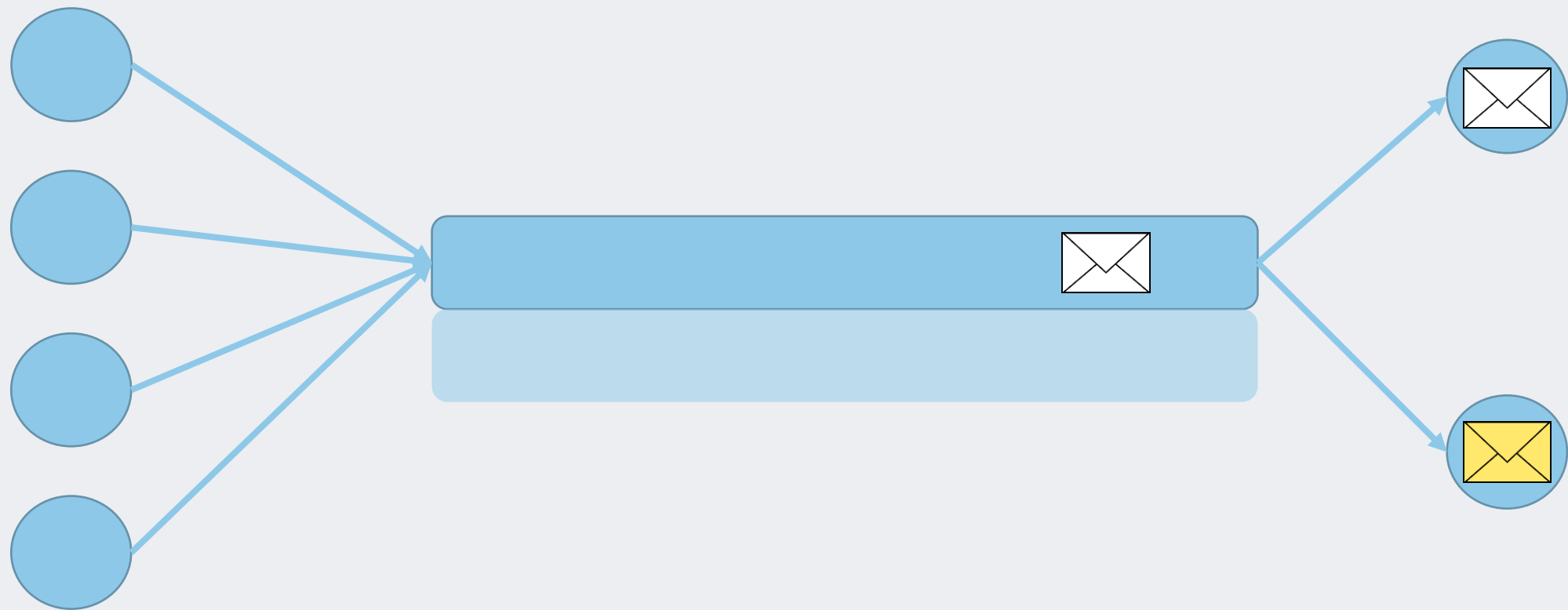
# Message Poisoning



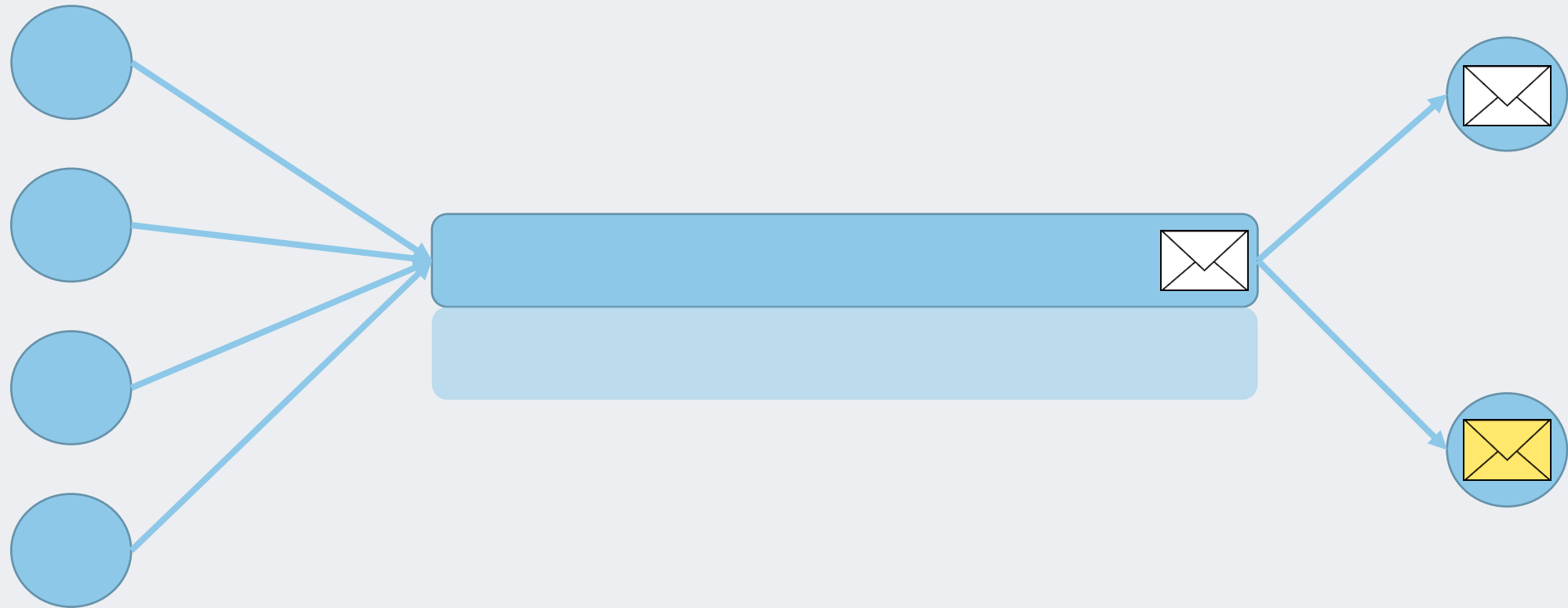
# Message Poisoning



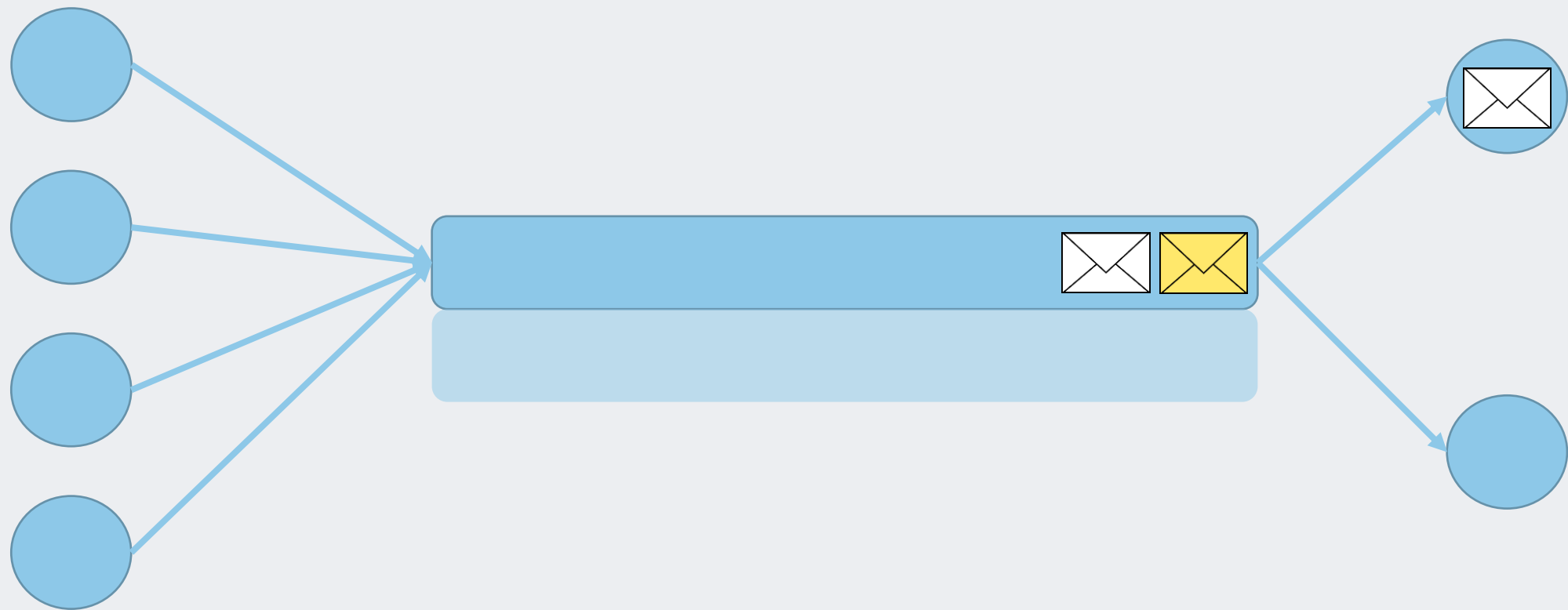
# Message Poisoning



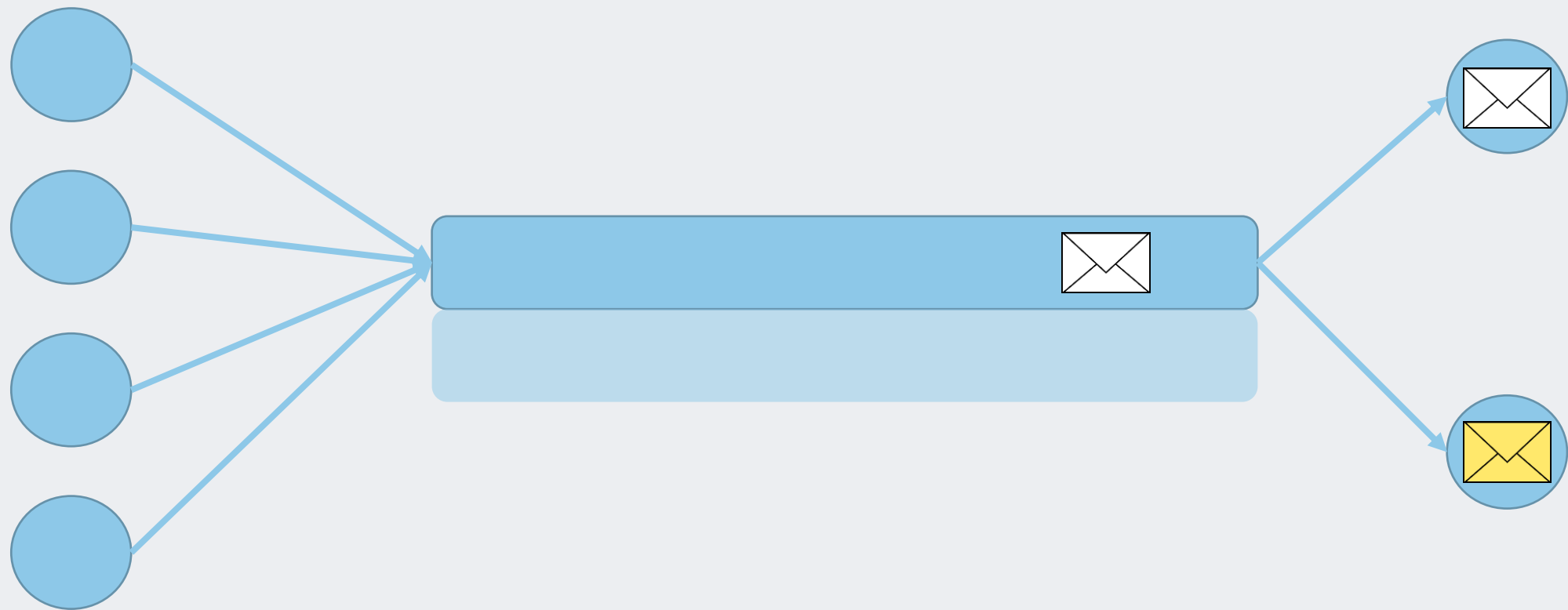
# Message Poisoning



# Message Poisoning

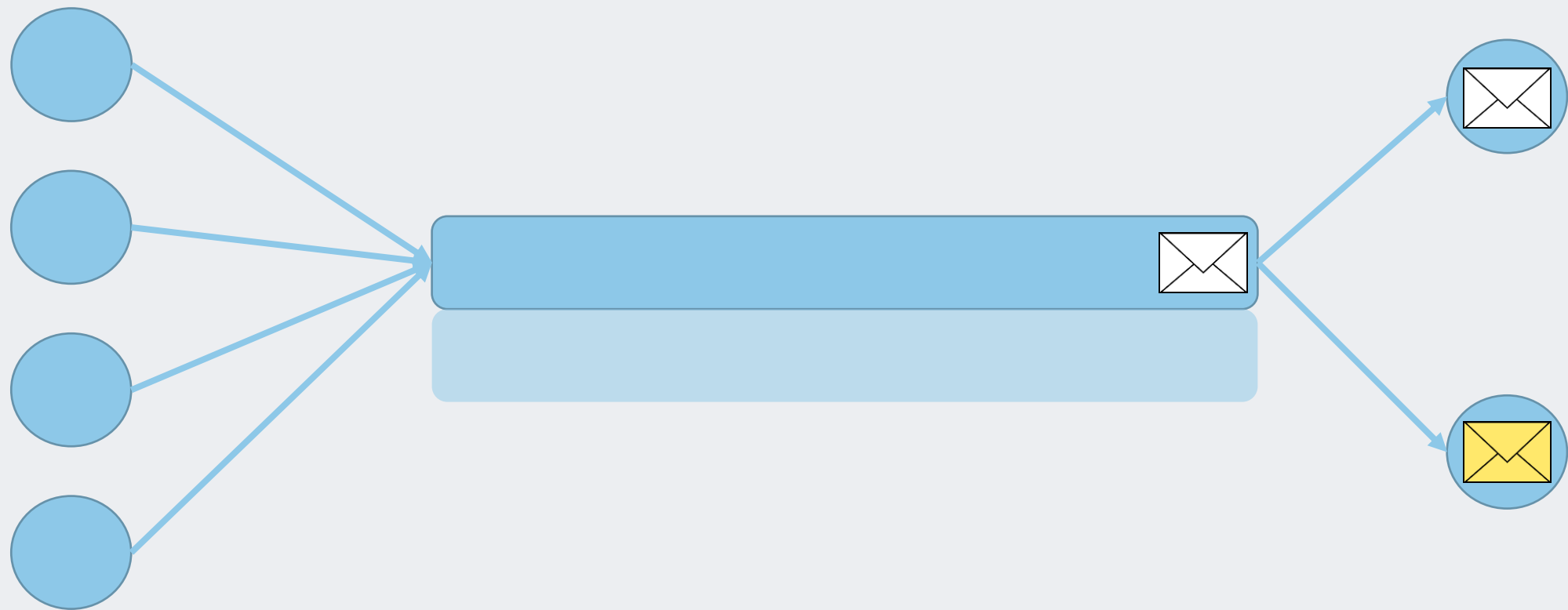


# Message Poisoning

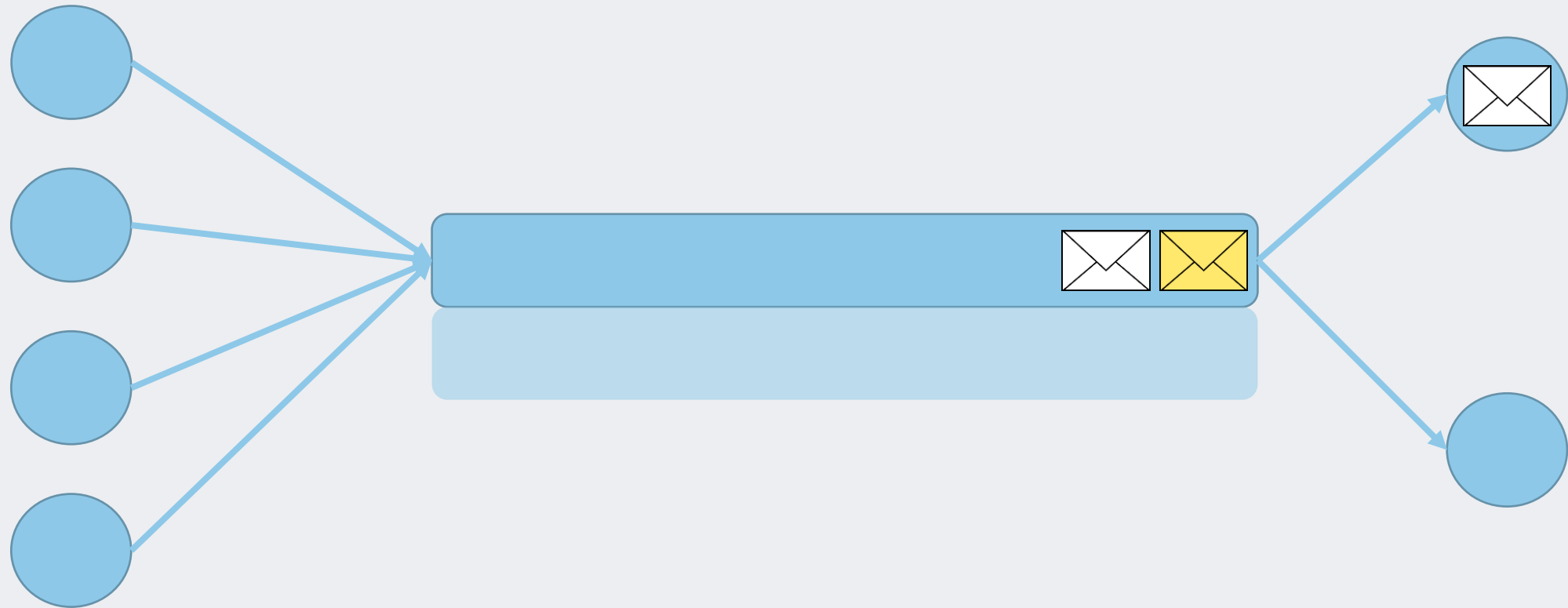




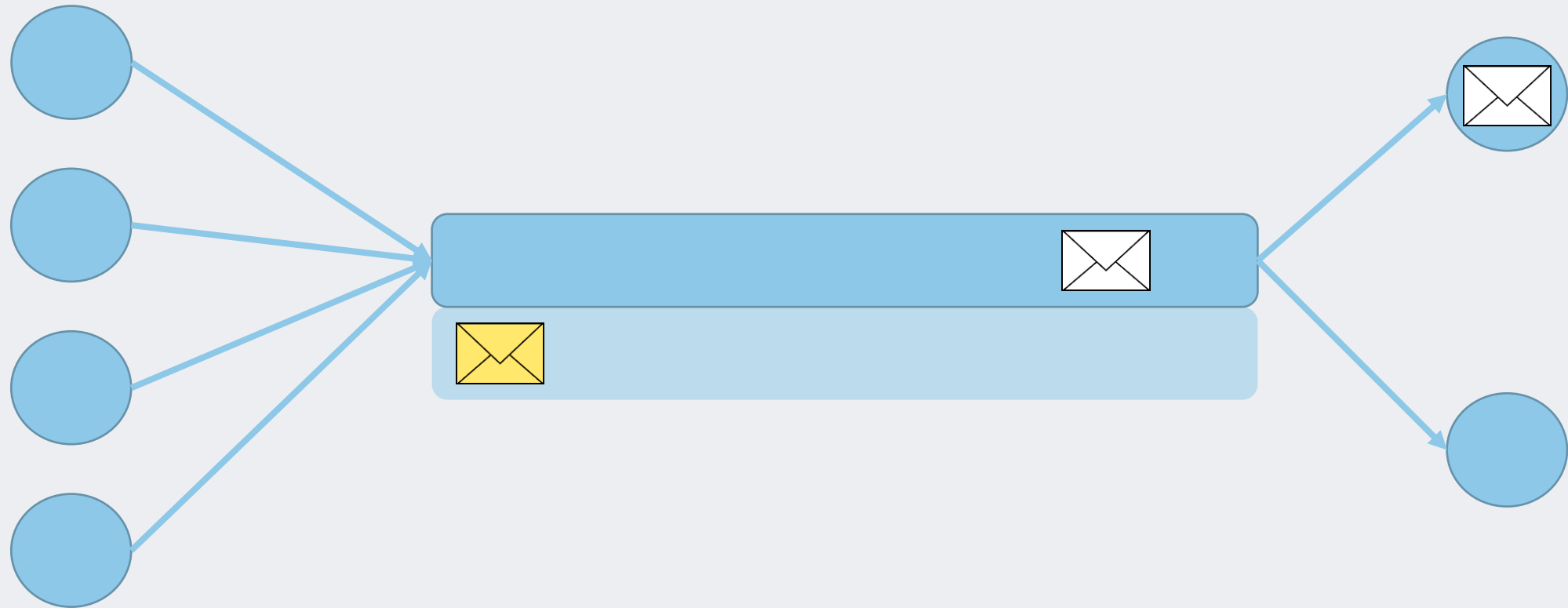
# Message Poisoning



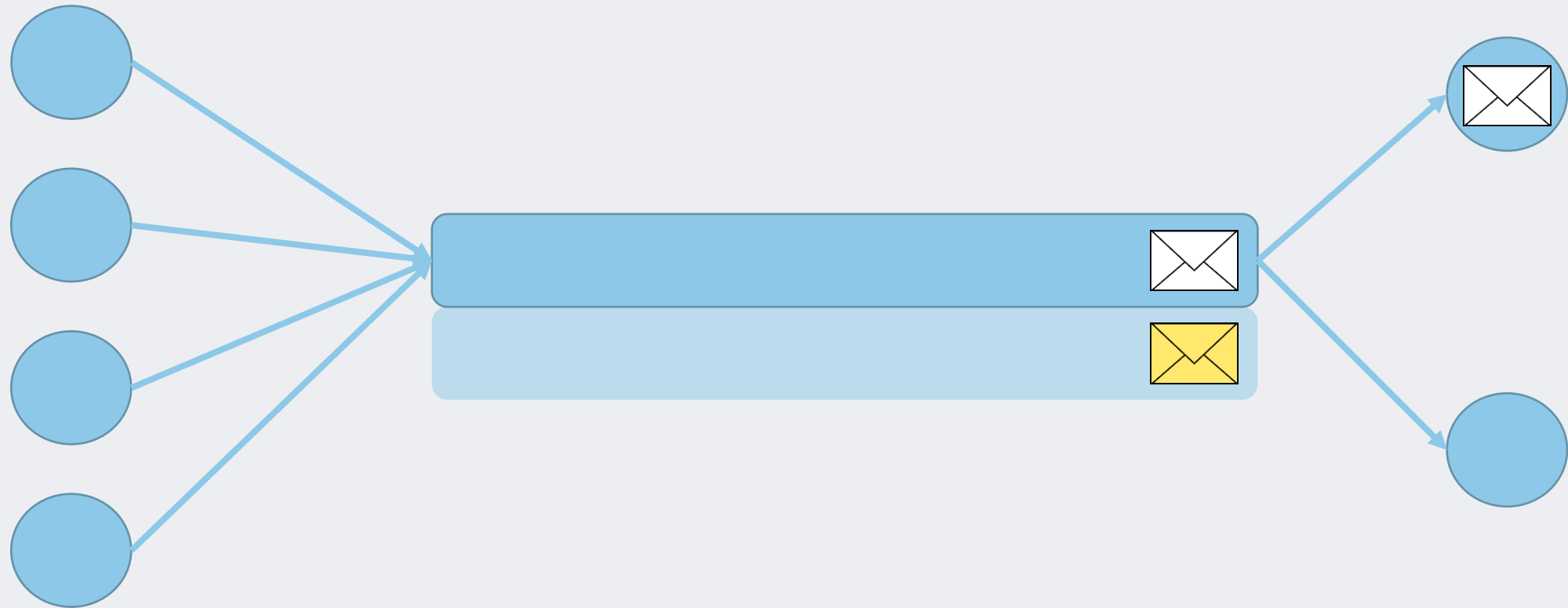
# Message Poisoning



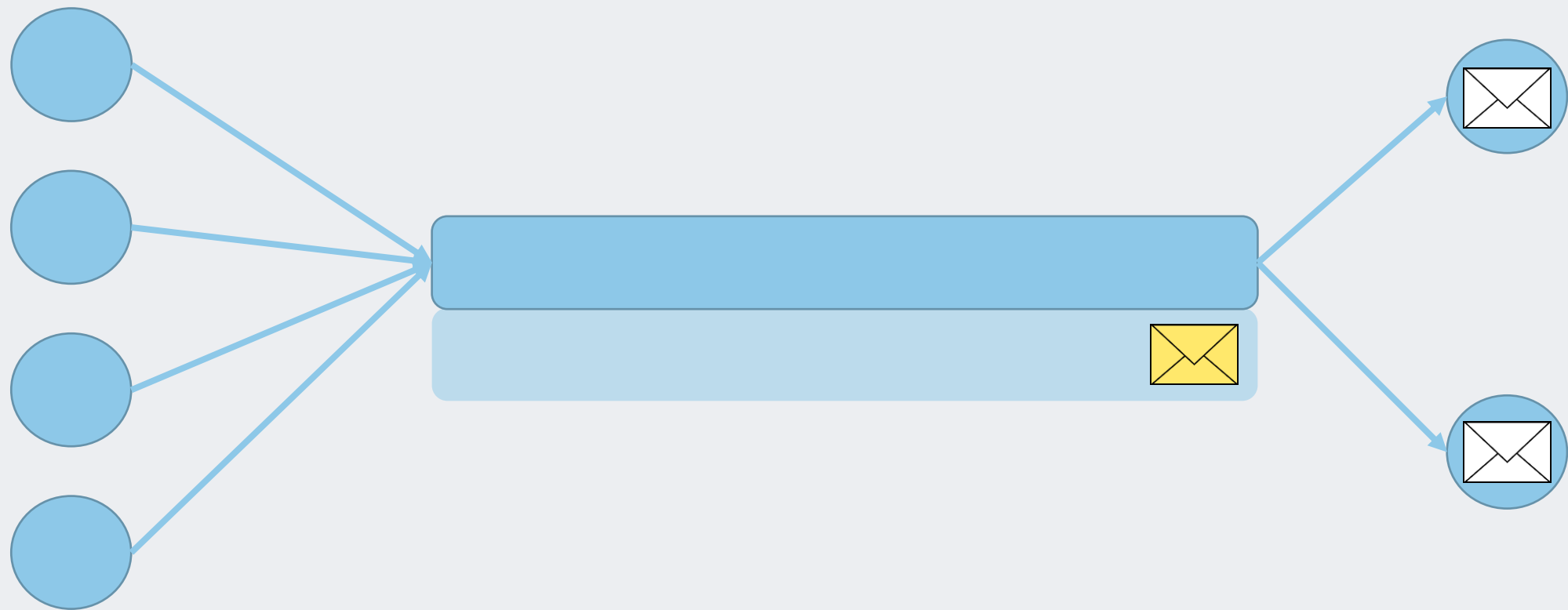
# Message Poisoning



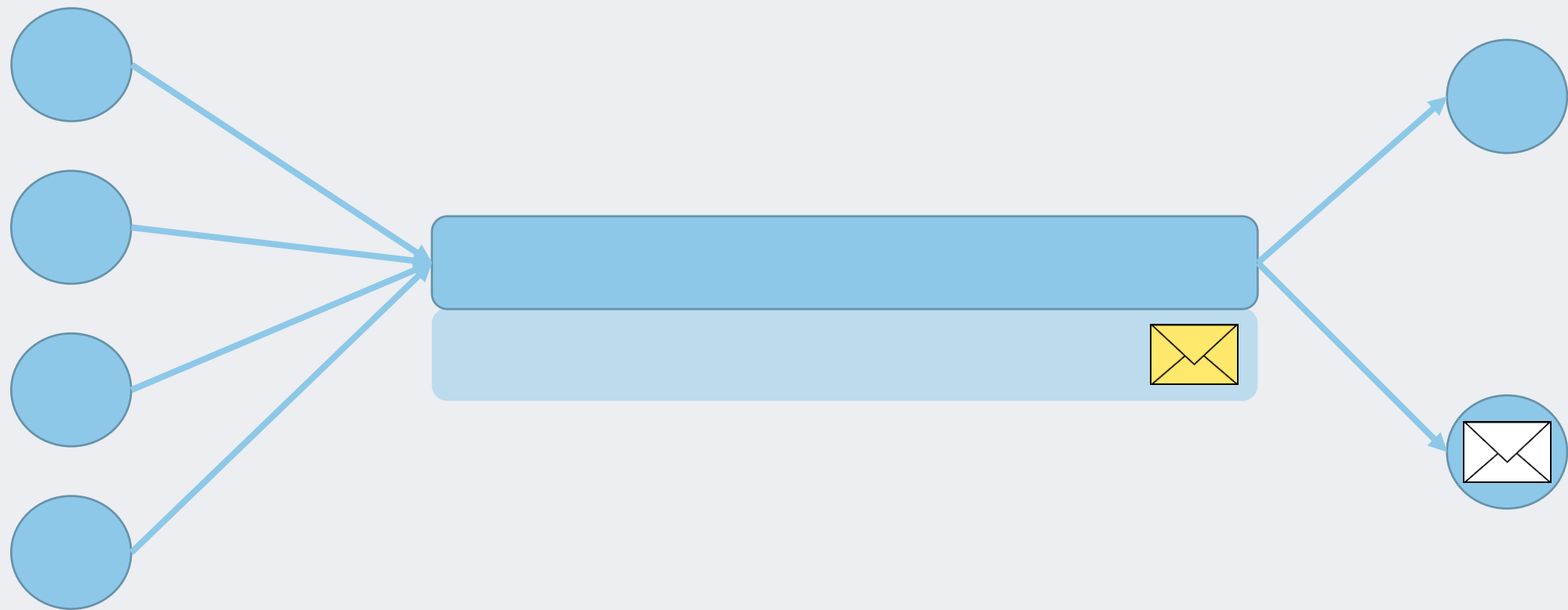
# Message Poisoning



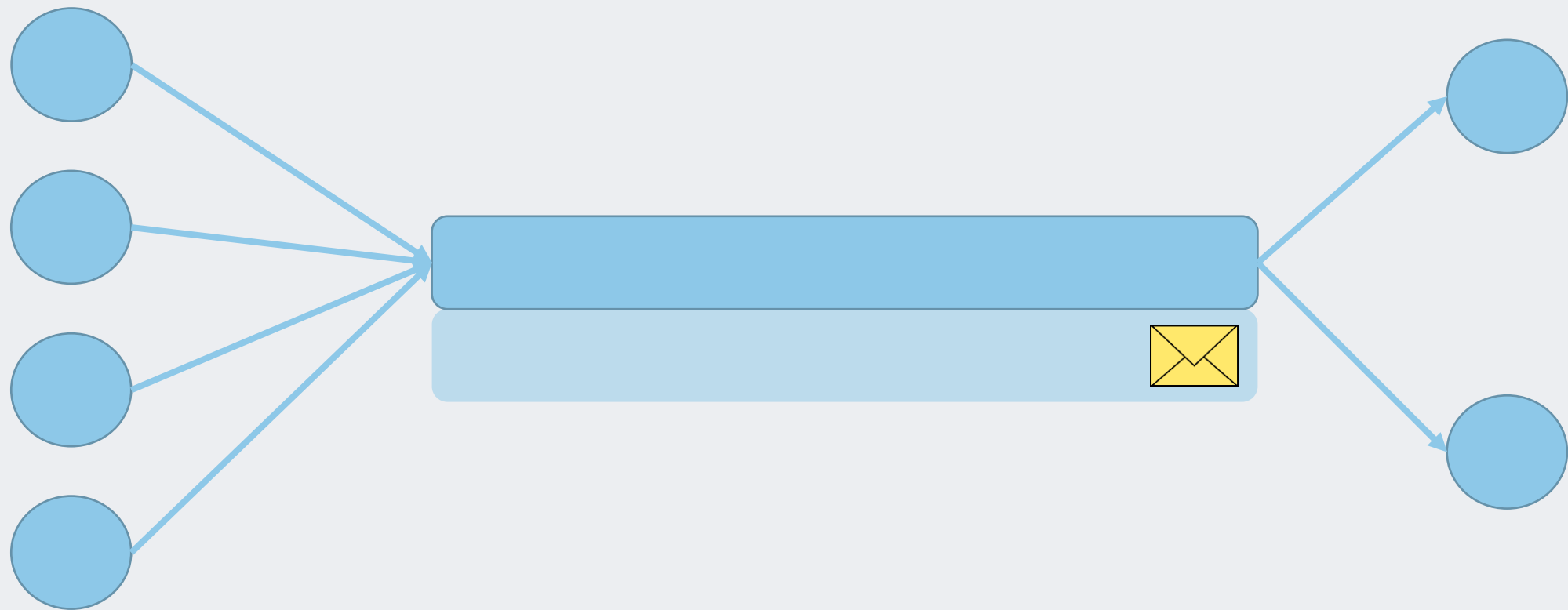
# Message Poisoning



# Message Poisoning



# Message Poisoning



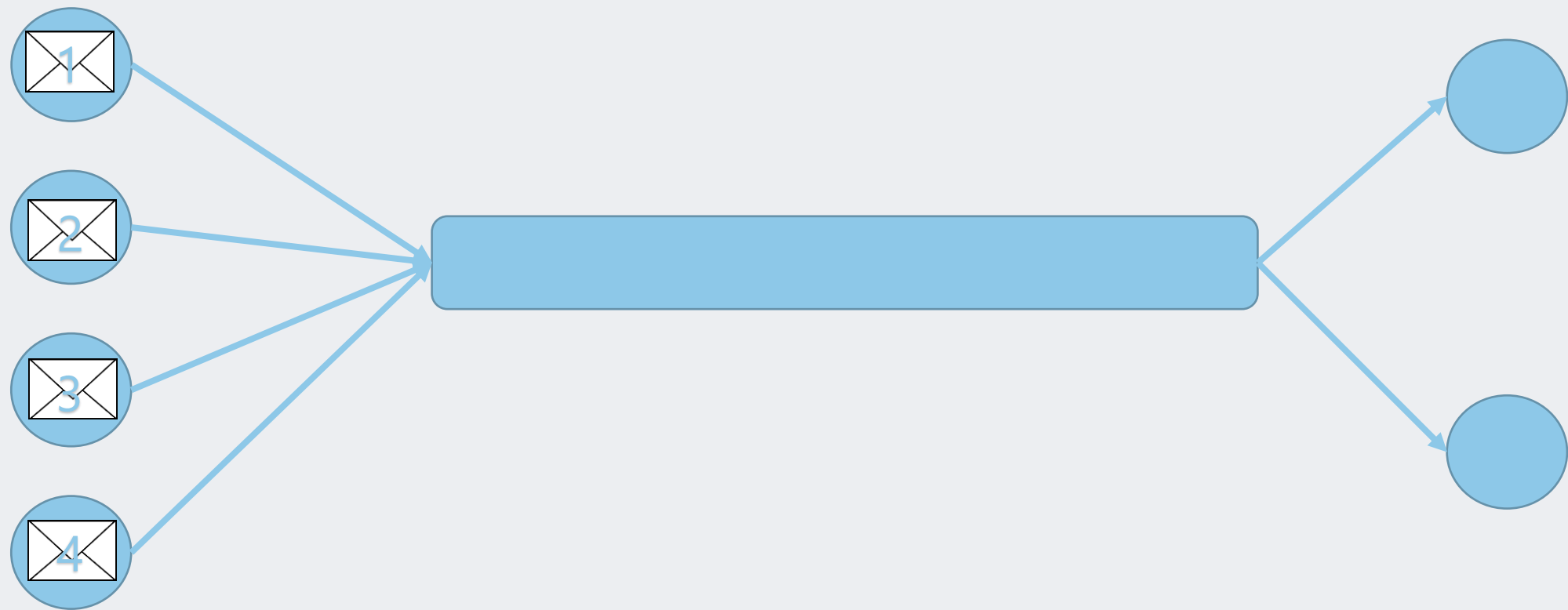
# Idempotent Receiver

<https://www.enterpriseintegrationpatterns.com/IdempotentReceiver.html>

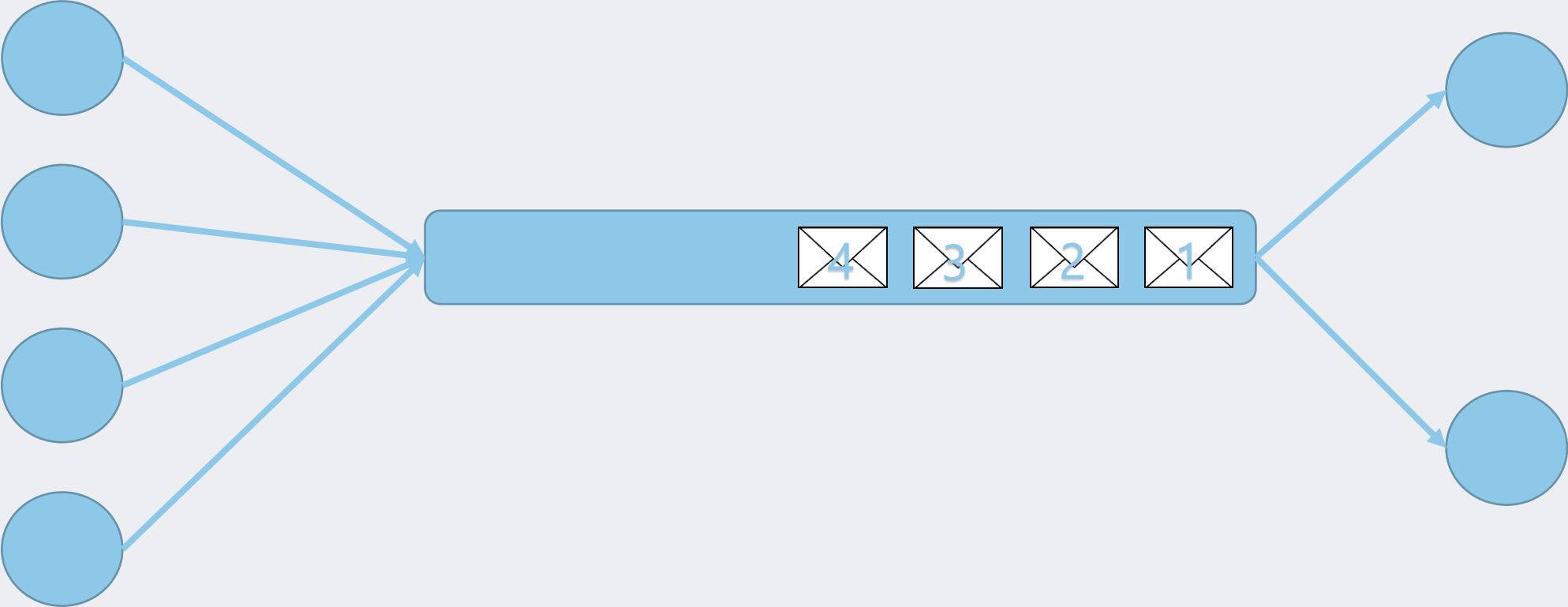




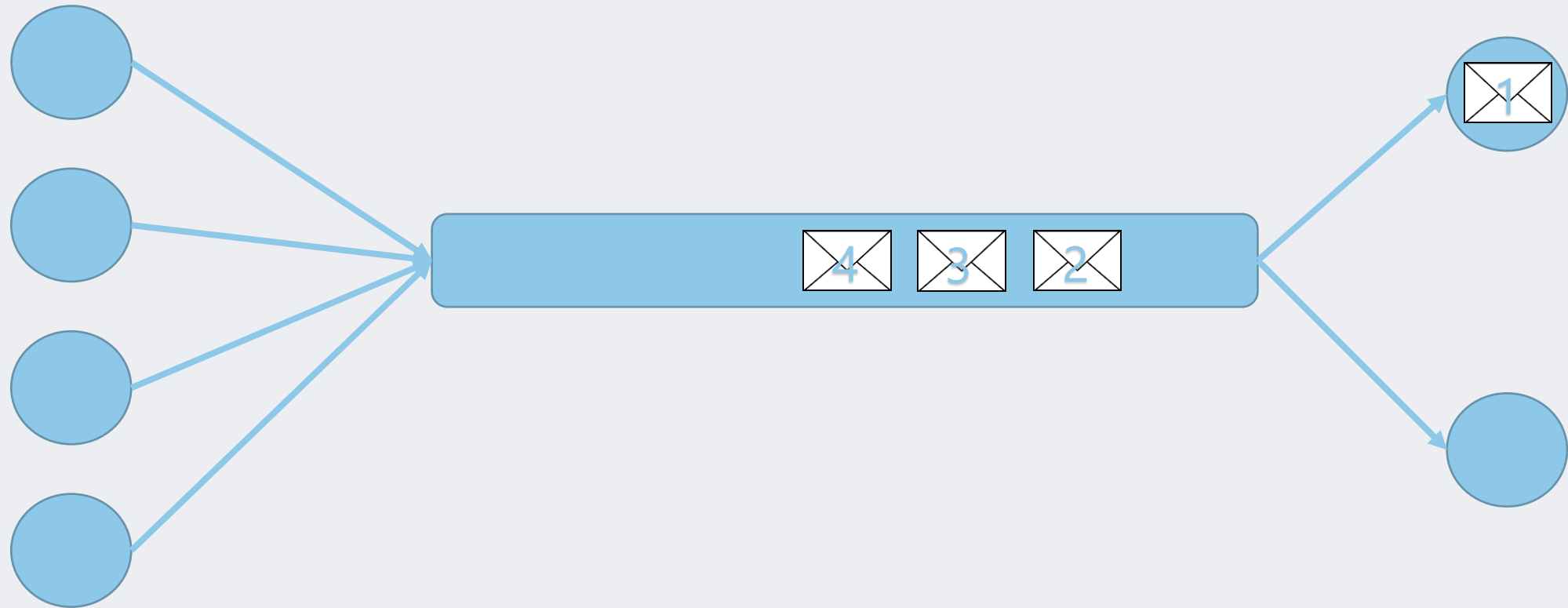
# Idempotent Receiver



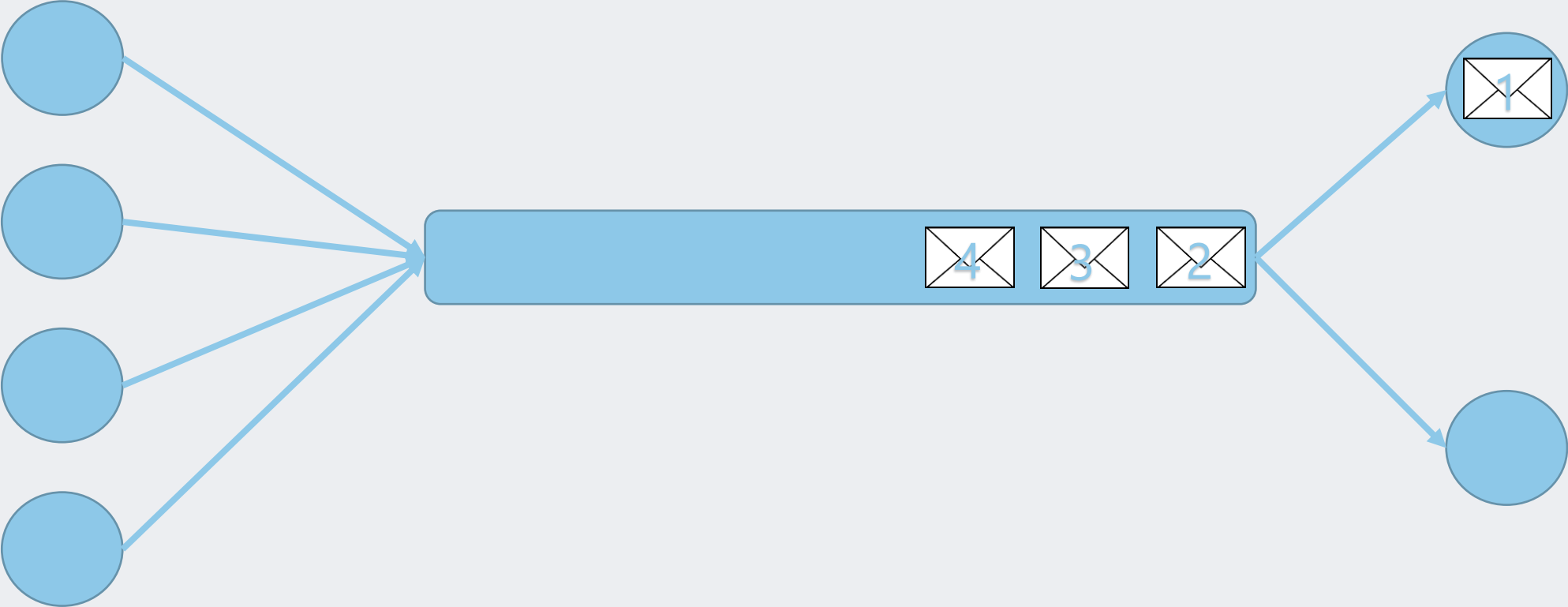
# Idempotent Receiver



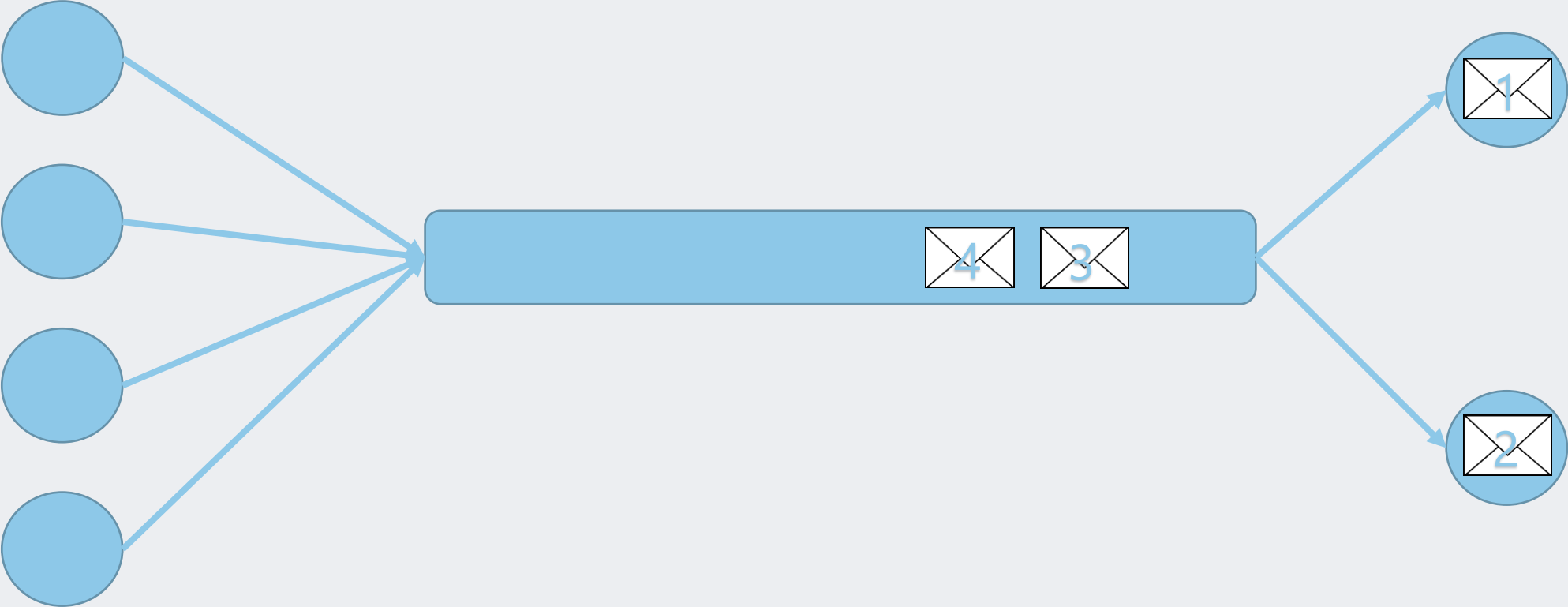
# Idempotent Receiver



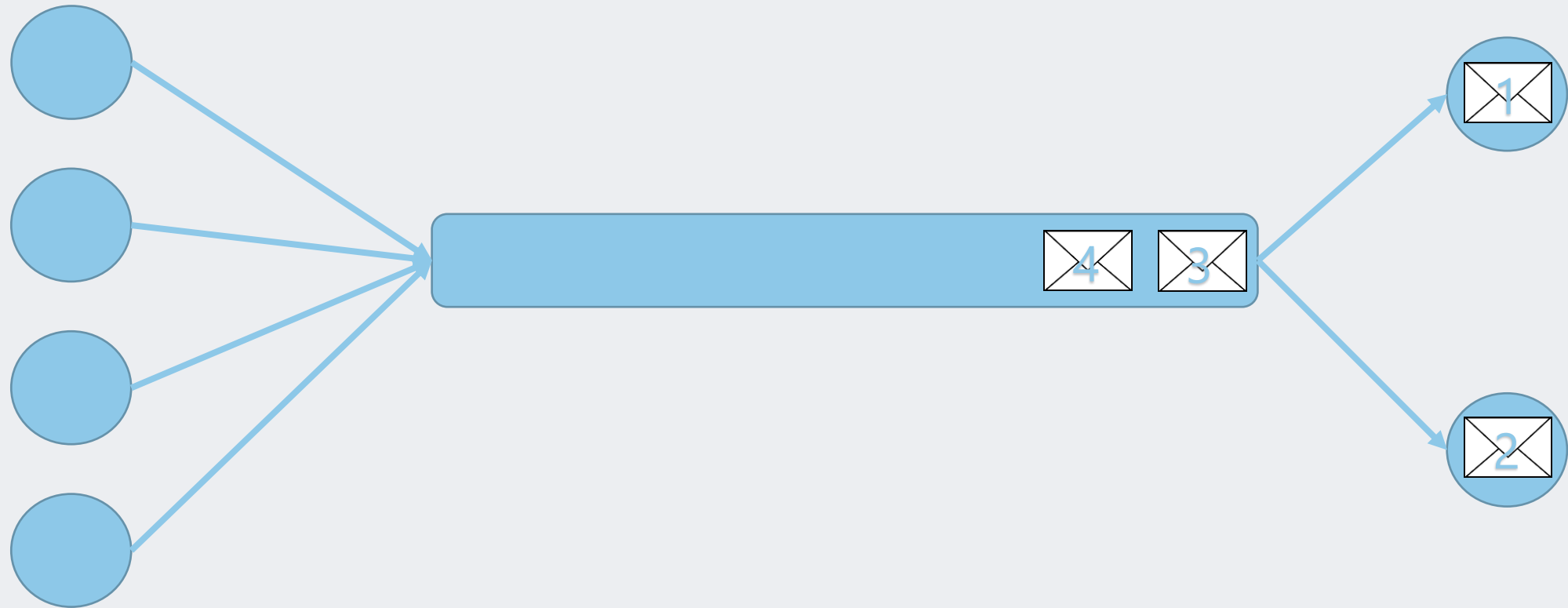
# Idempotent Receiver



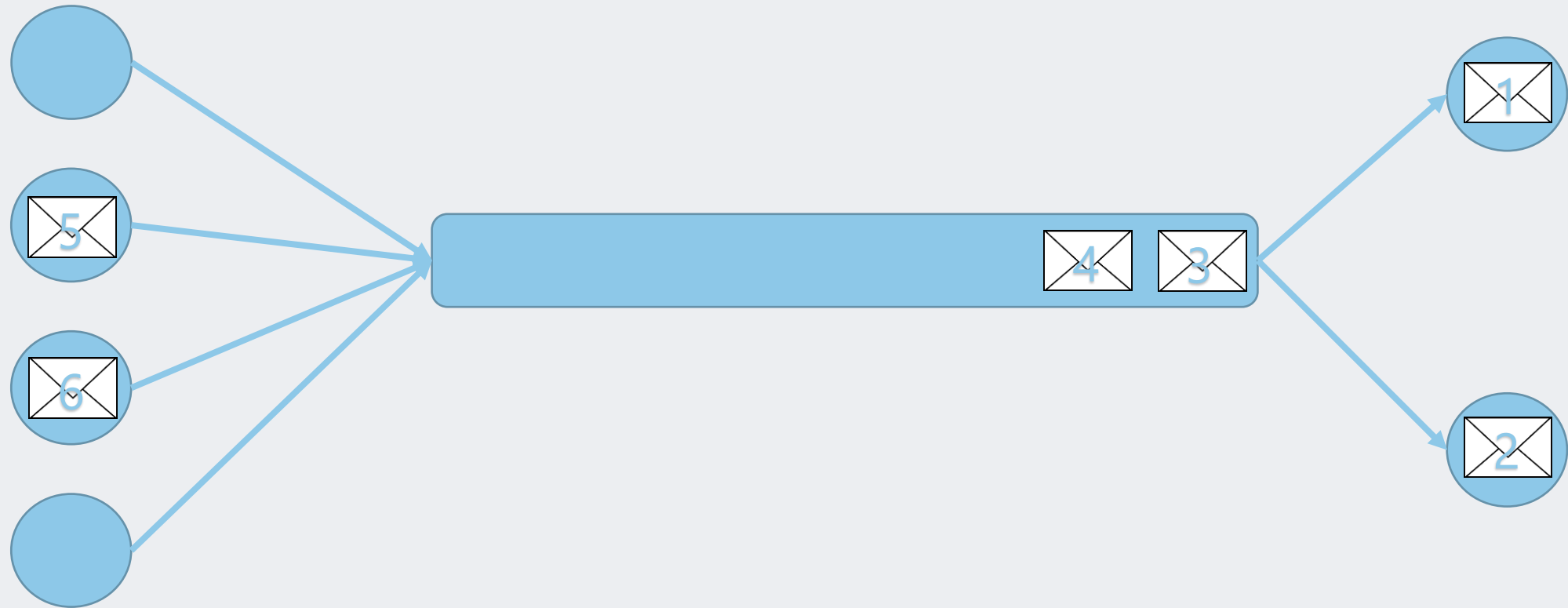
# Idempotent Receiver



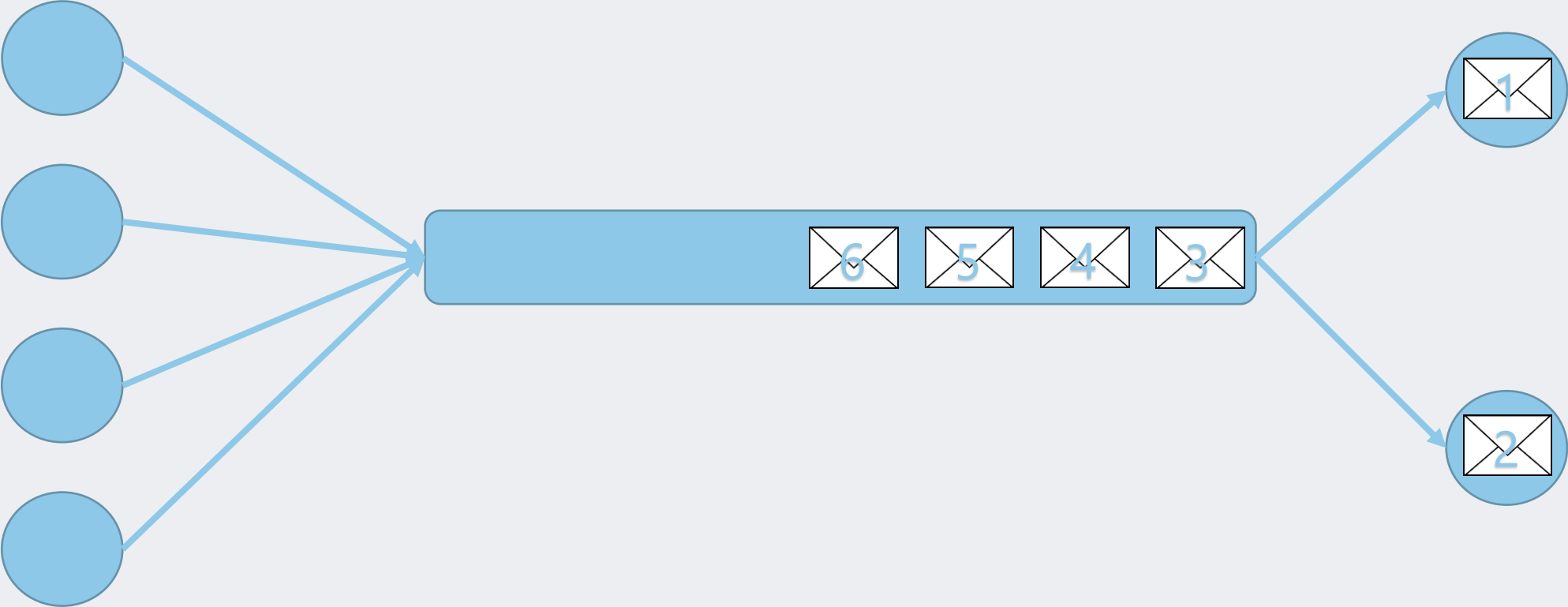
# Idempotent Receiver



# Idempotent Receiver

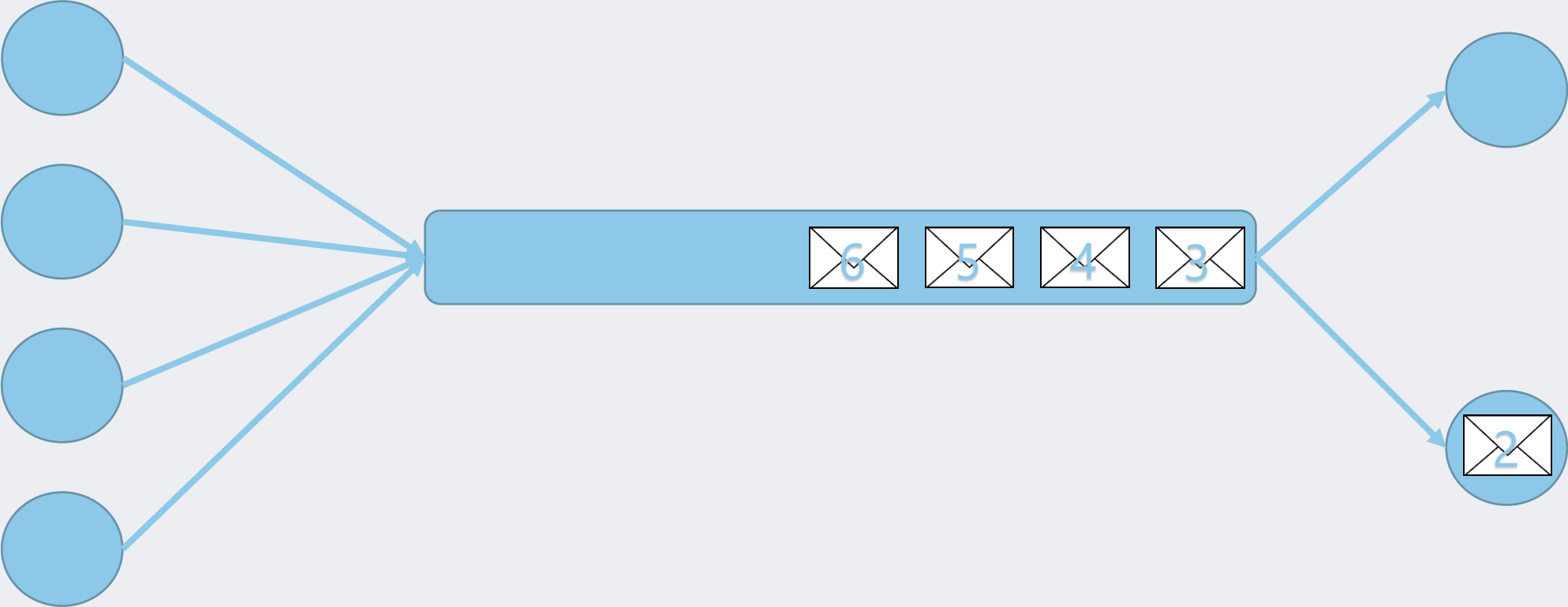


# Idempotent Receiver

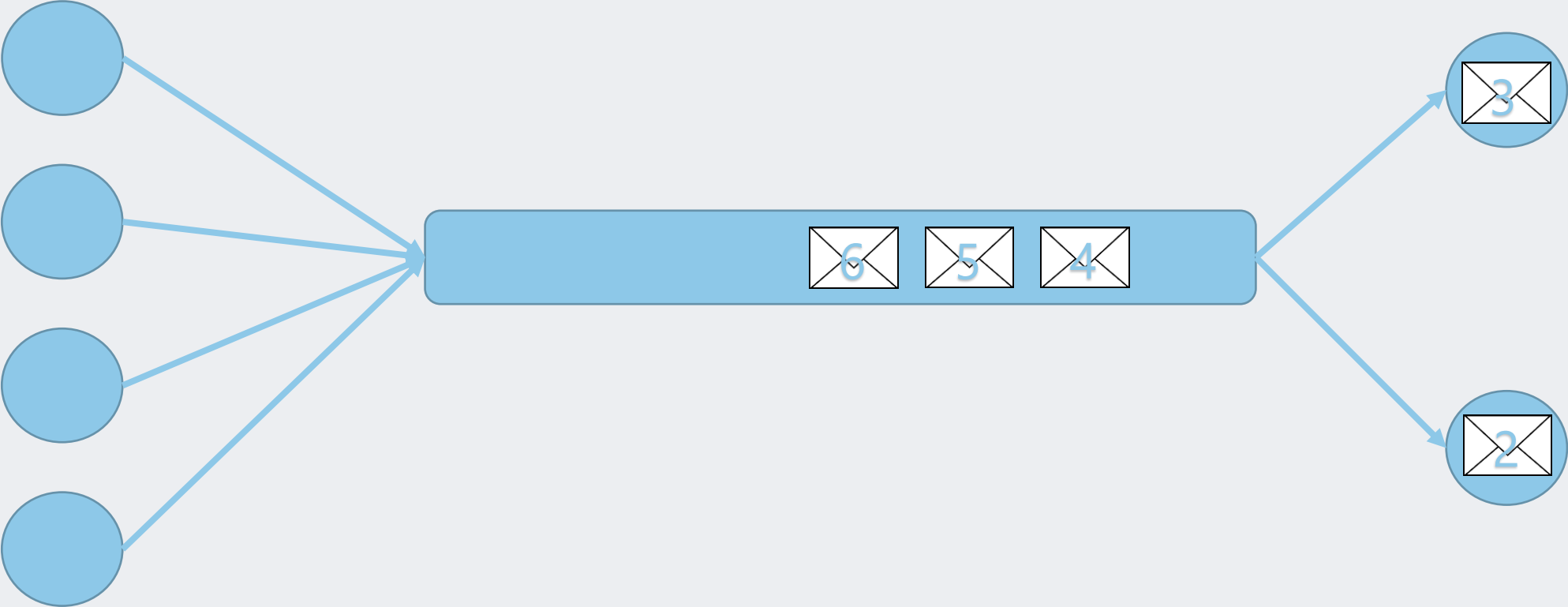




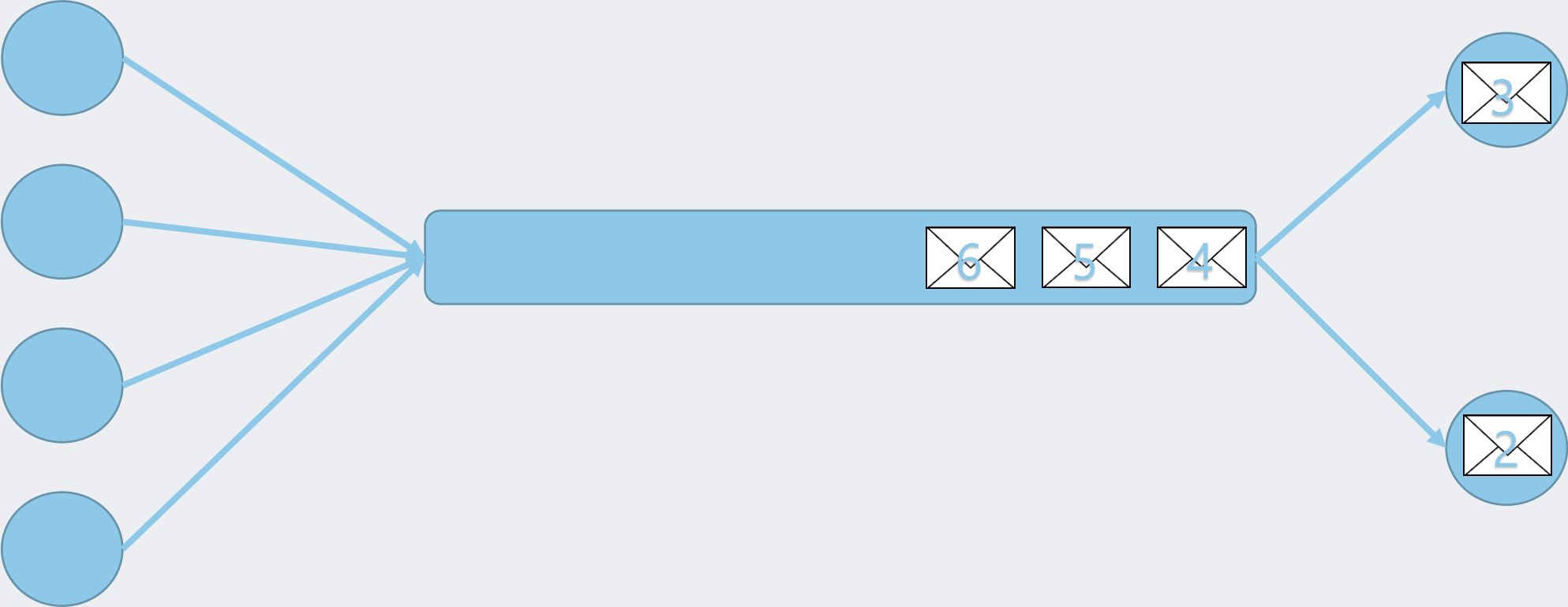
# Idempotent Receiver



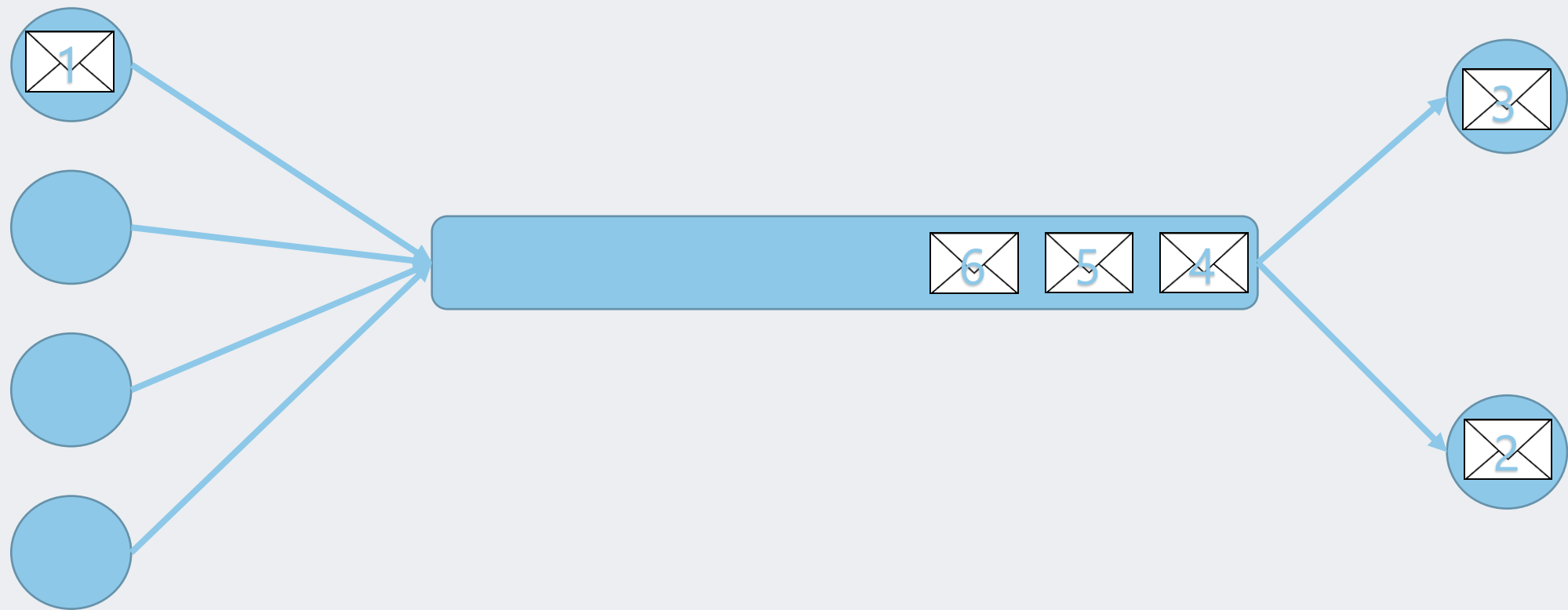
# Idempotent Receiver



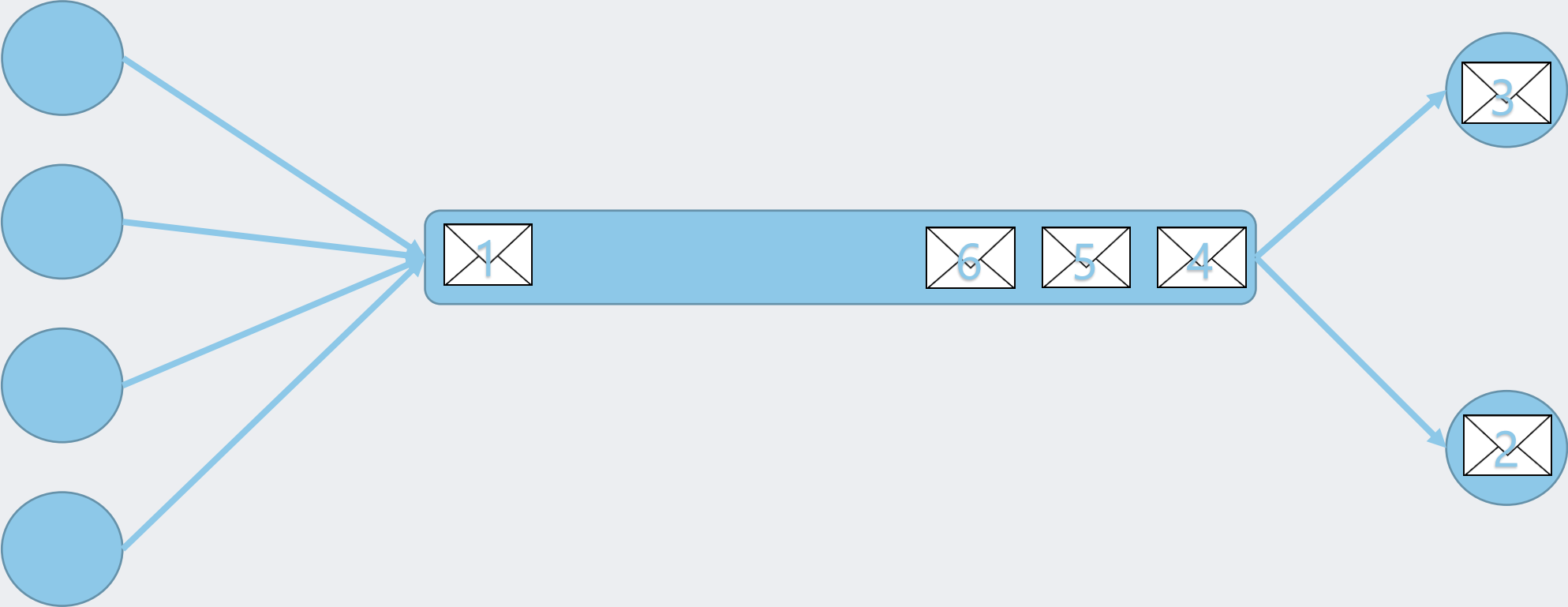
# Idempotent Receiver



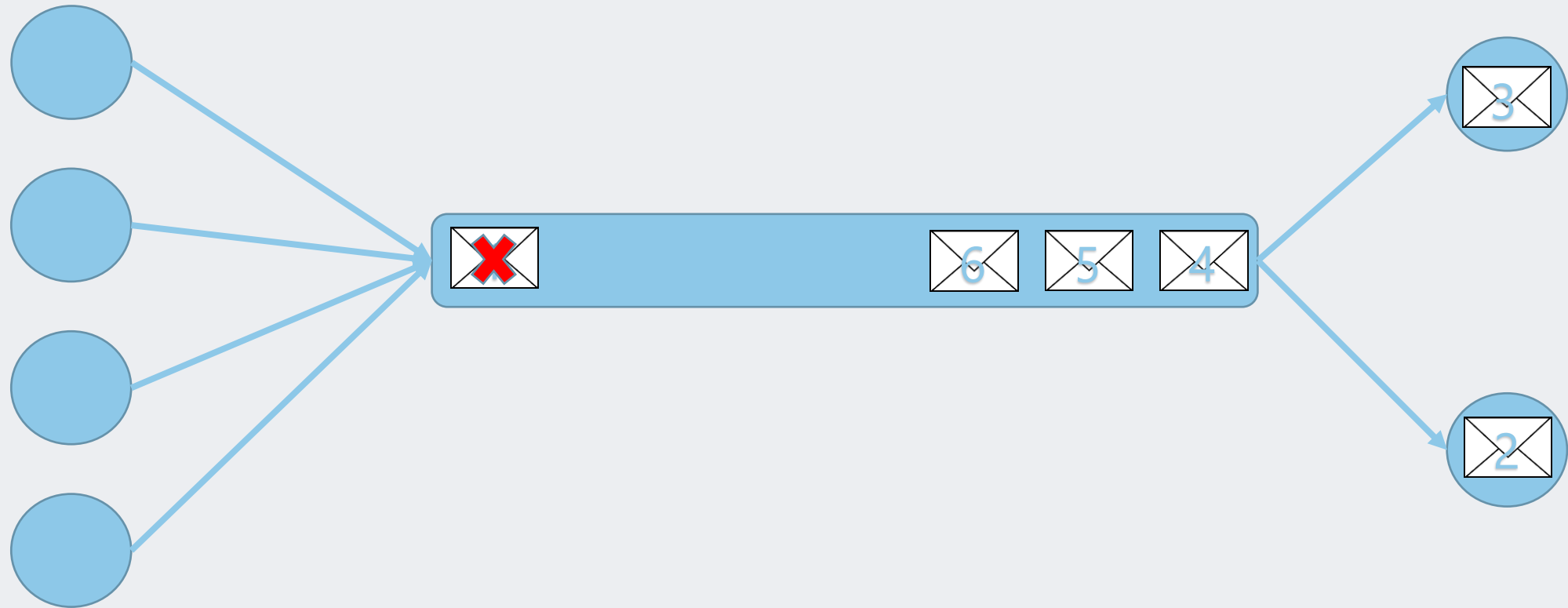
# Idempotent Receiver



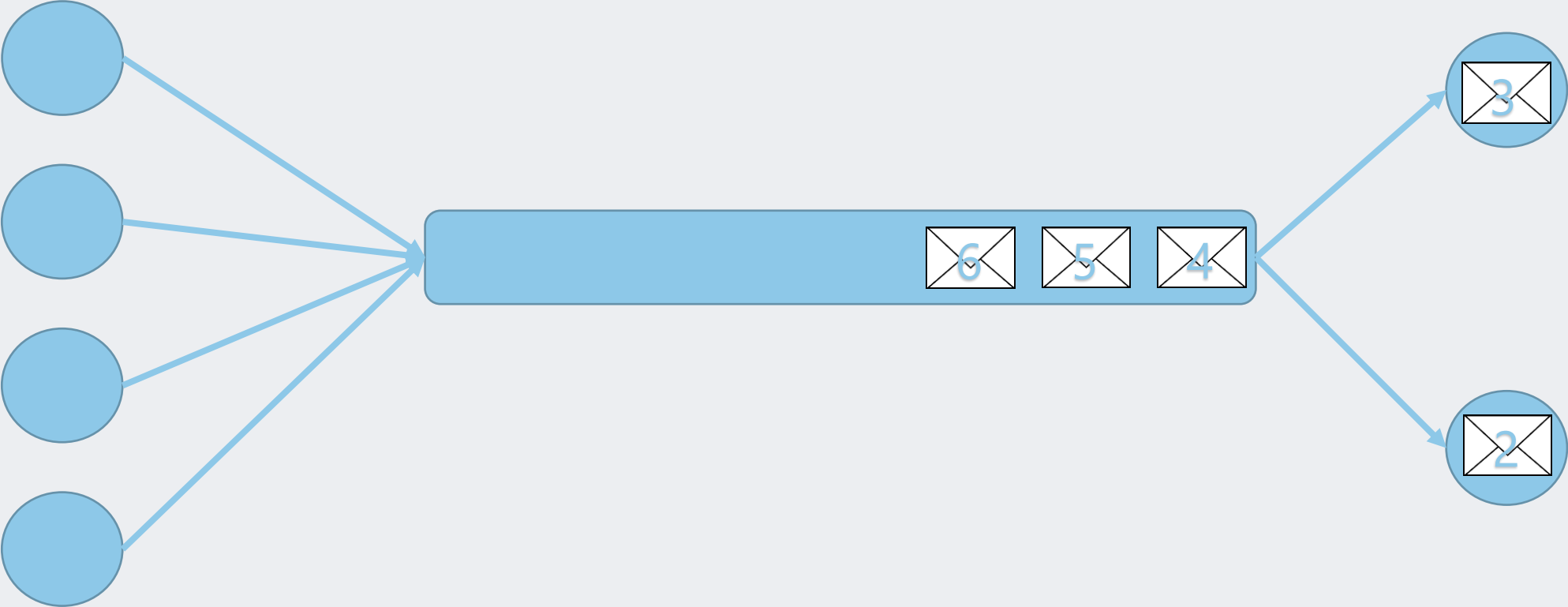
# Idempotent Receiver



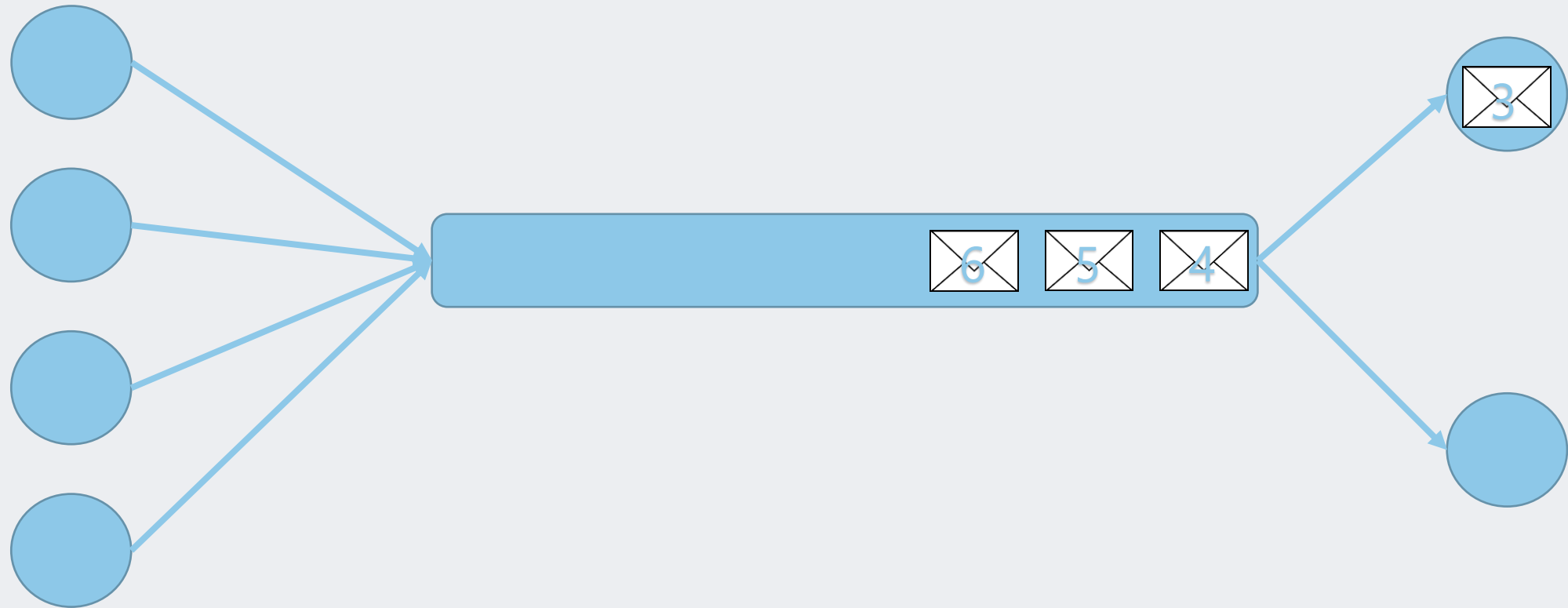
# Idempotent Receiver



# Idempotent Receiver

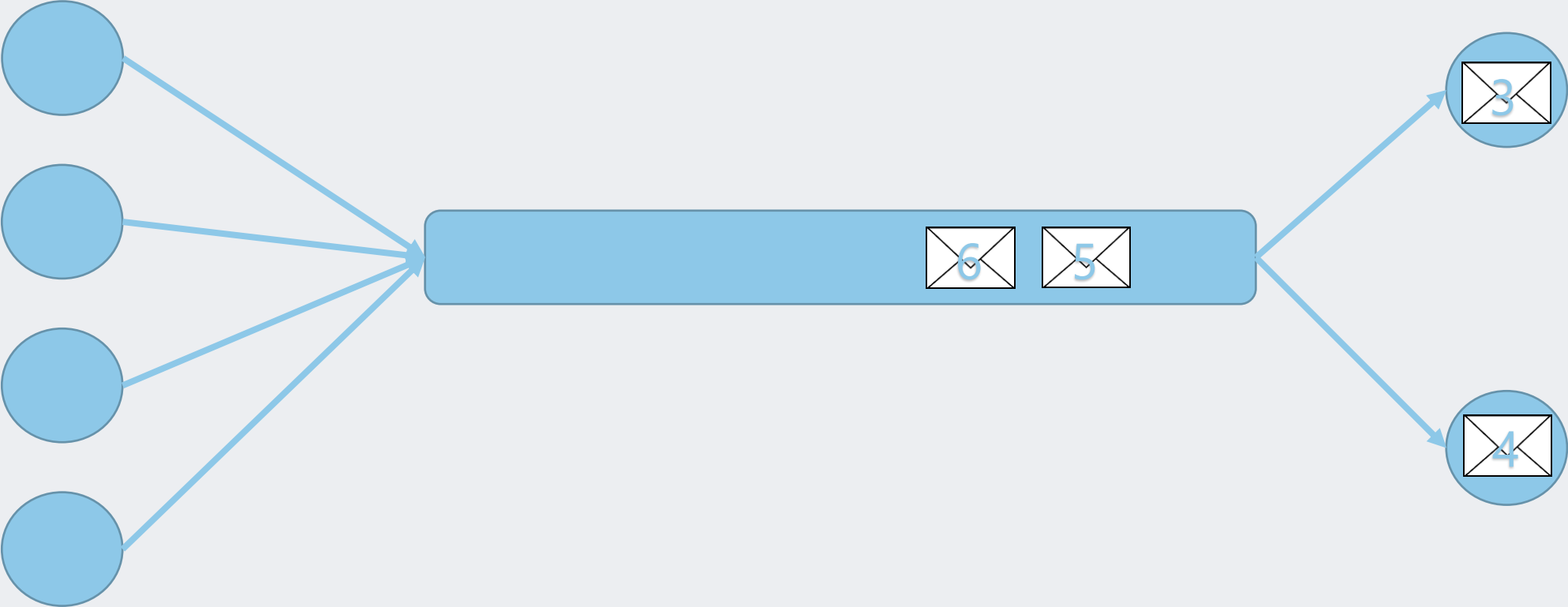


# Idempotent Receiver

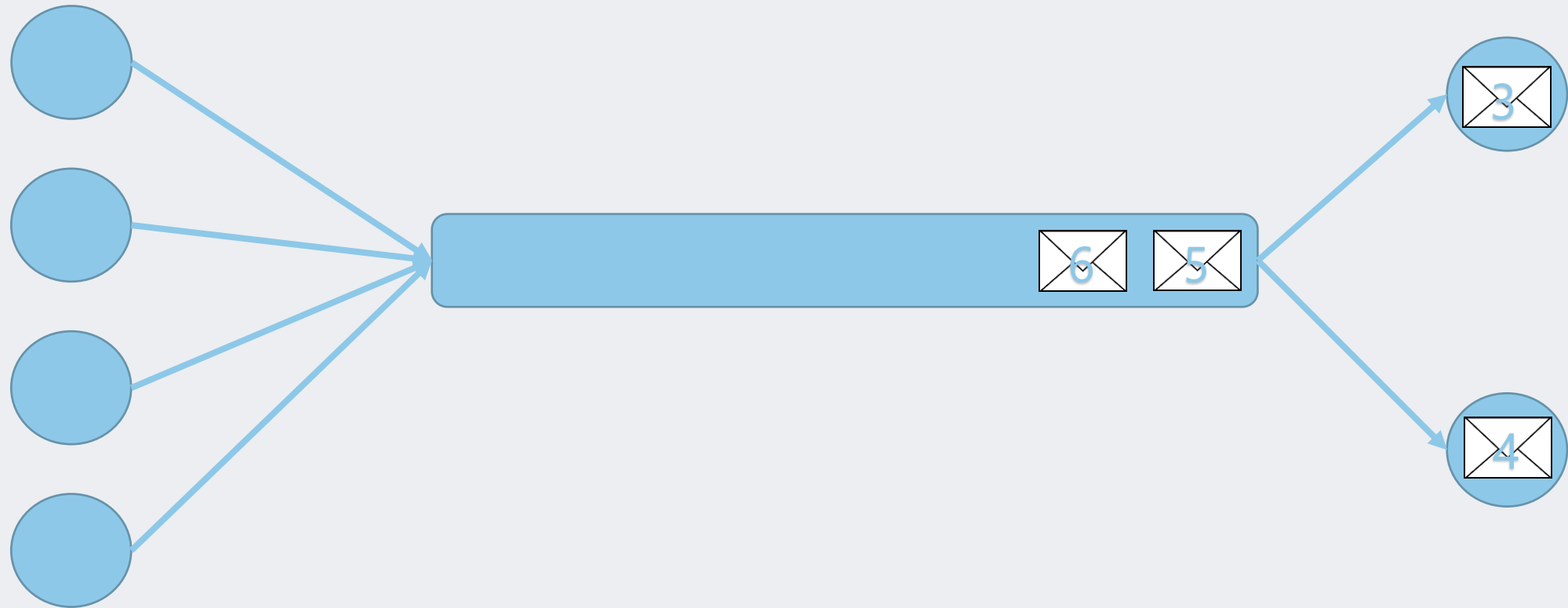




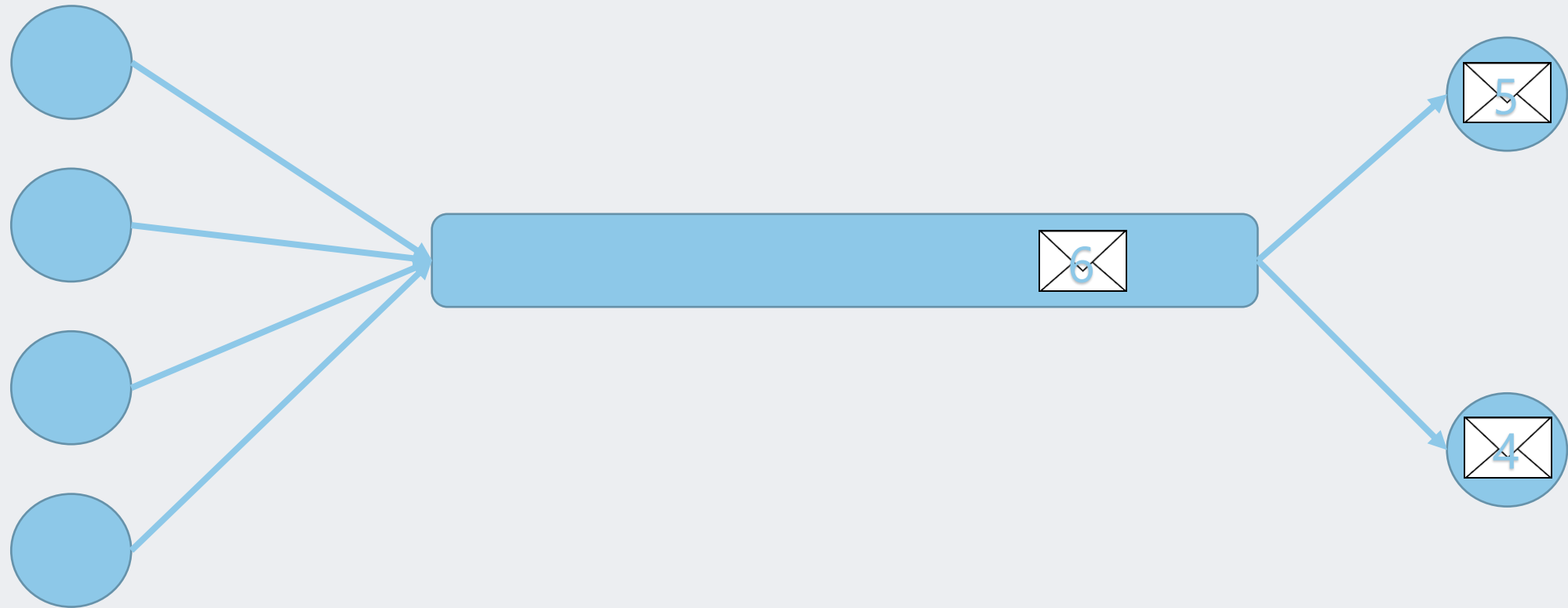
# Idempotent Receiver



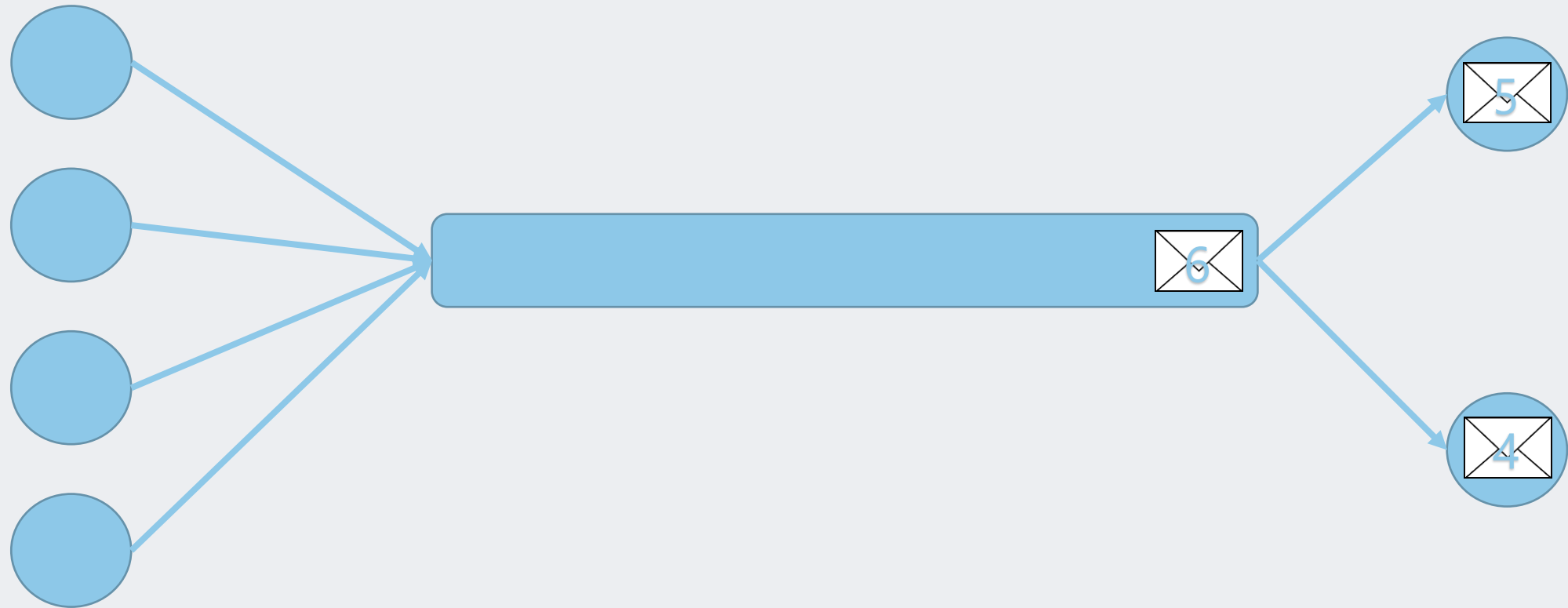
# Idempotent Receiver



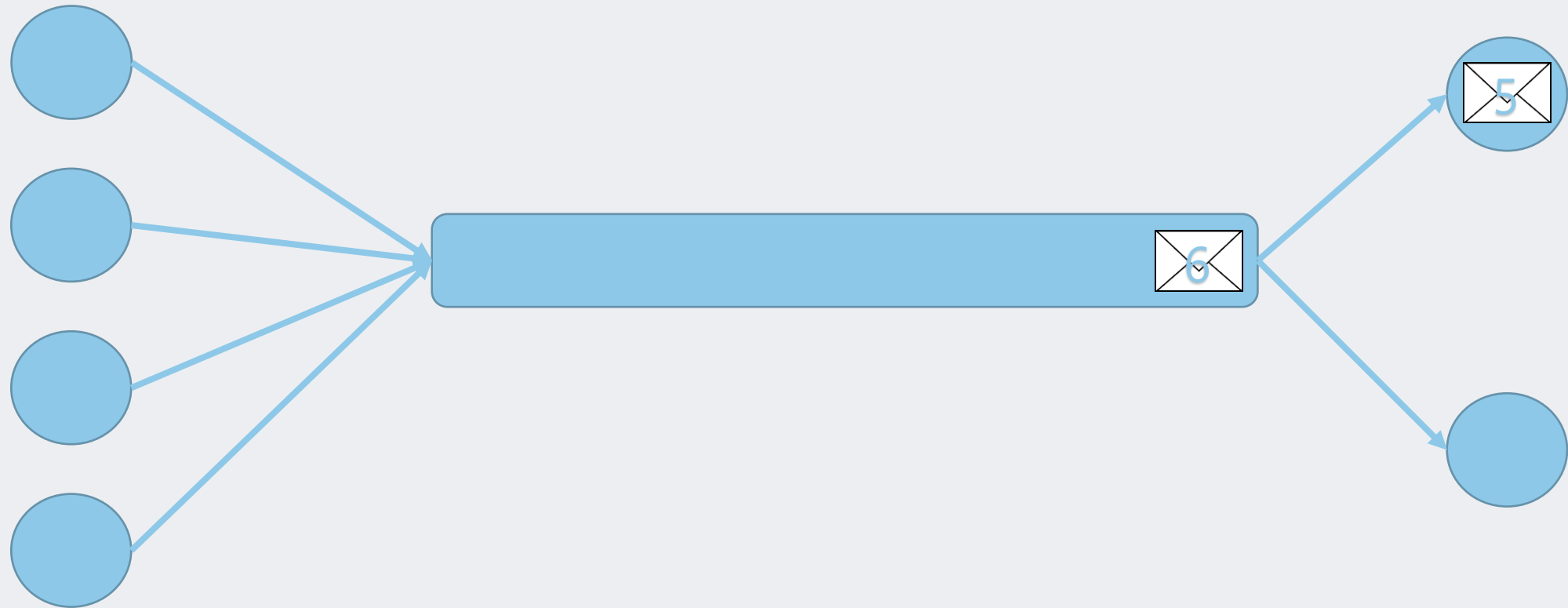
# Idempotent Receiver



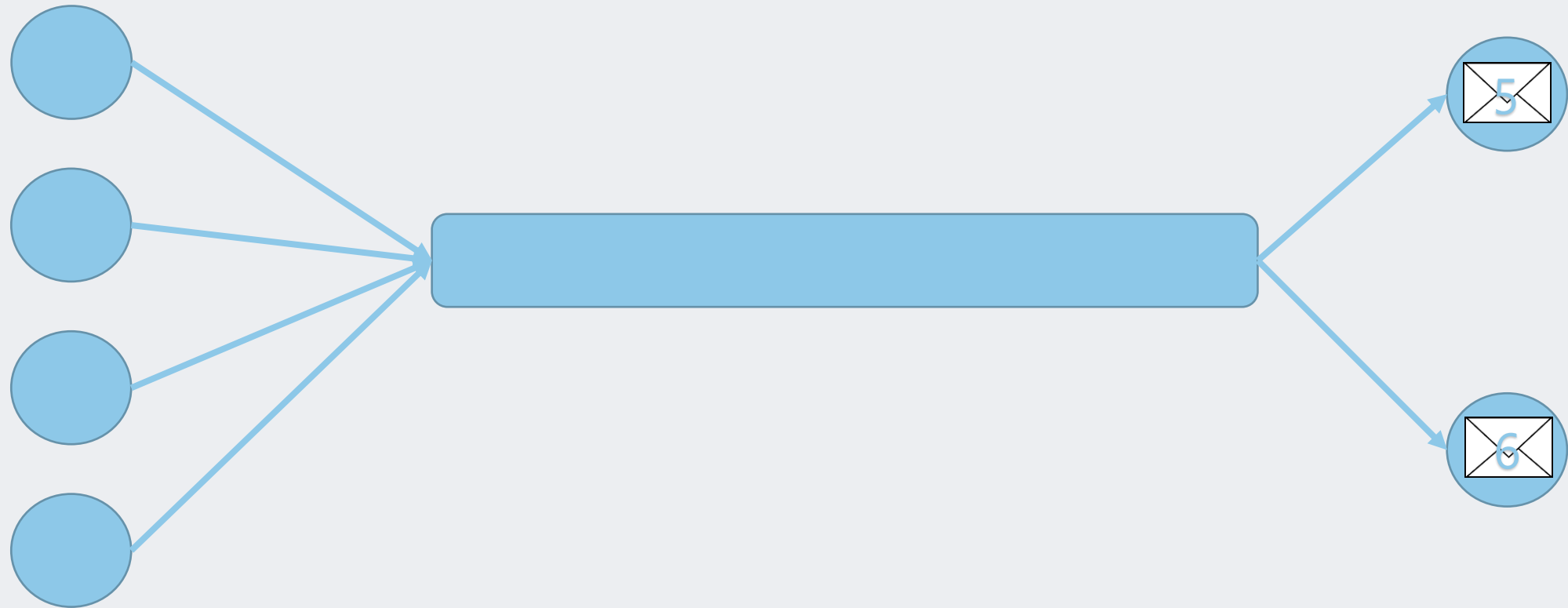
# Idempotent Receiver



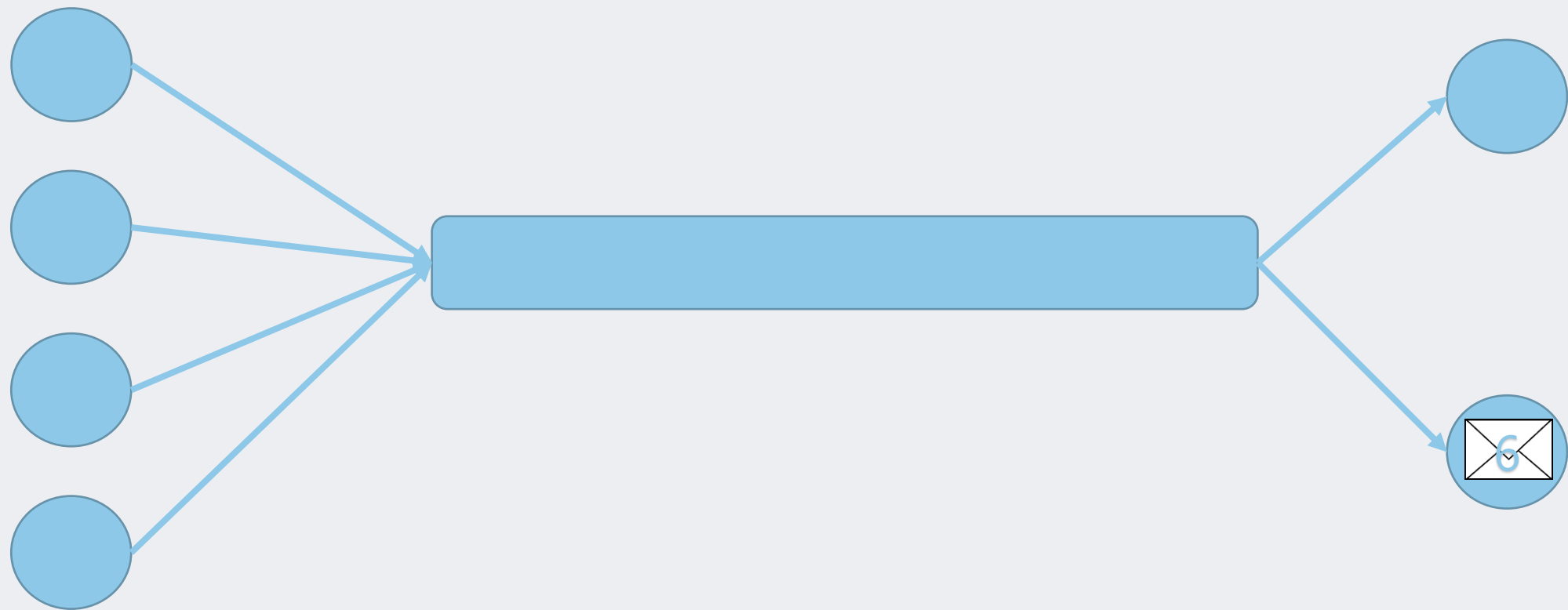
# Idempotent Receiver



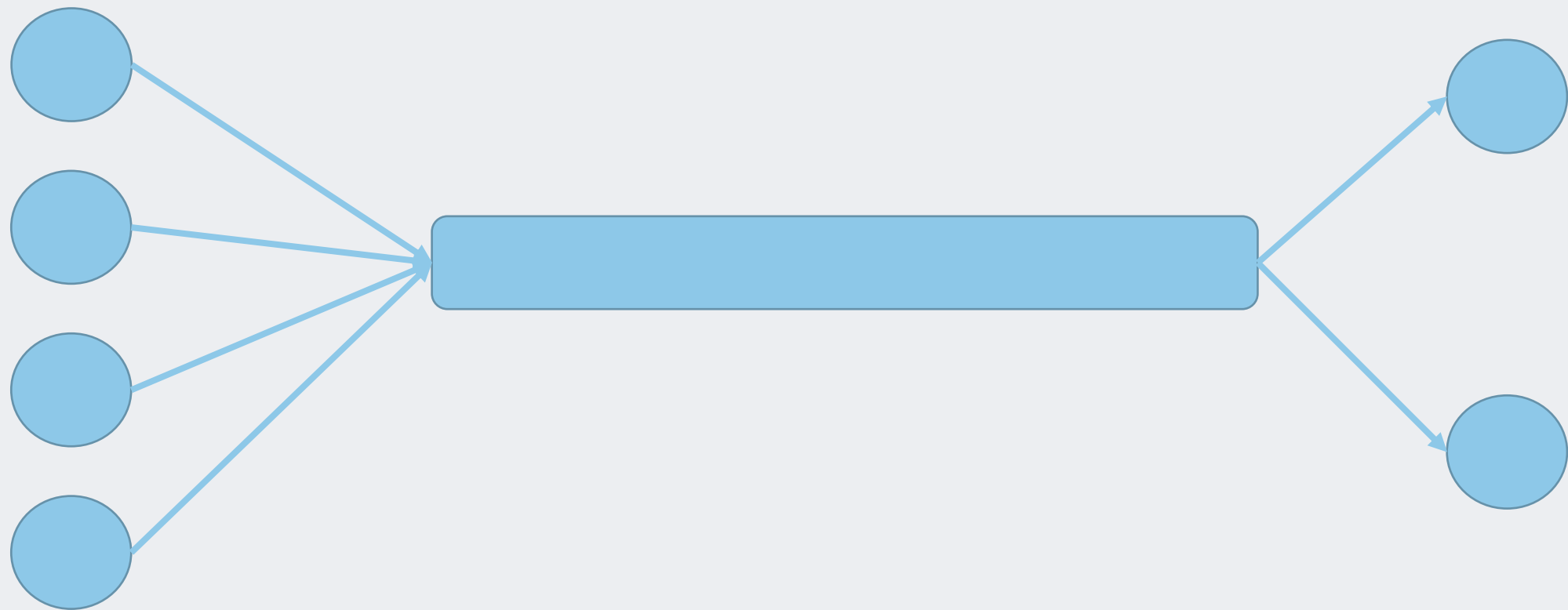
# Idempotent Receiver



# Idempotent Receiver



# Idempotent Receiver

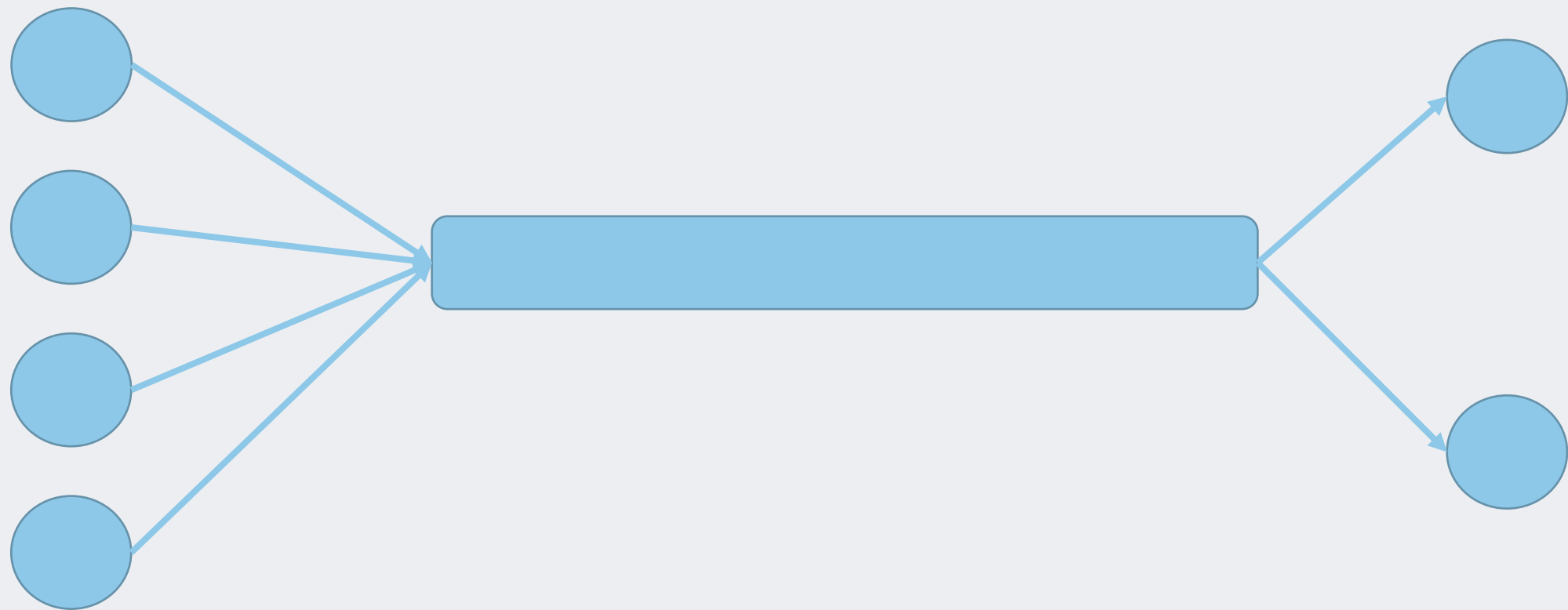




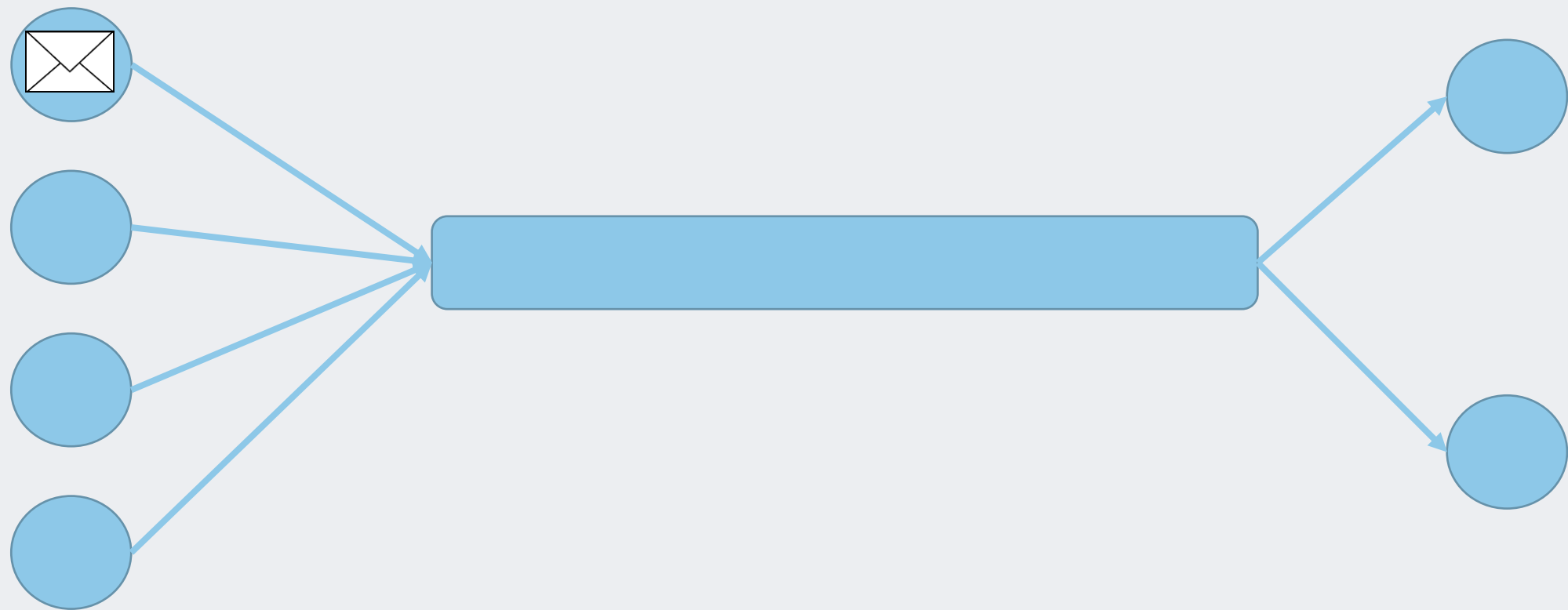
# Message Scheduling

<https://docs.microsoft.com/en-us/azure/service-bus-messaging/message-sequencing#scheduled-messages>

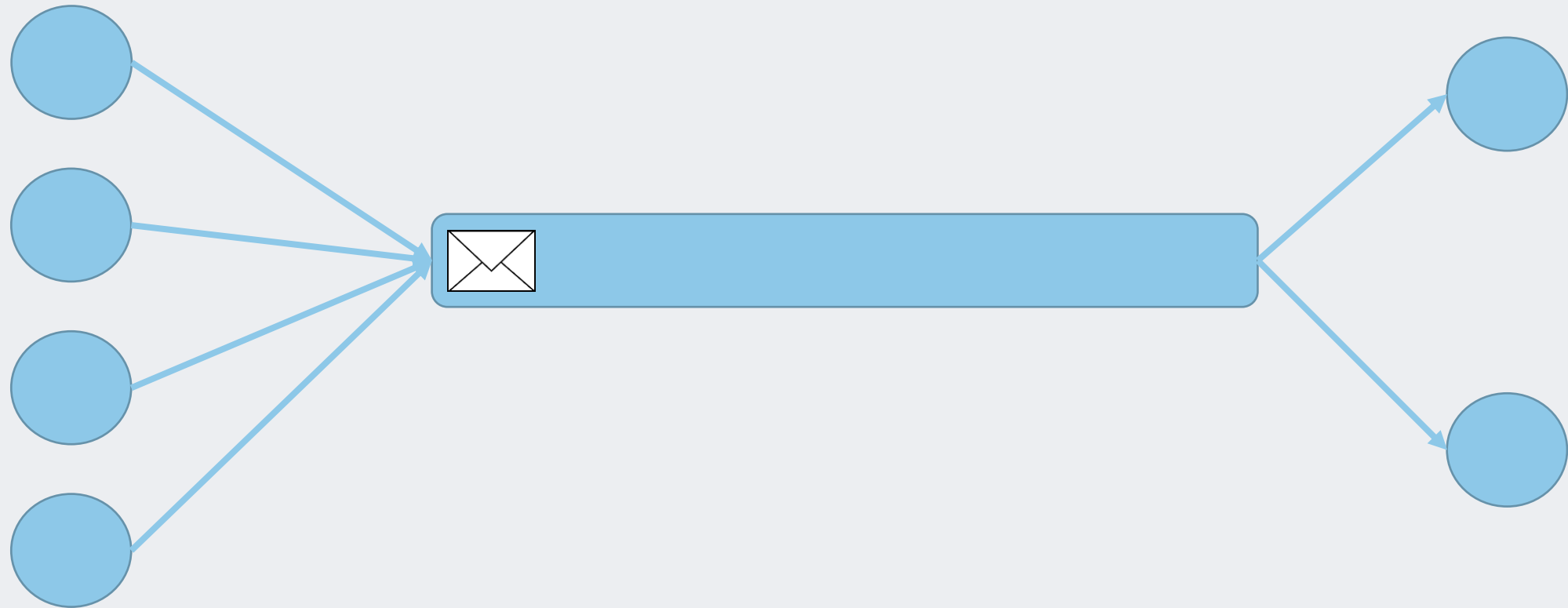
# Message Scheduling



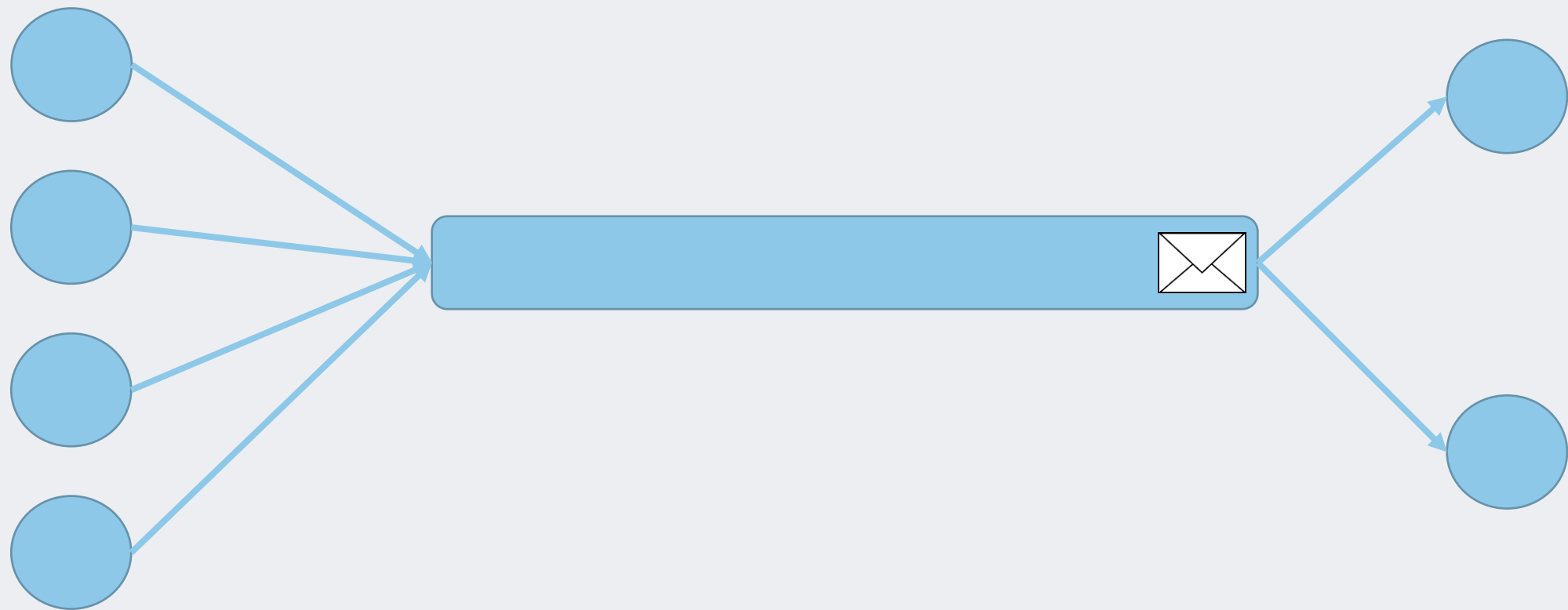
# Message Scheduling



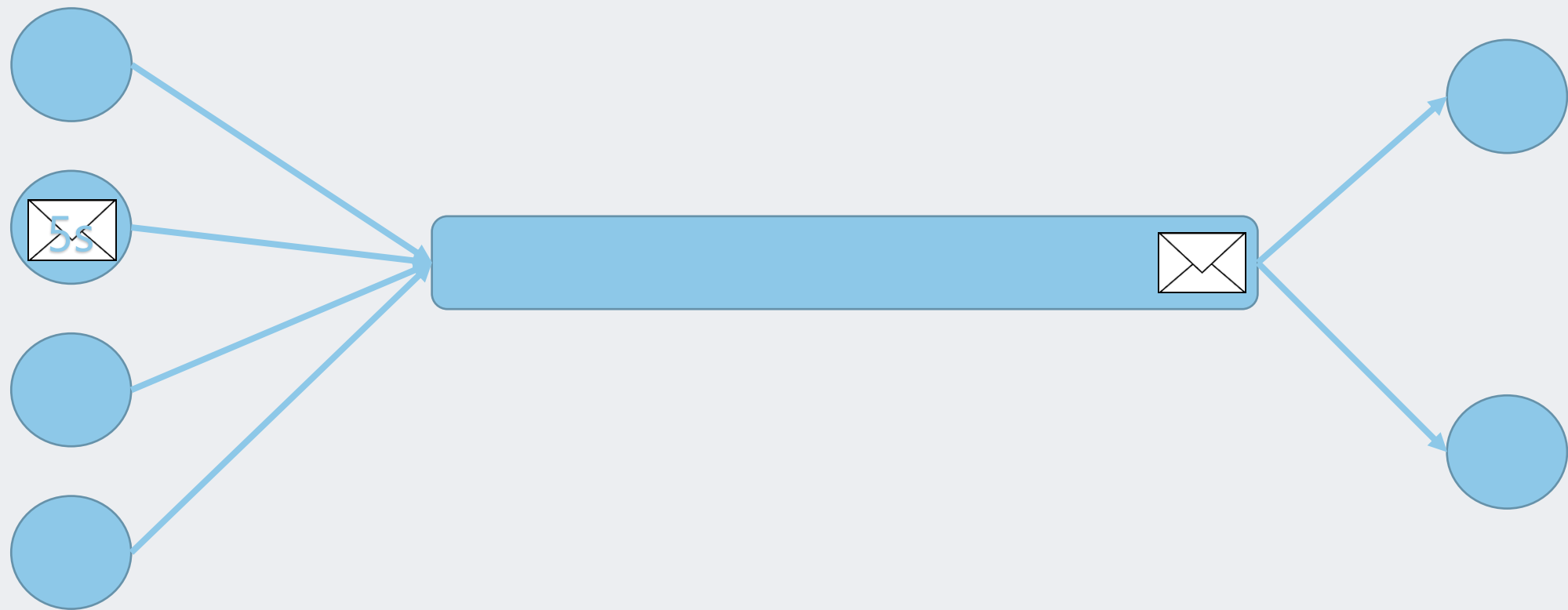
# Message Scheduling



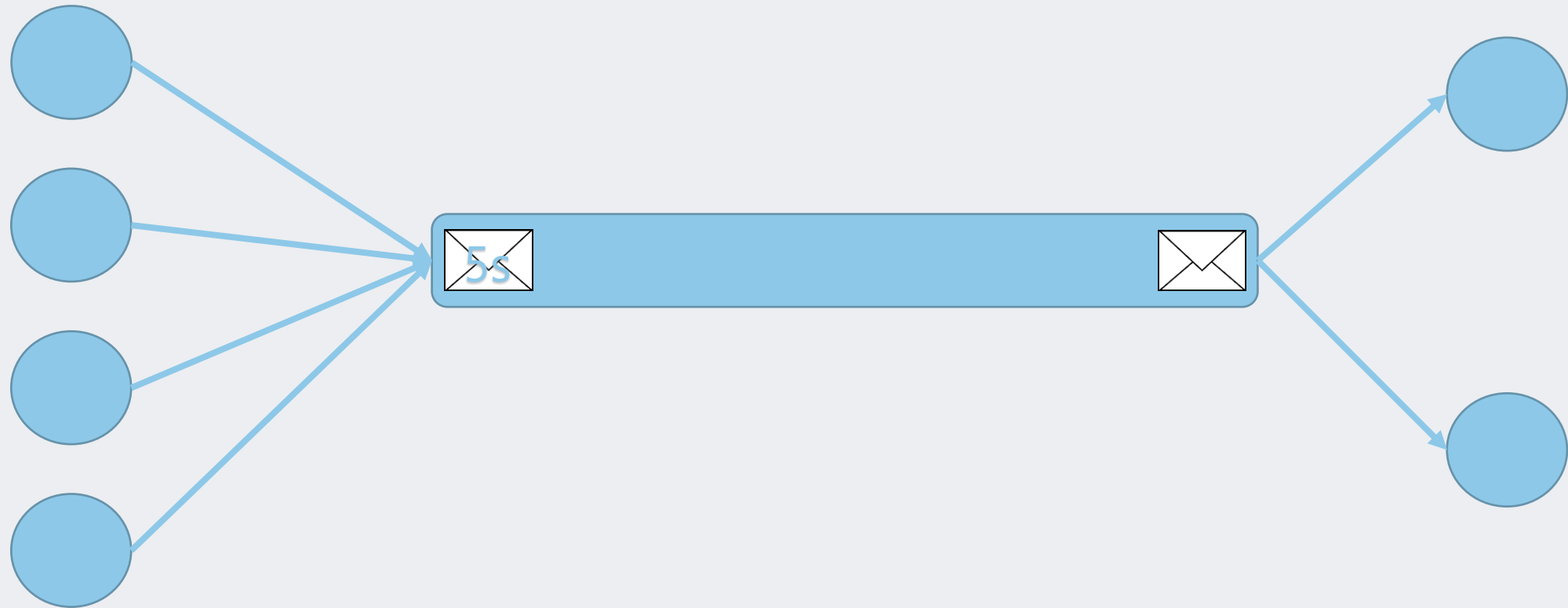
# Message Scheduling



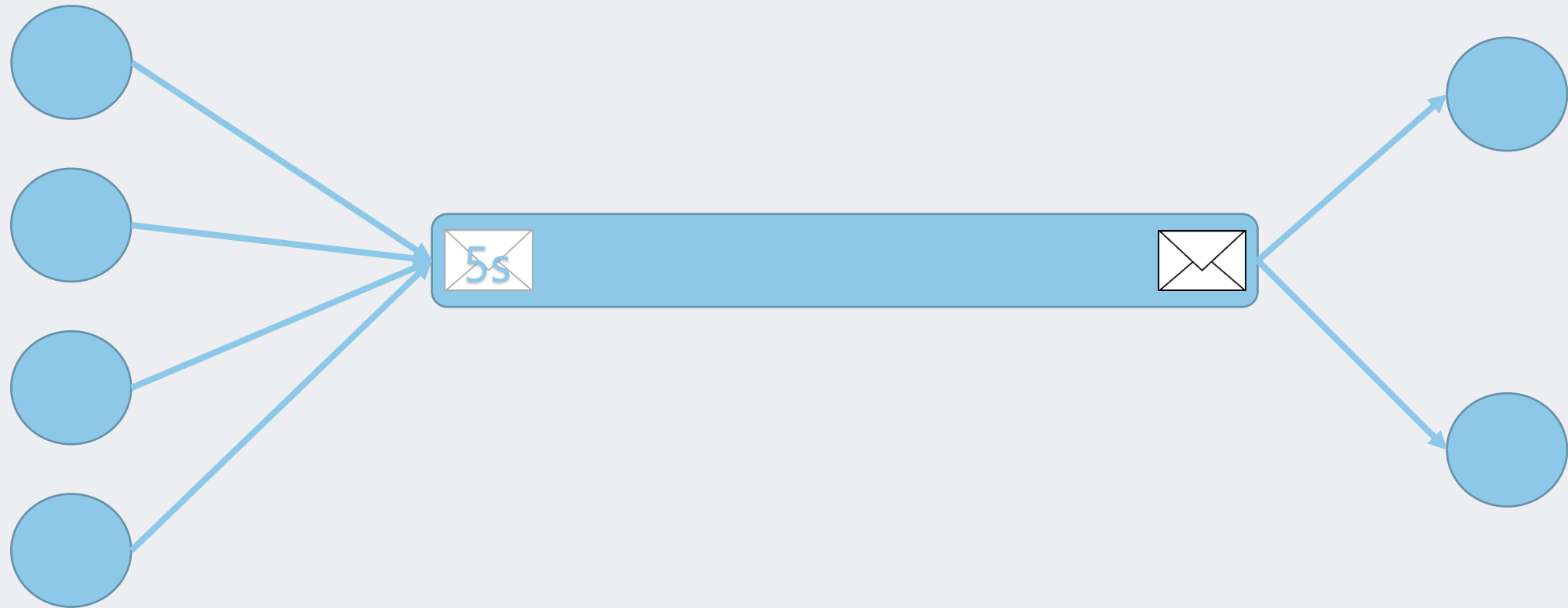
# Message Scheduling



# Message Scheduling

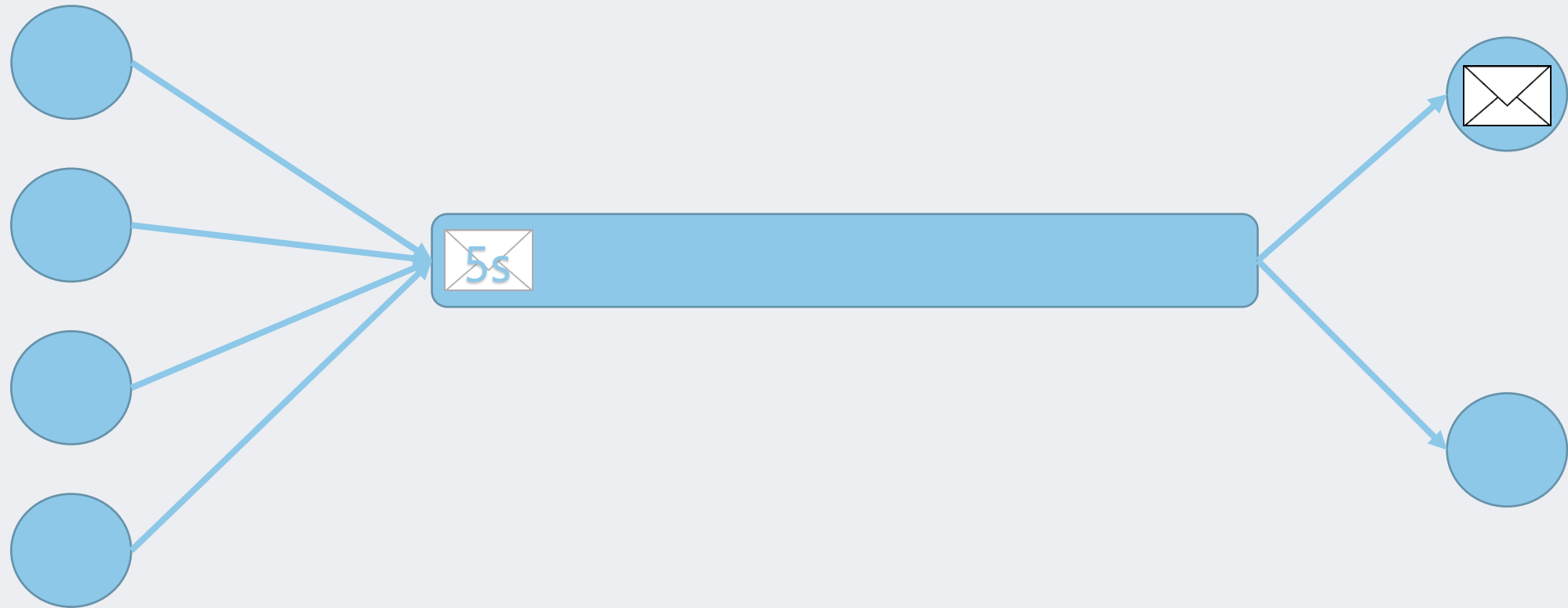


# Message Scheduling

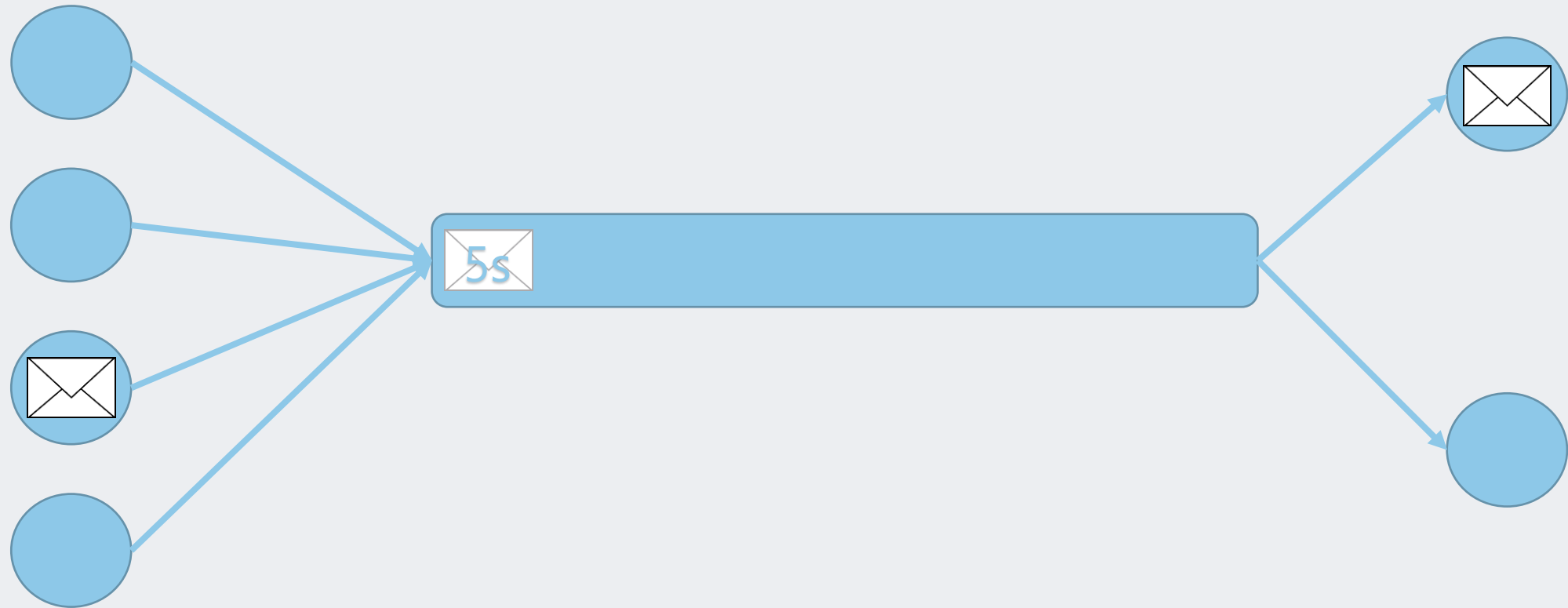




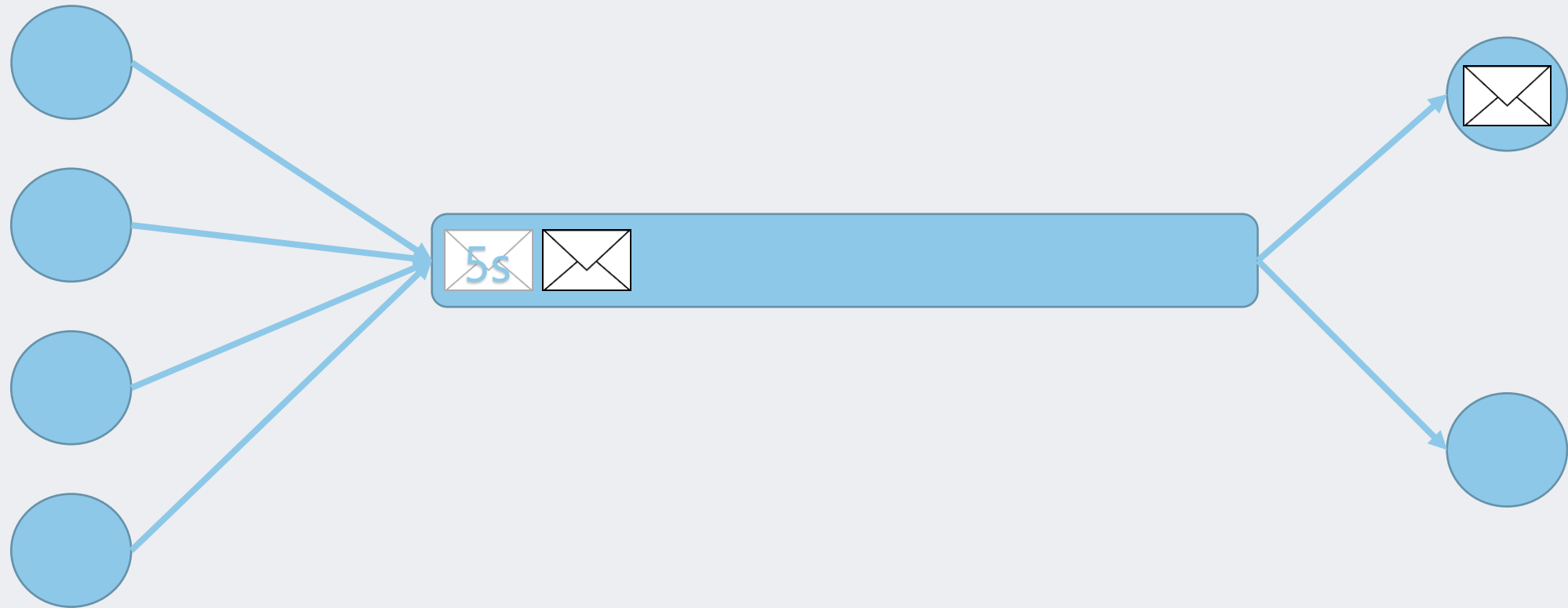
# Message Scheduling



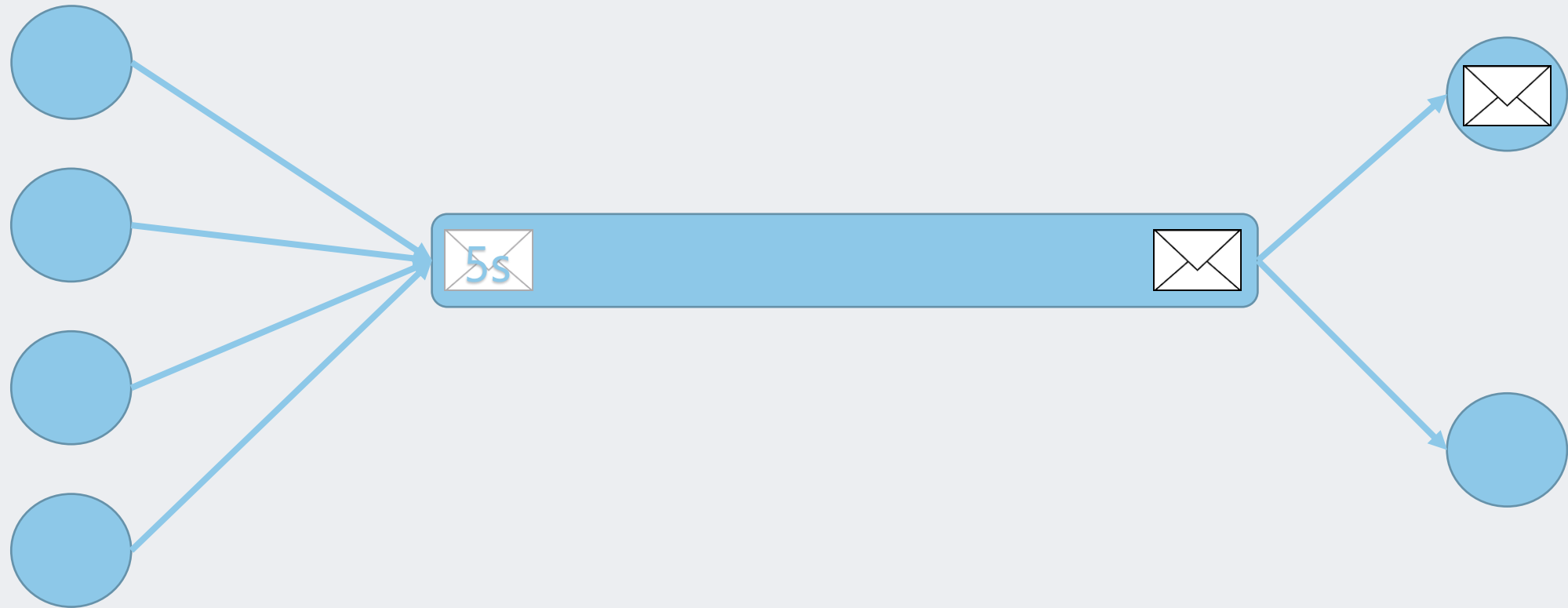
# Message Scheduling



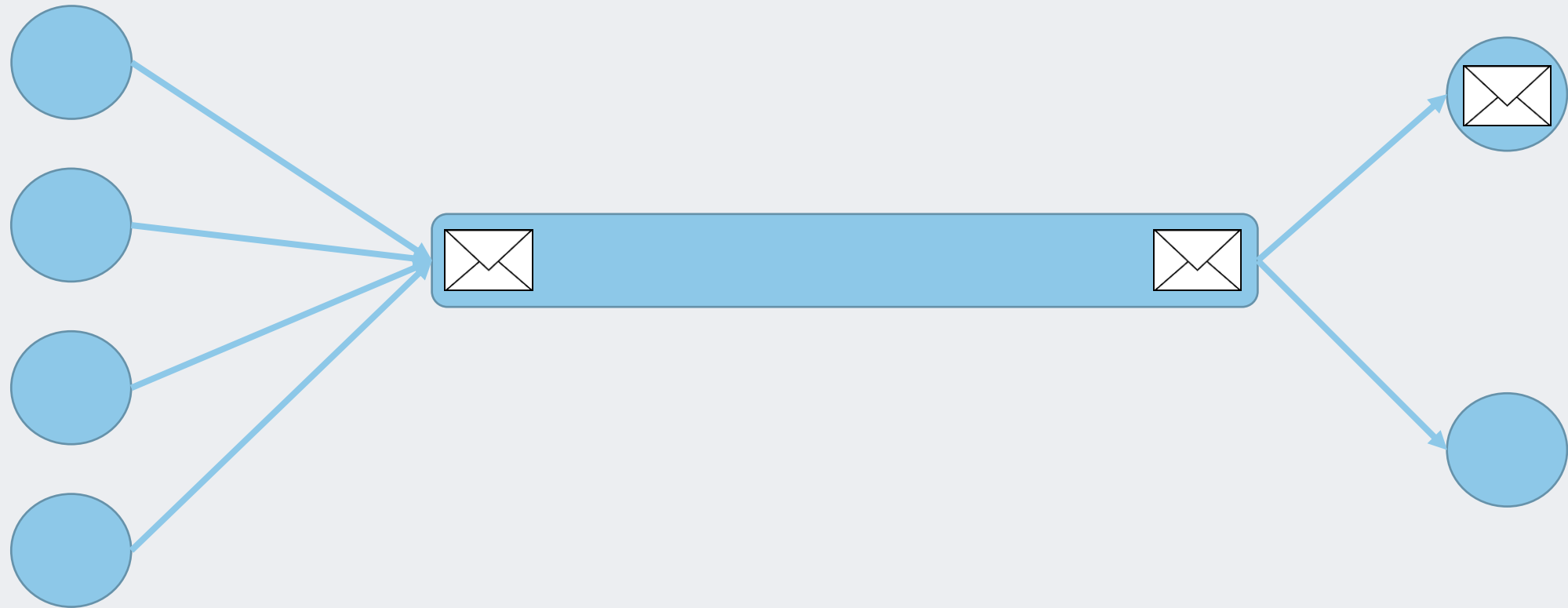
# Message Scheduling



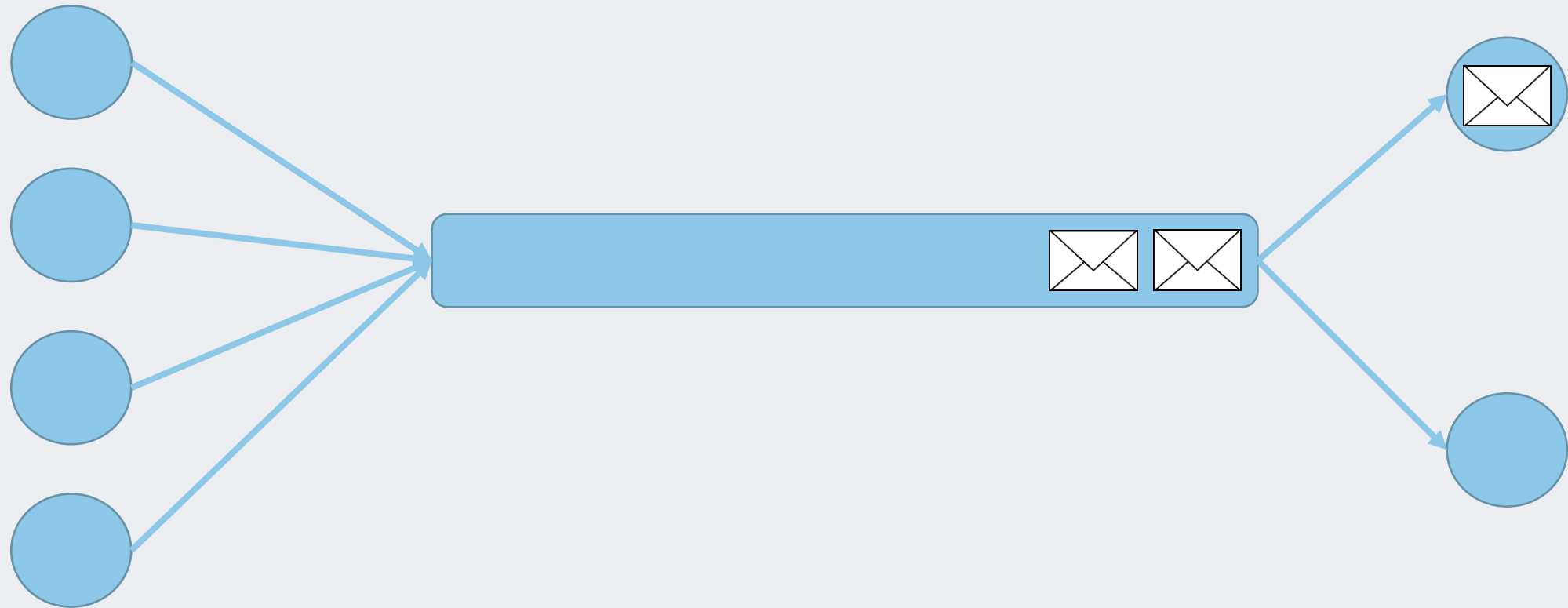
# Message Scheduling



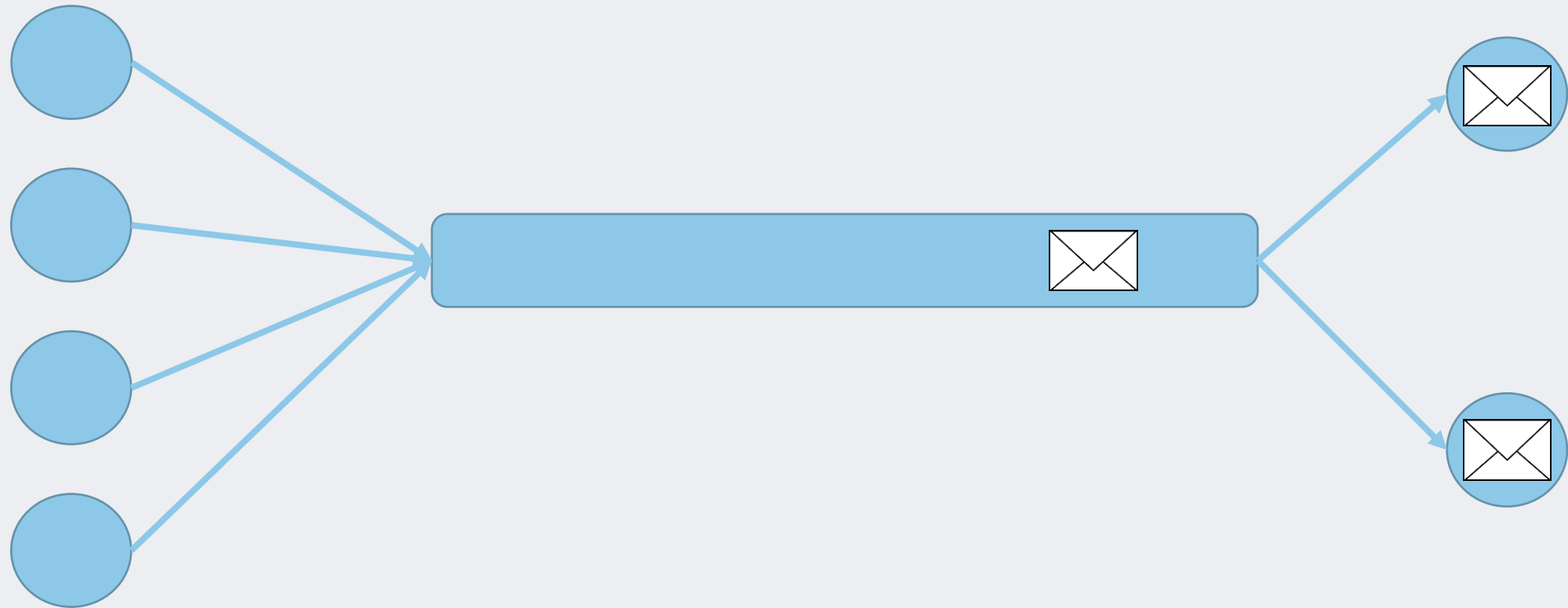
# Message Scheduling



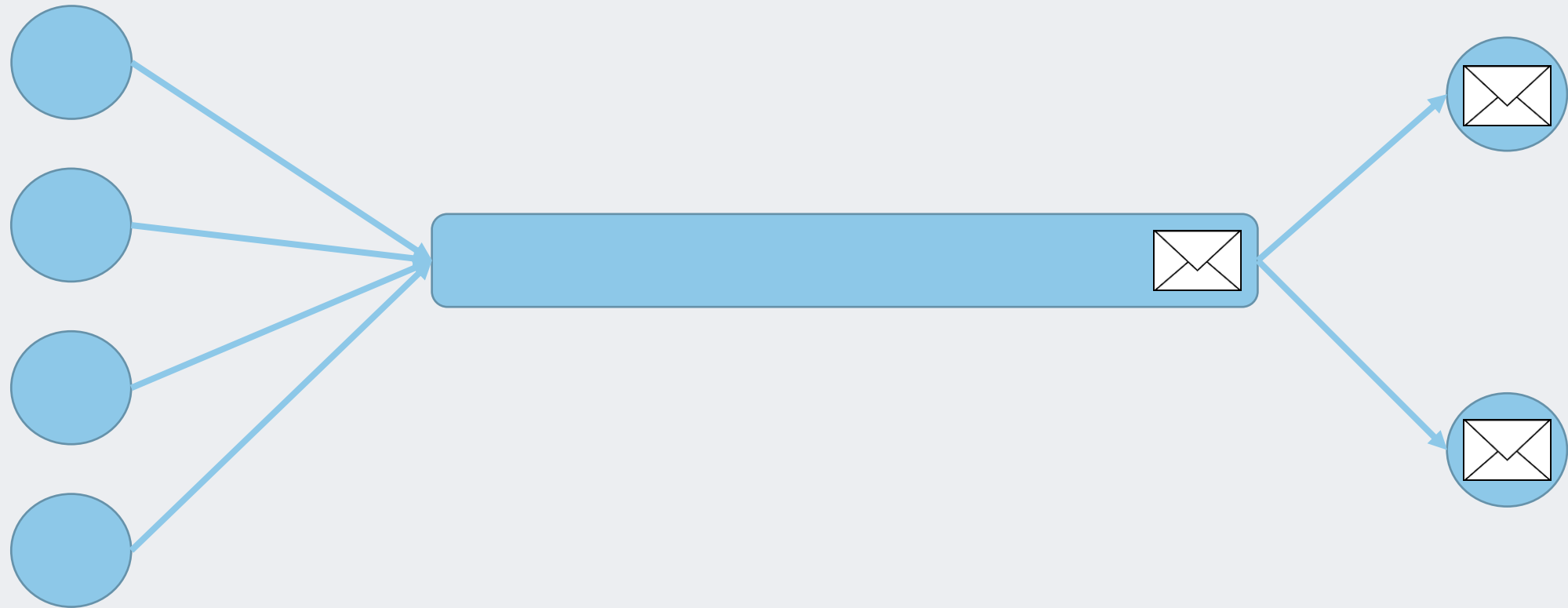
# Message Scheduling



# Message Scheduling

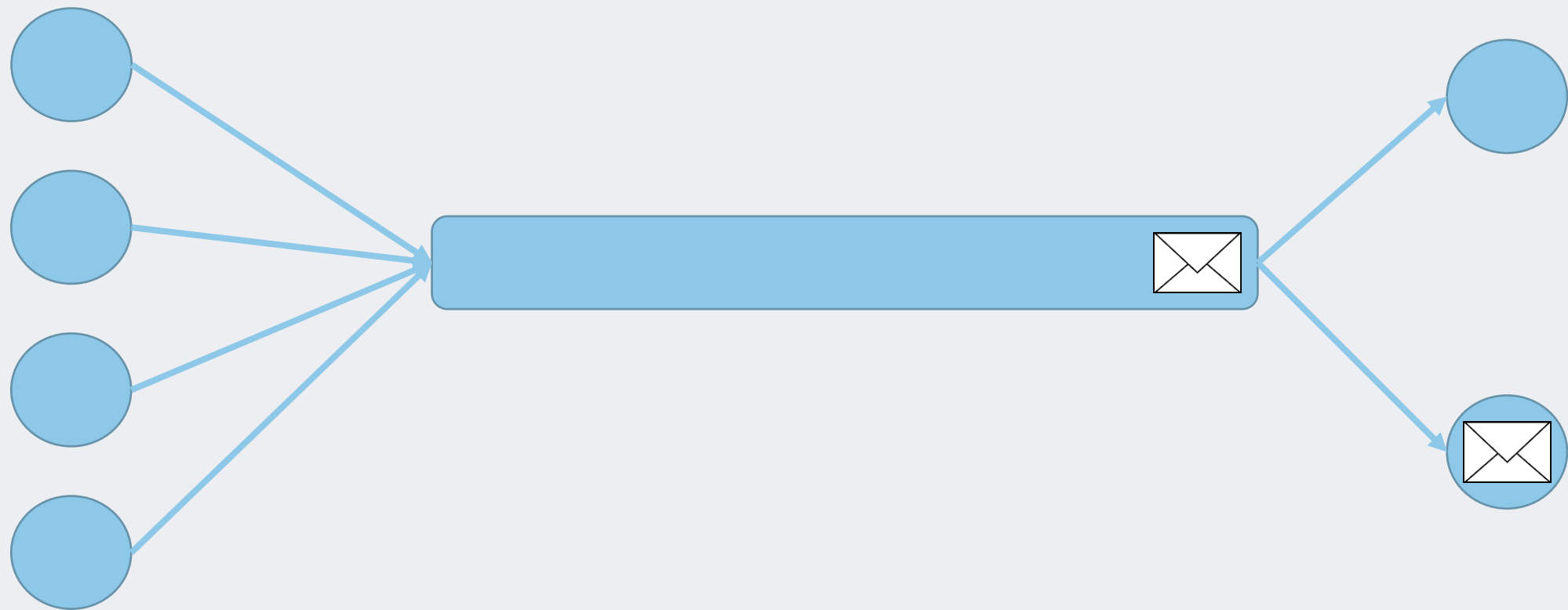


# Message Scheduling

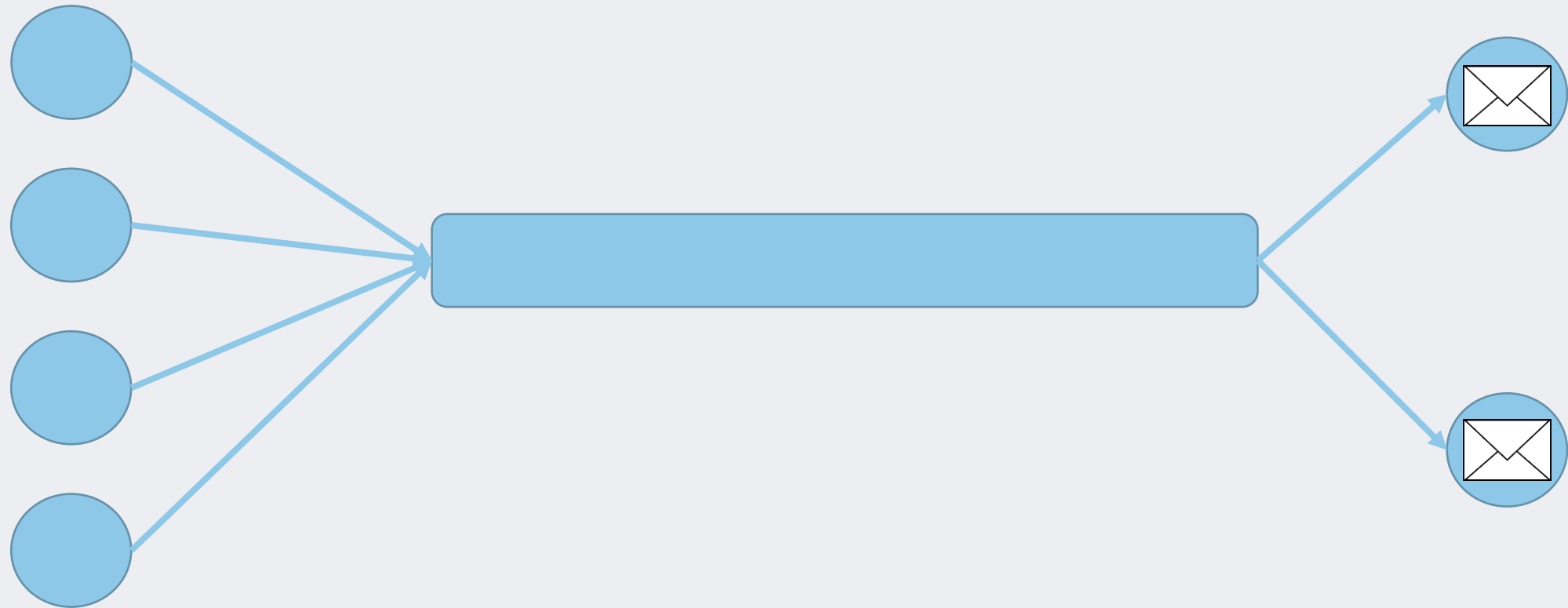




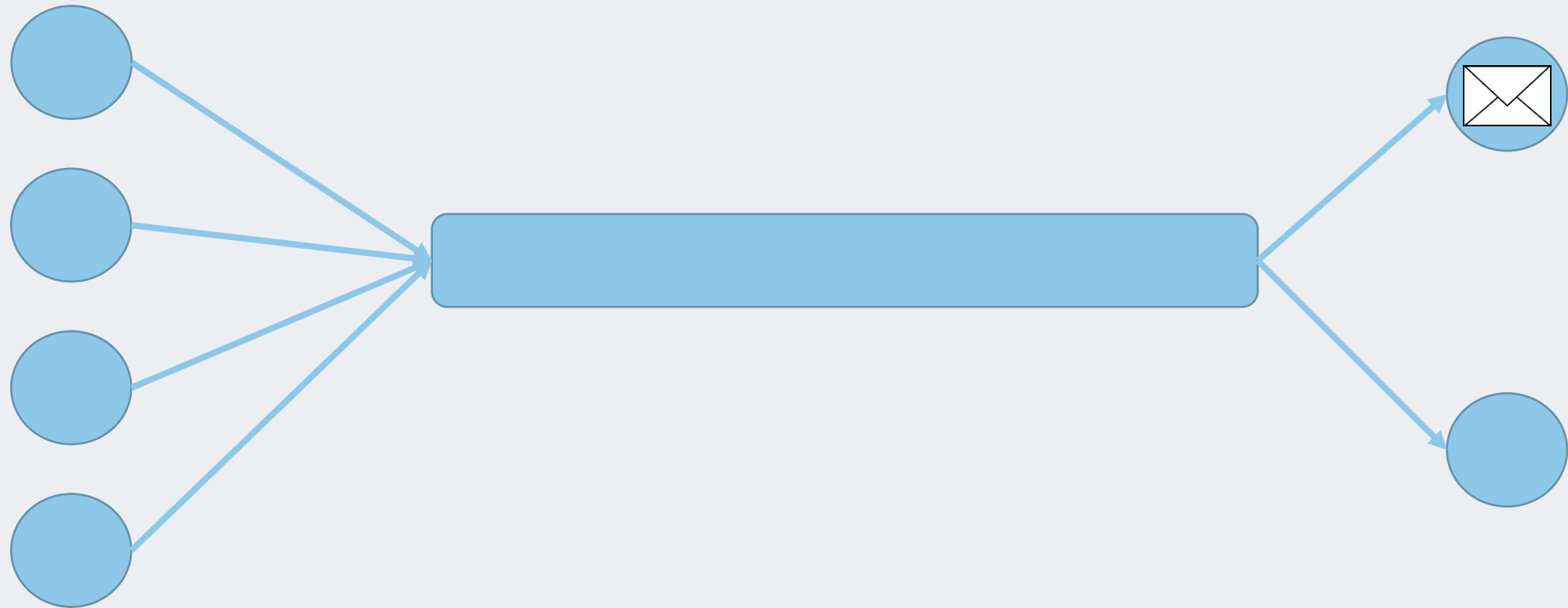
# Message Scheduling



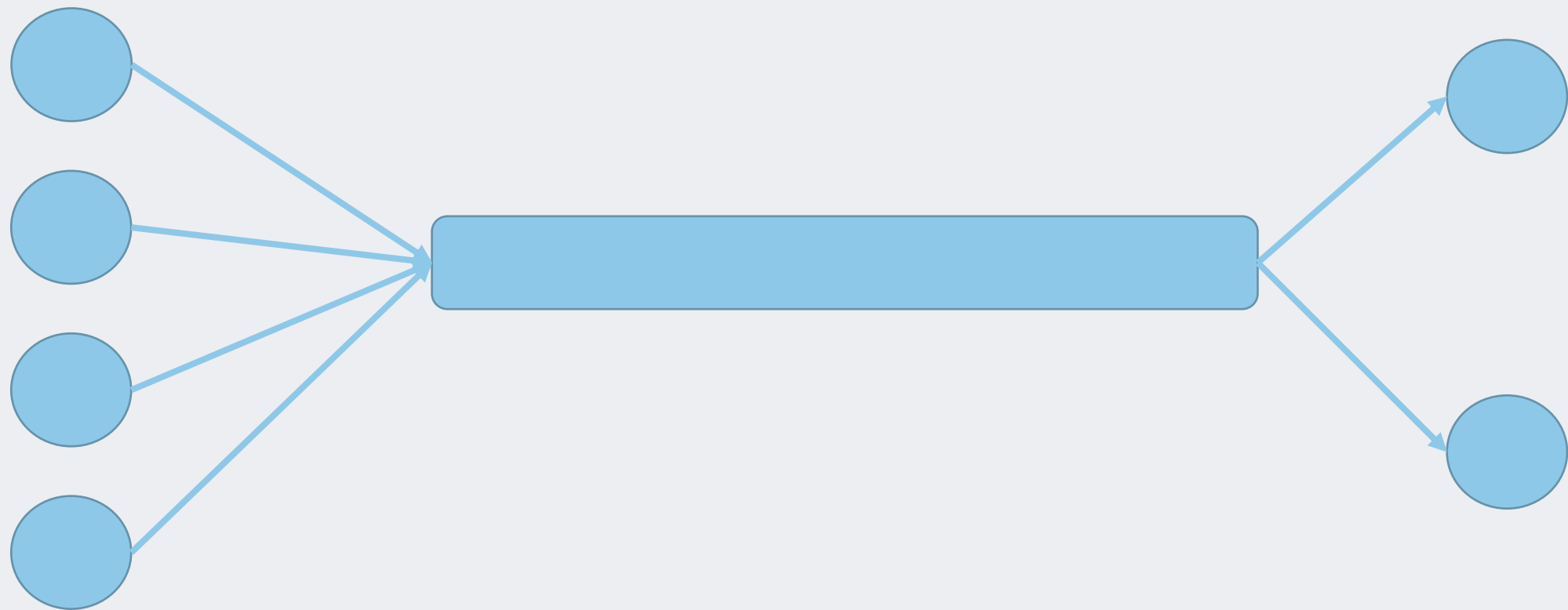
# Message Scheduling



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# Message Scheduling

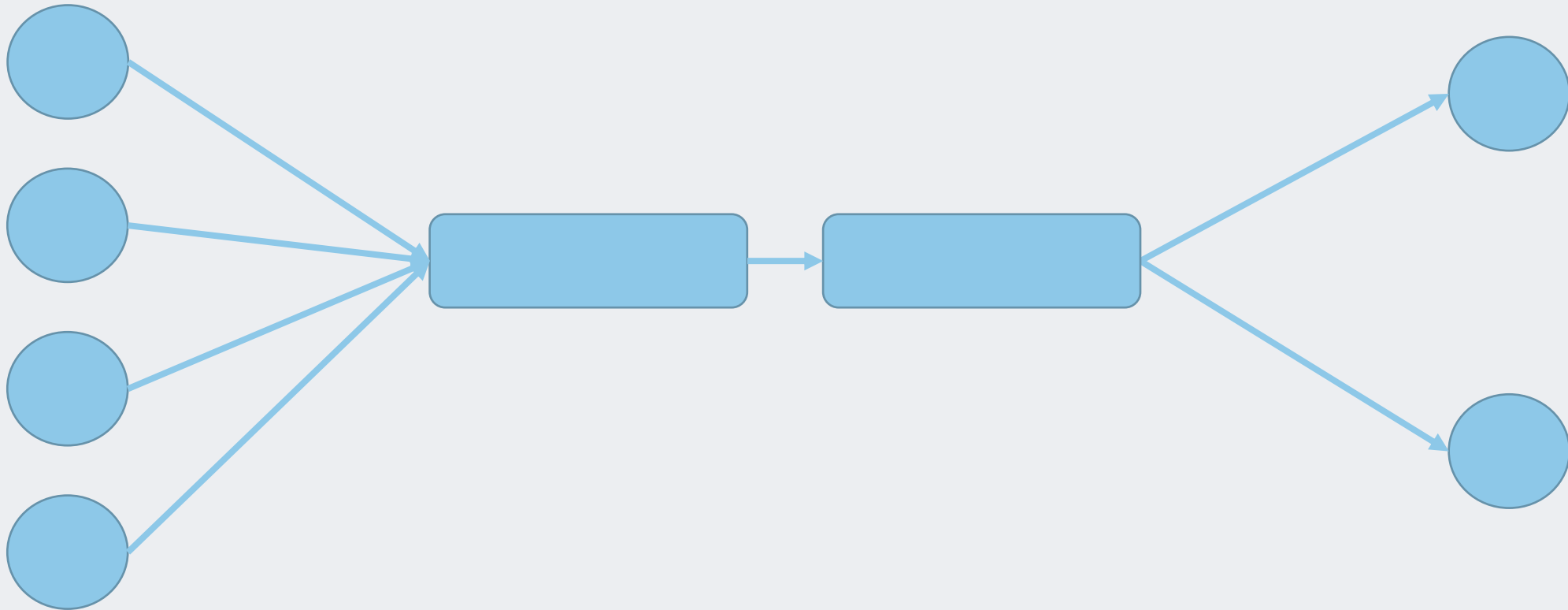


The background features a stylized illustration of two hands shaking in a firm grip, symbolizing agreement or partnership. This is overlaid with a network of glowing teal lines forming various rectangular shapes, some of which are interconnected. Scattered throughout the scene are numerous white dots of varying sizes, giving the impression of data points or nodes in a network. The overall color palette is a mix of teal, white, and a muted blue-grey.

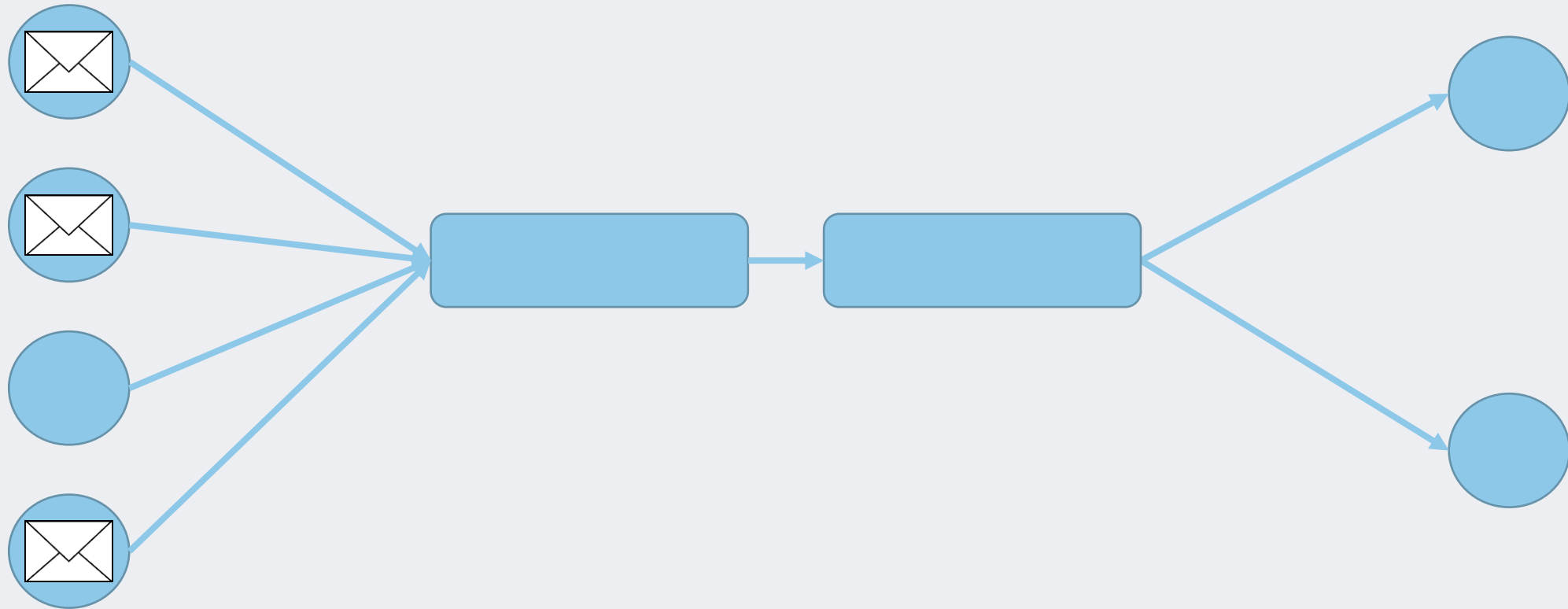
# Transactional Queues

<https://docs.microsoft.com/en-us/azure/service-bus-messaging/service-bus-transactions>

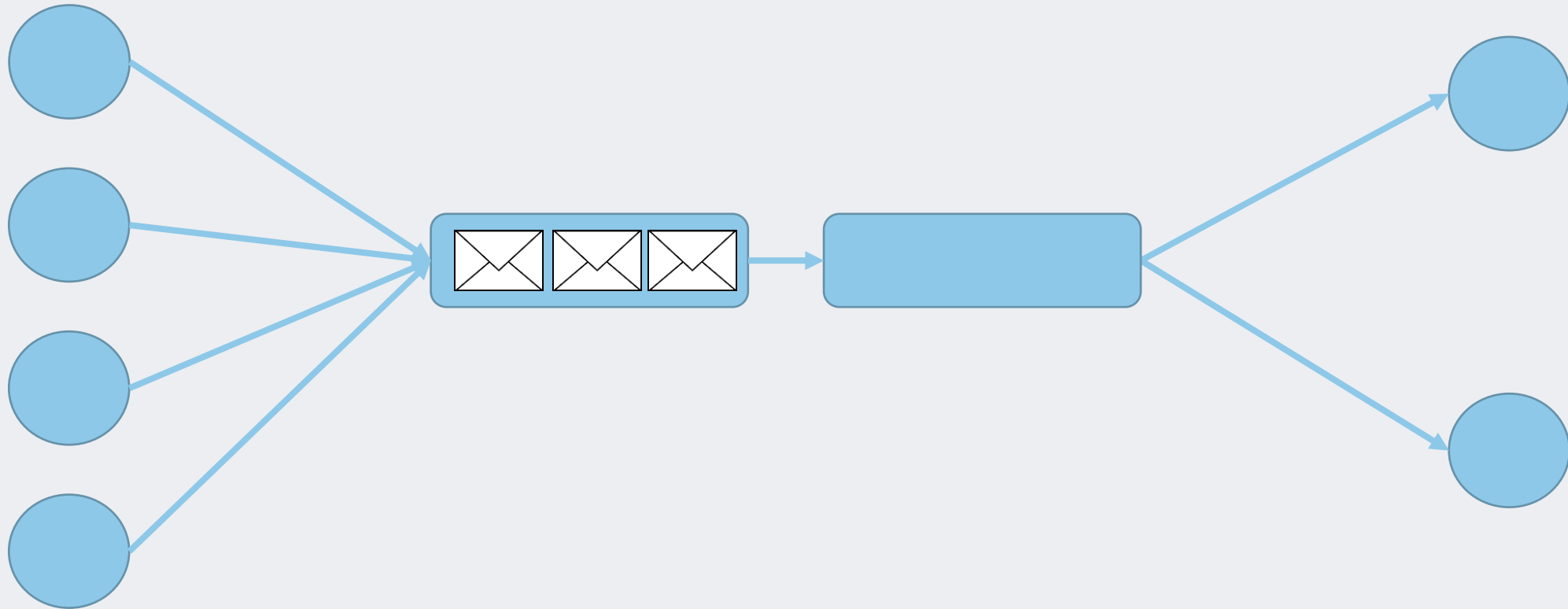
# Transactional Queues



# Transactional Queues

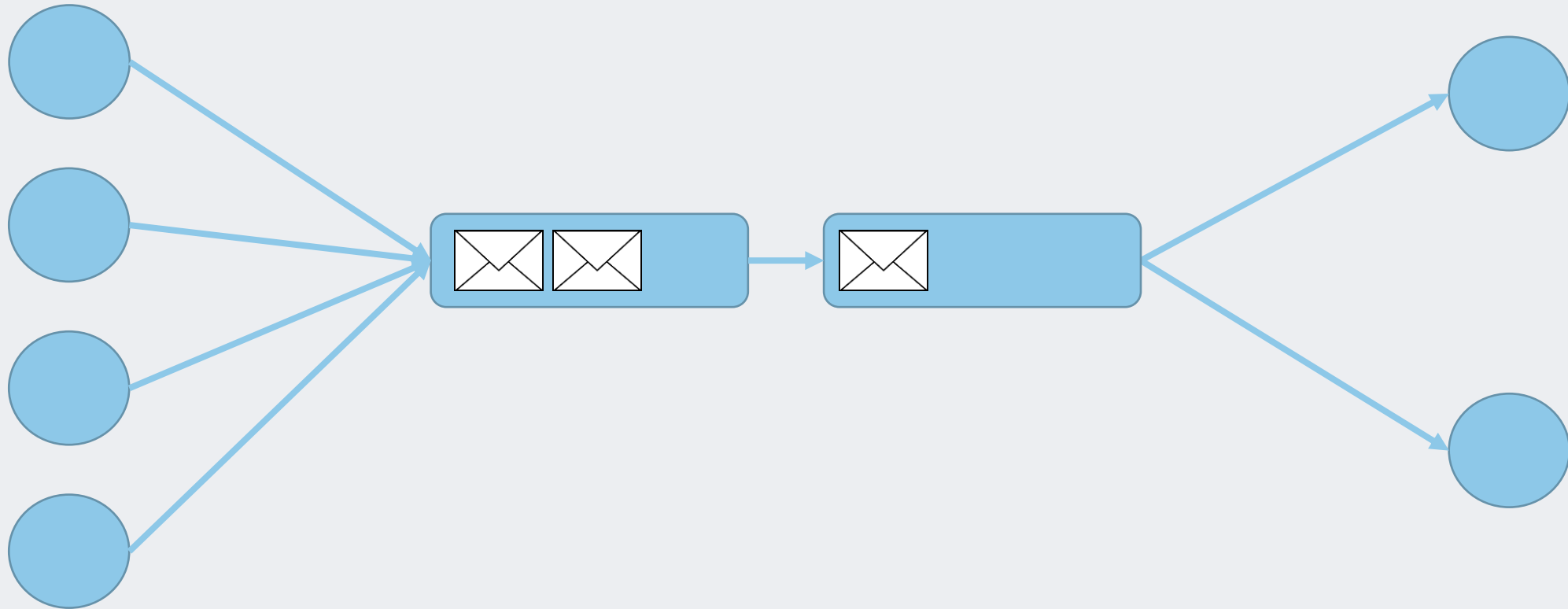


# Transactional Queues

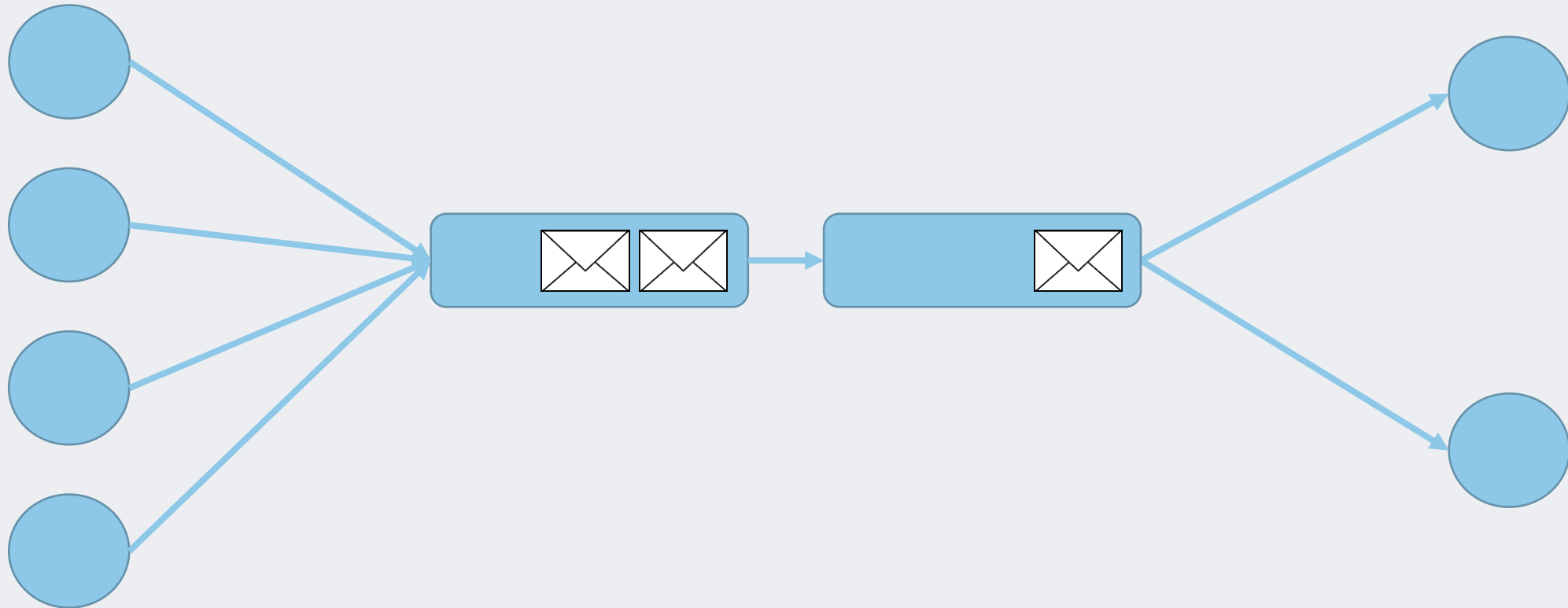




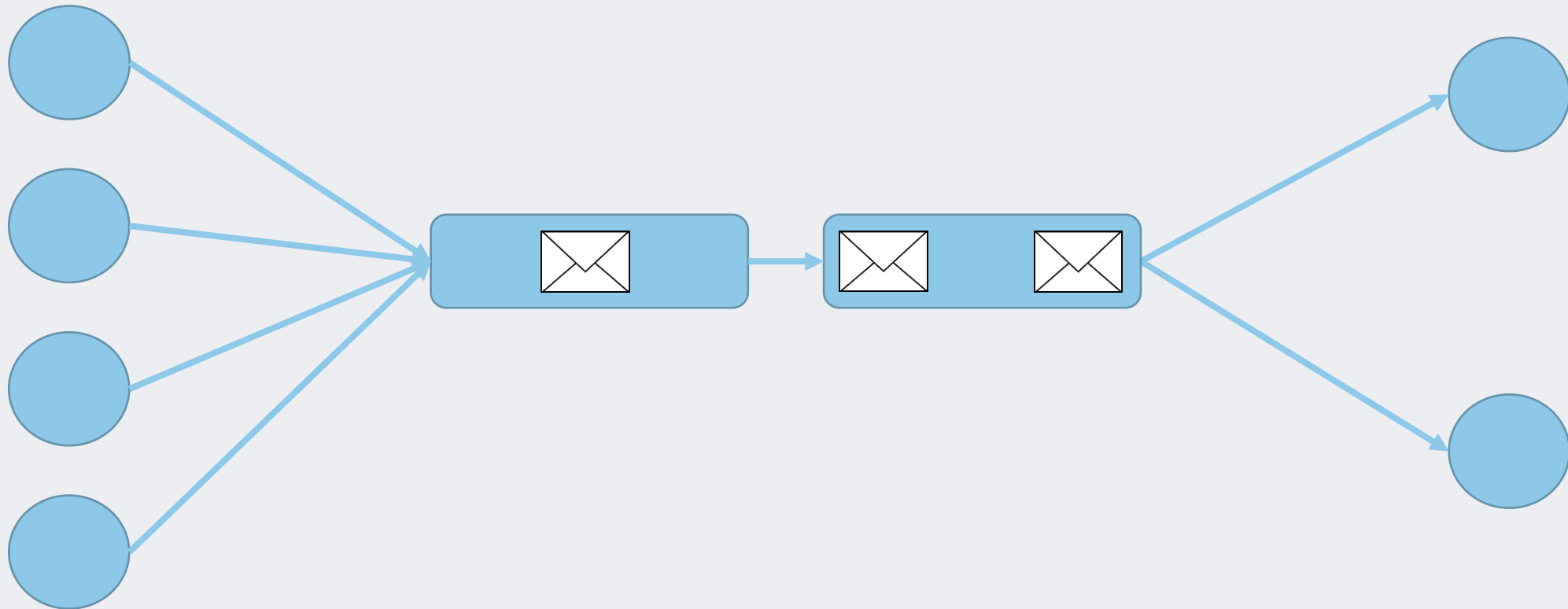
# Transactional Queues



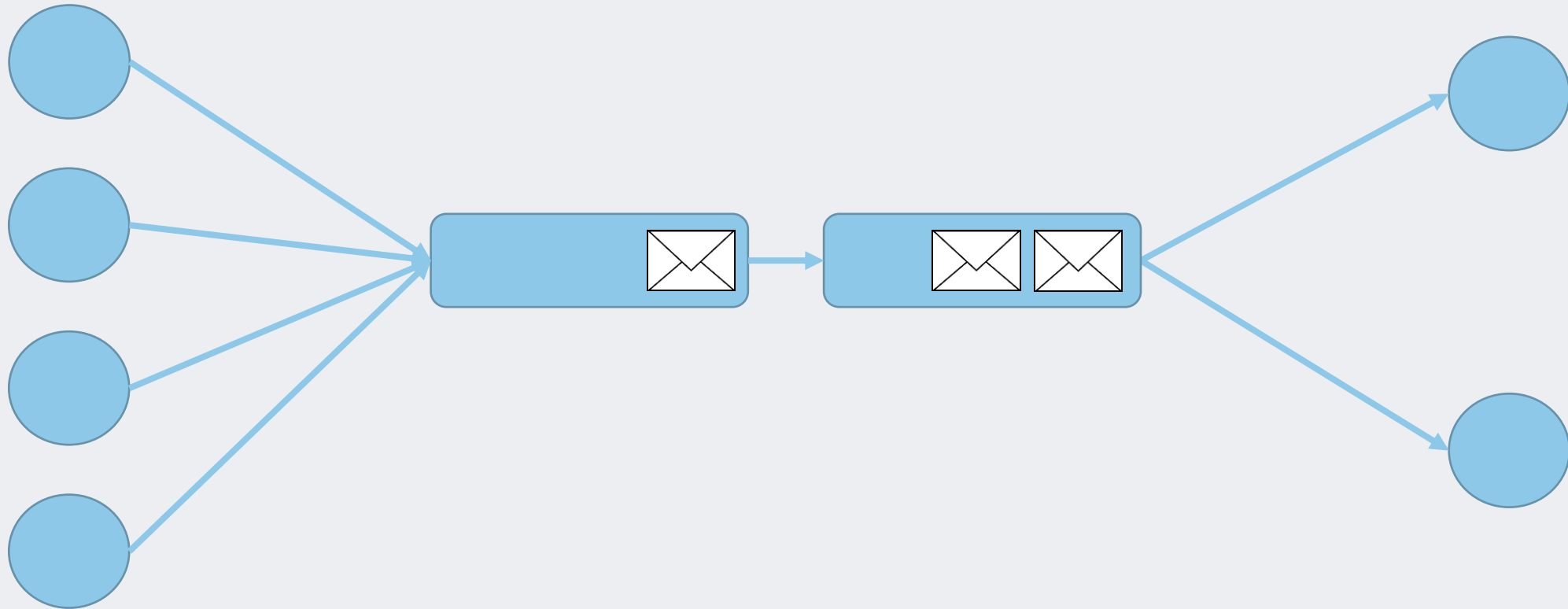
# Transactional Queues



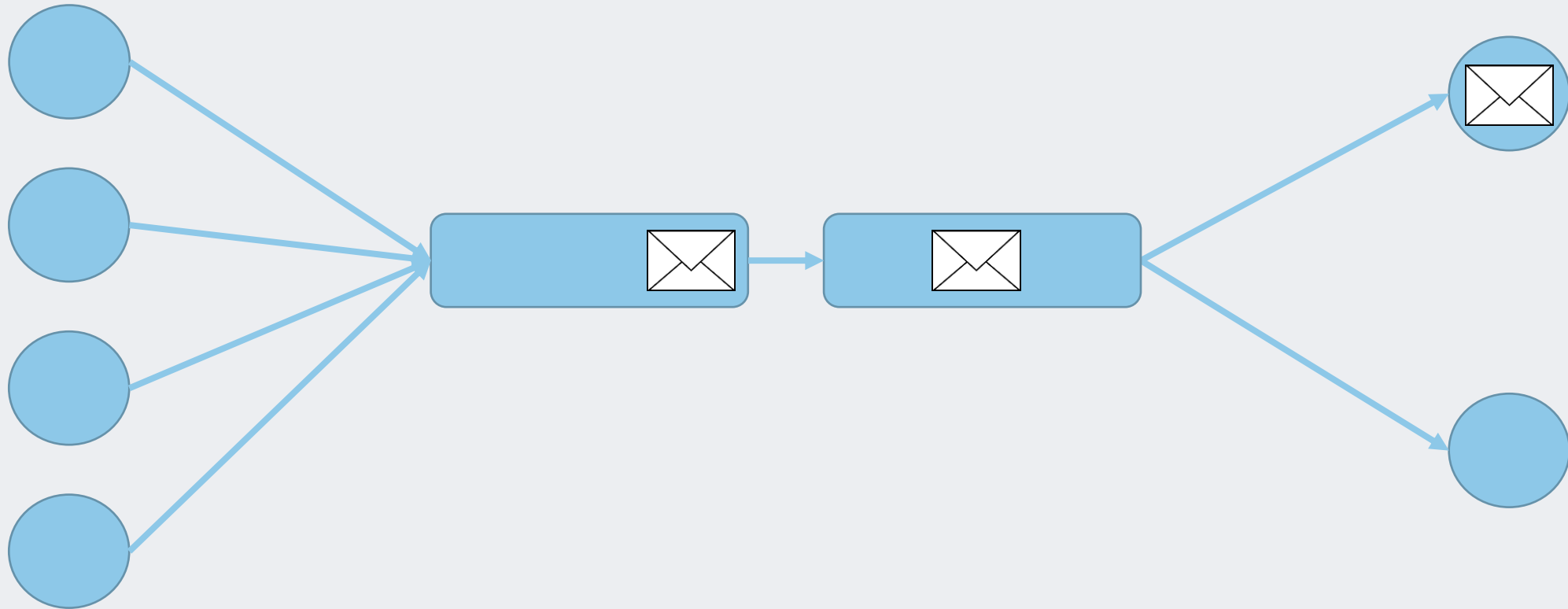
# Transactional Queues



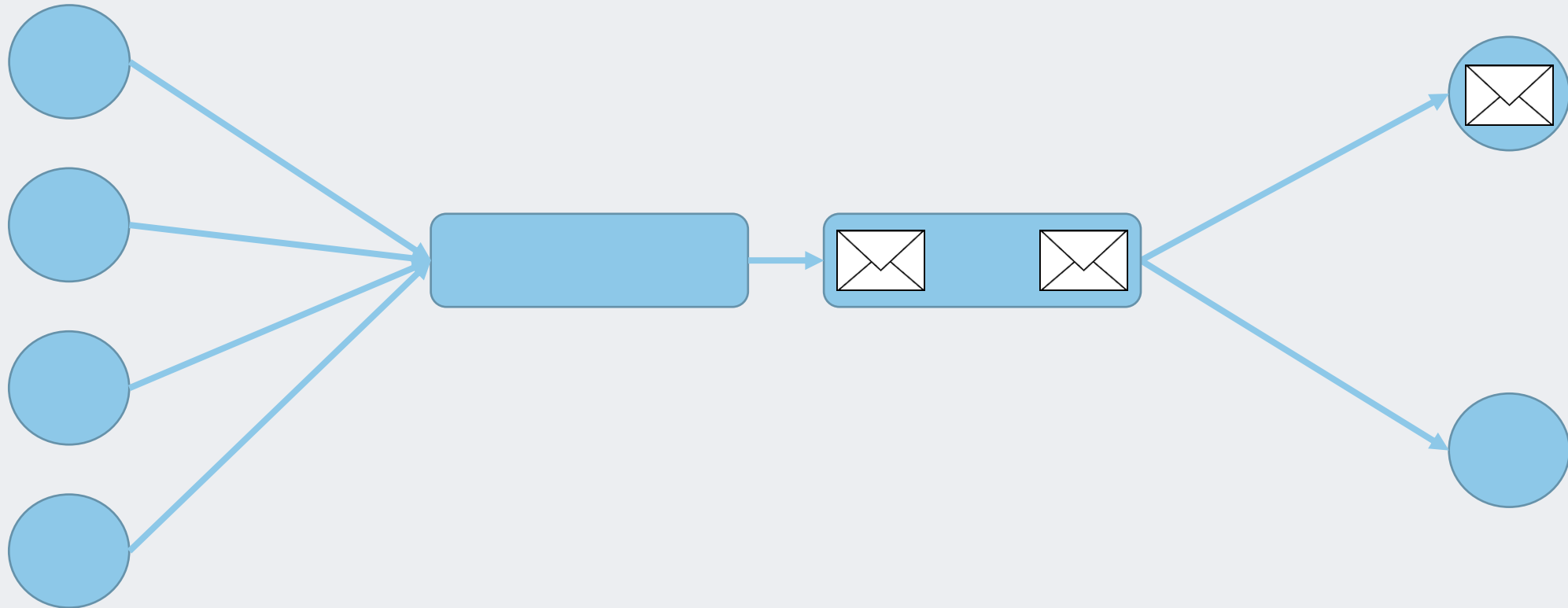
# Transactional Queues



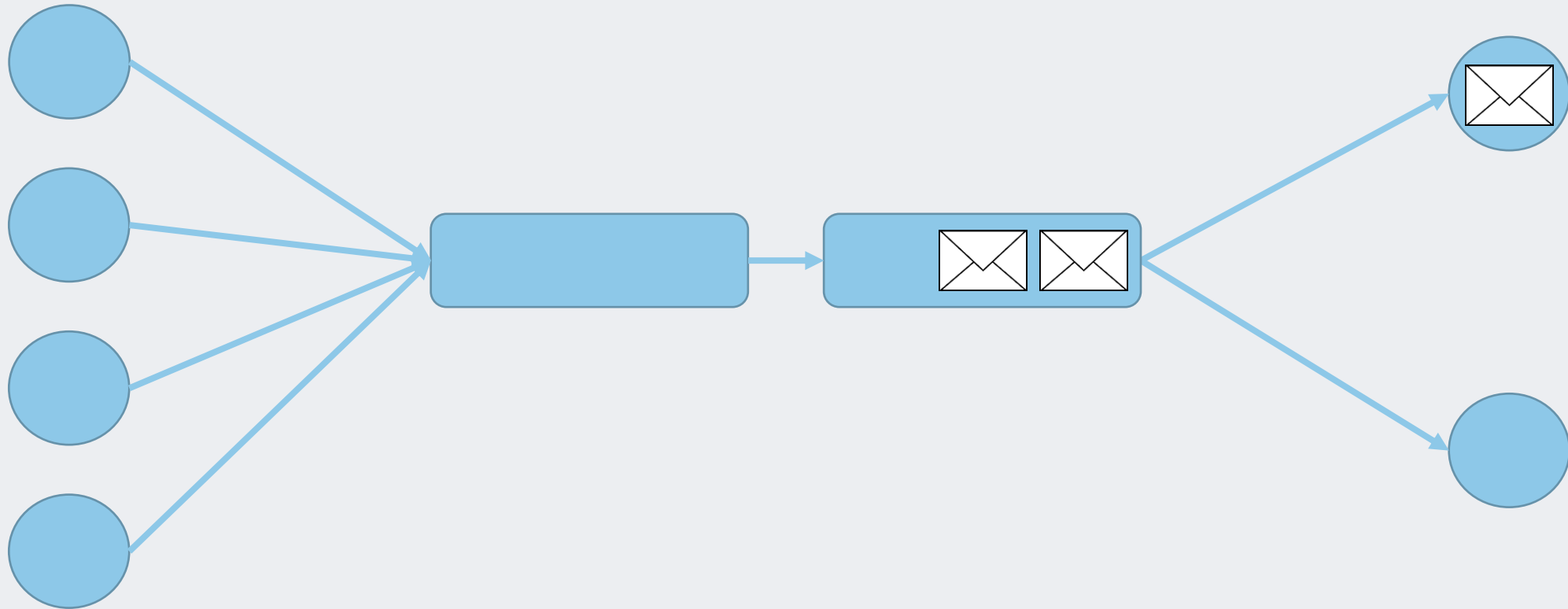
# Transactional Queues



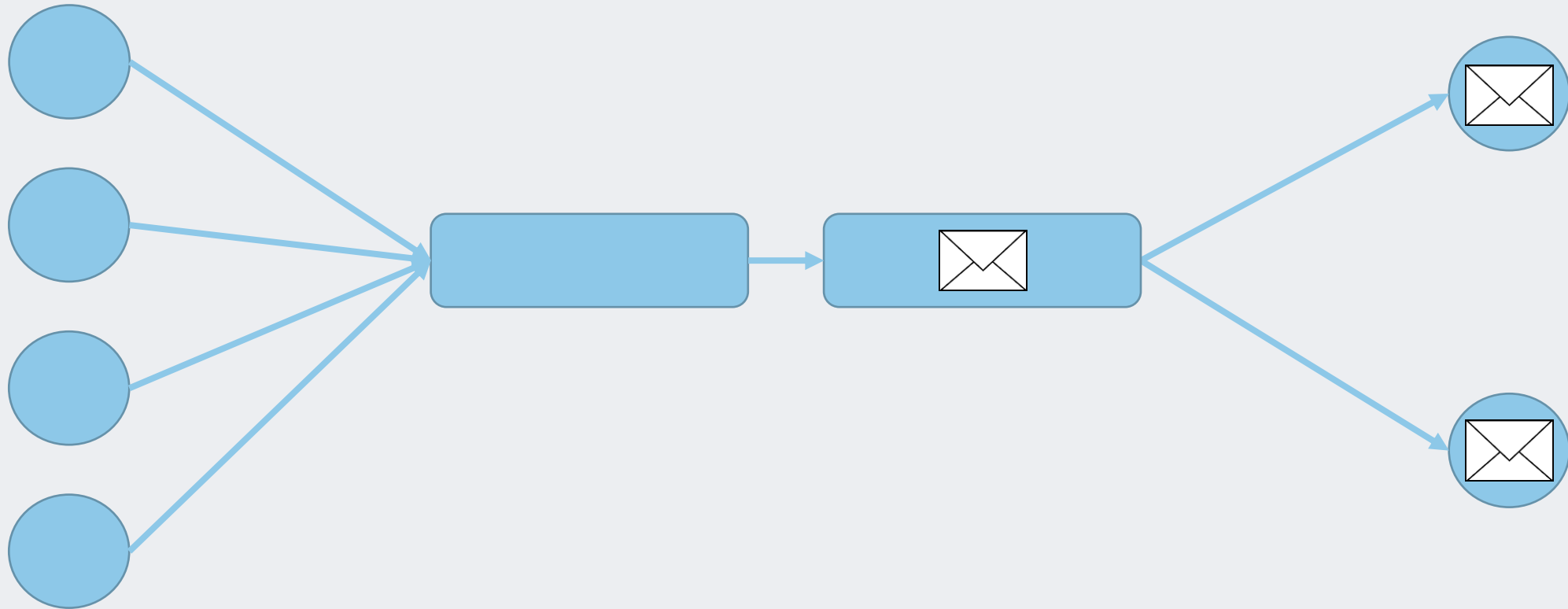
# Transactional Queues



# Transactional Queues

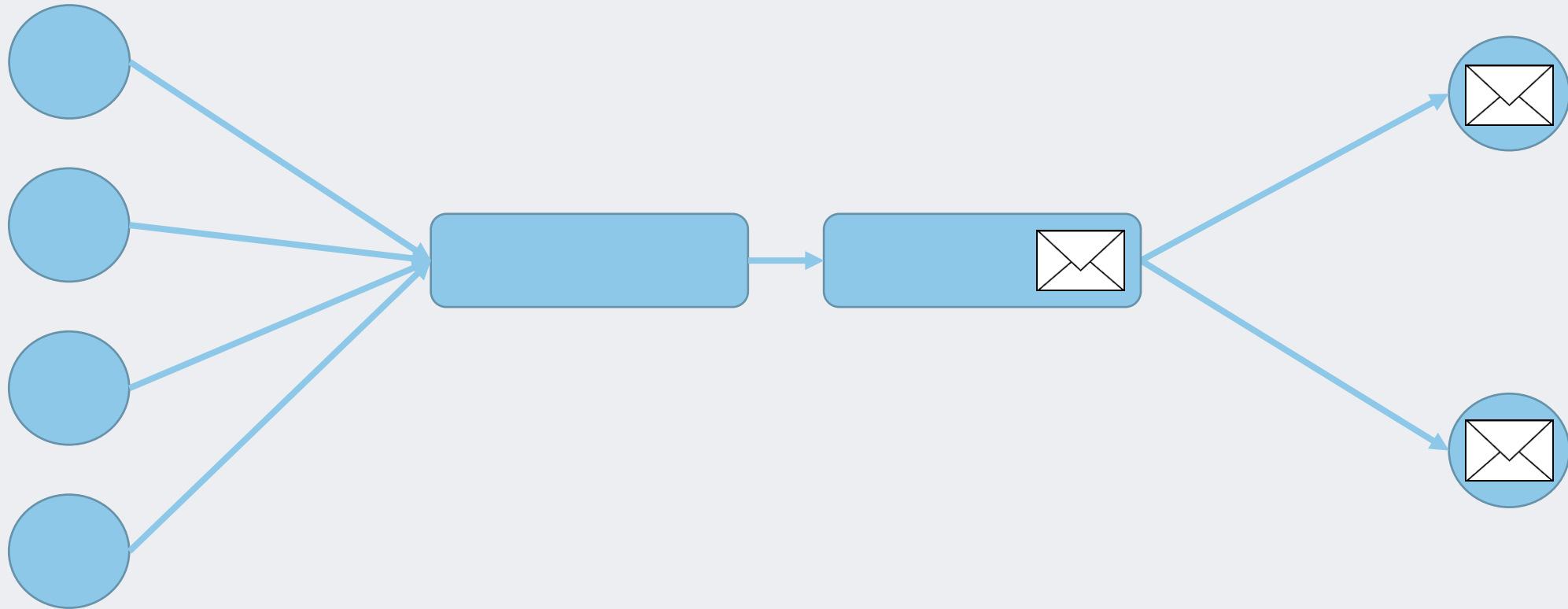


# Transactional Queues

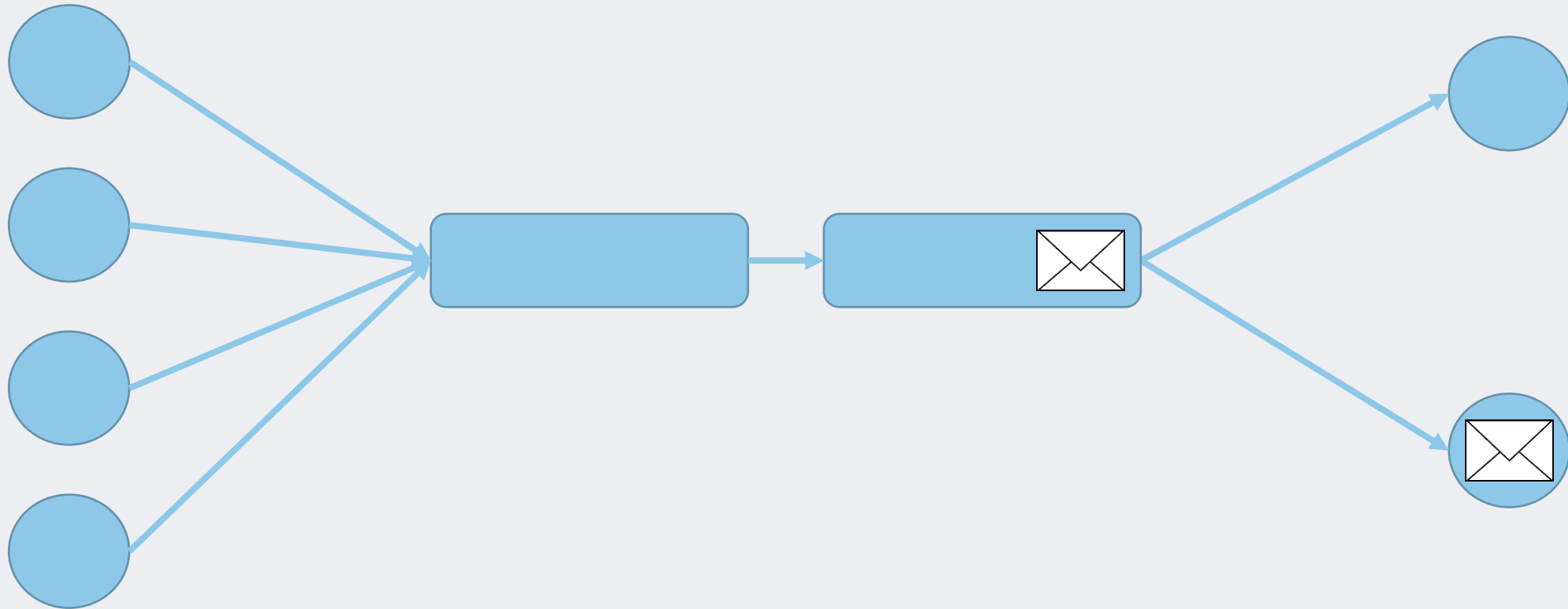




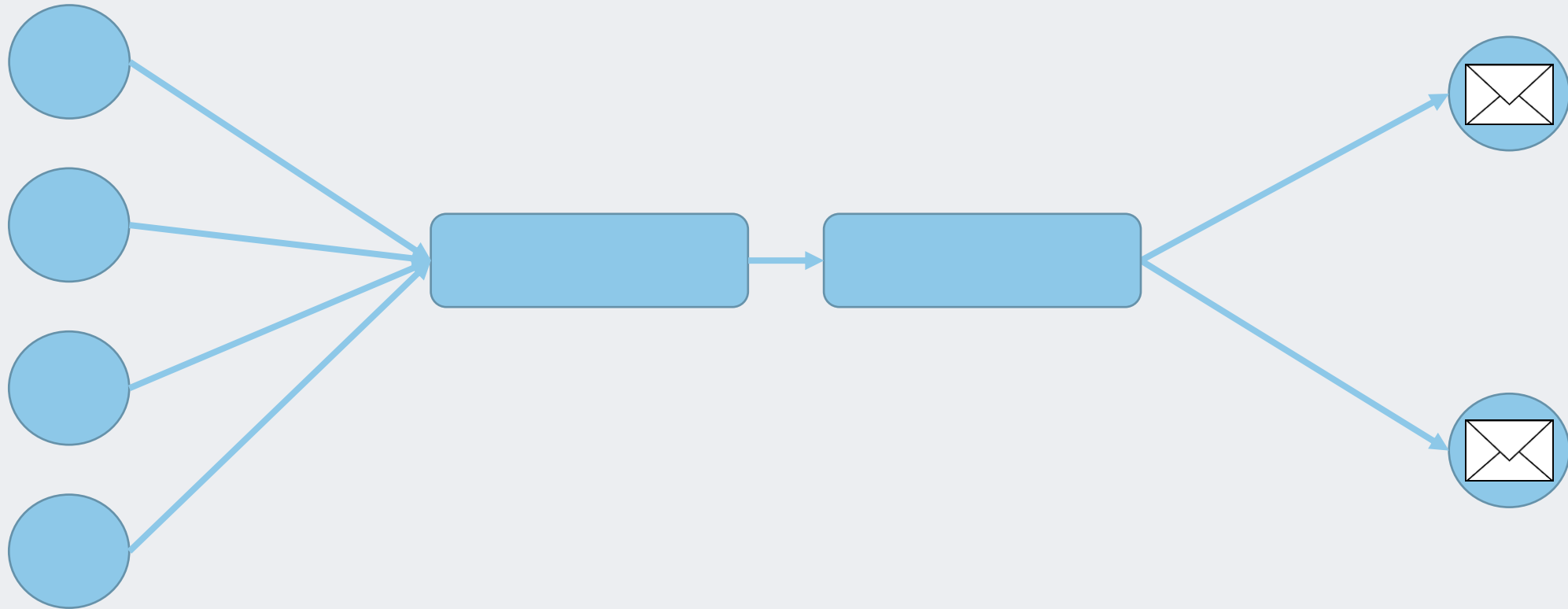
# Transactional Queues



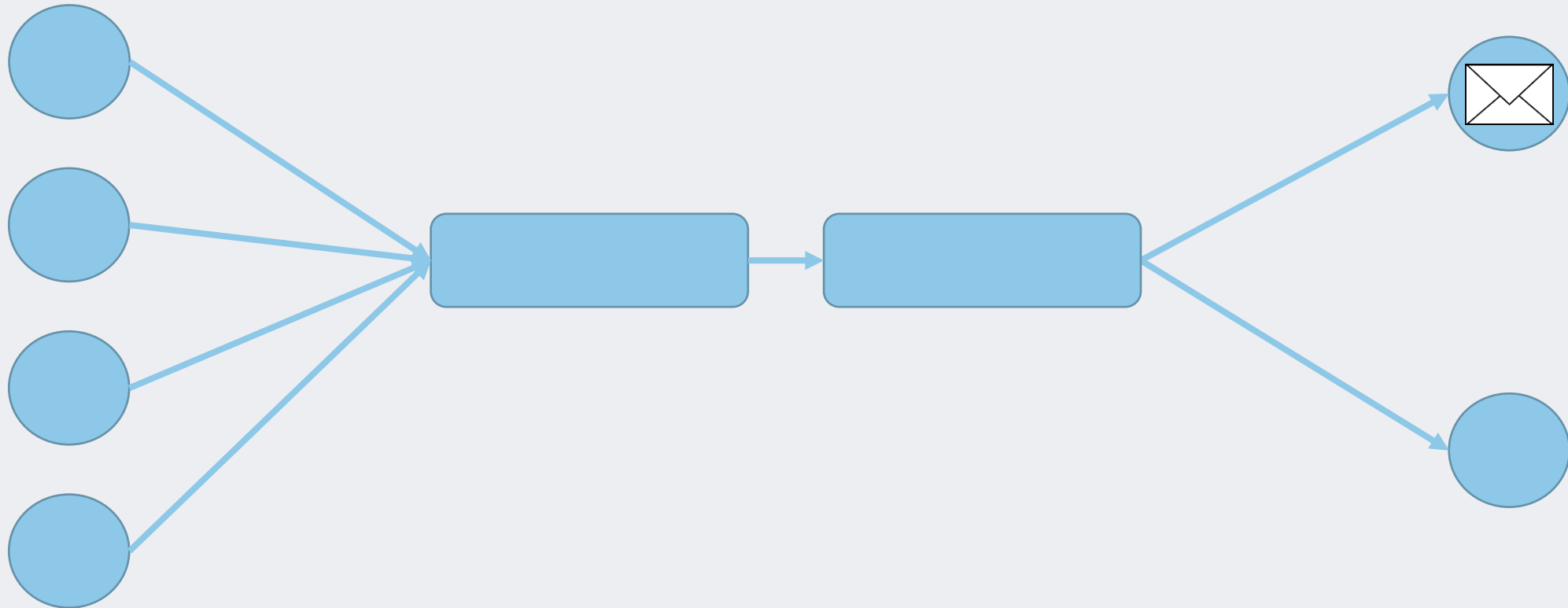
# Transactional Queues



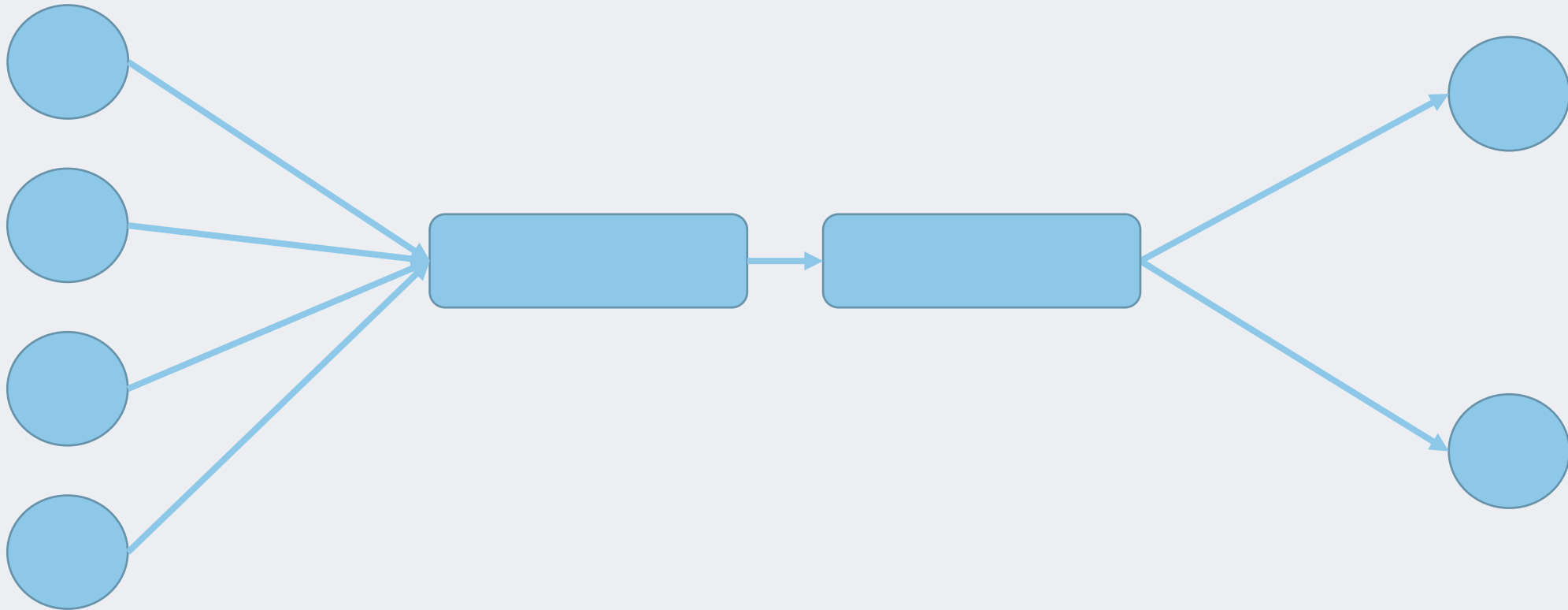
# Transactional Queues



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# Transactional Queues

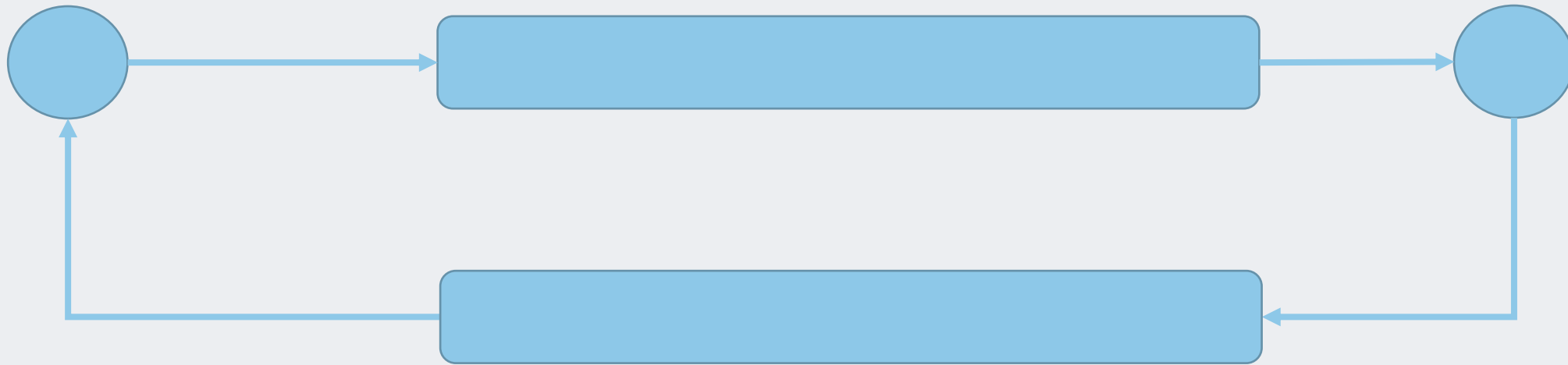




# Asynchronous Request-Reply

<https://docs.microsoft.com/en-us/azure/architecture/patterns/async-request-reply>

# Asynchronous Request-Reply



# Asynchronous Request-Reply





# Asynchronous Request-Reply



# Asynchronous Request-Reply



# Asynchronous Request-Reply



# Asynchronous Request-Reply



# Asynchronous Request-Reply



# Asynchronous Request-Reply



# Asynchronous Request-Reply



# Asynchronous Request-Reply





# Asynchronous Request-Reply



# Asynchronous Request-Reply



# Asynchronous Request-Reply

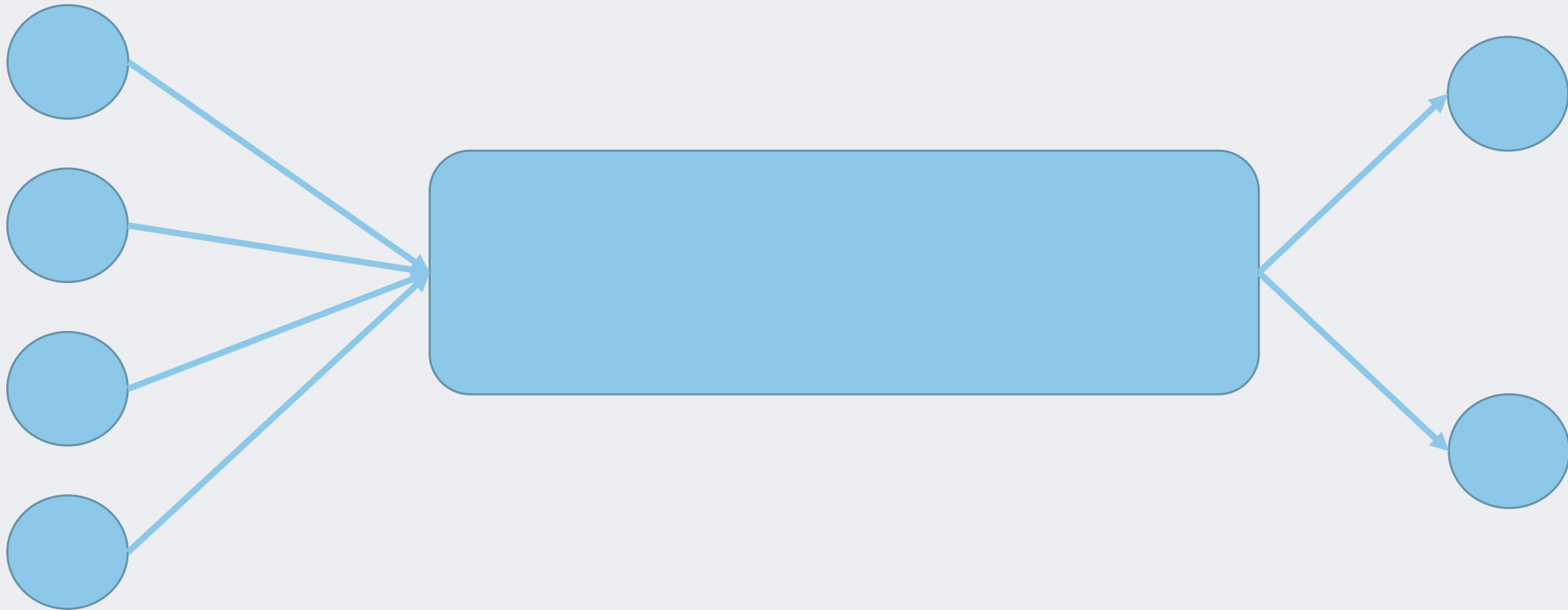




# Sequential Convoy

<https://docs.microsoft.com/en-us/azure/architecture/patterns/sequential-convoy>

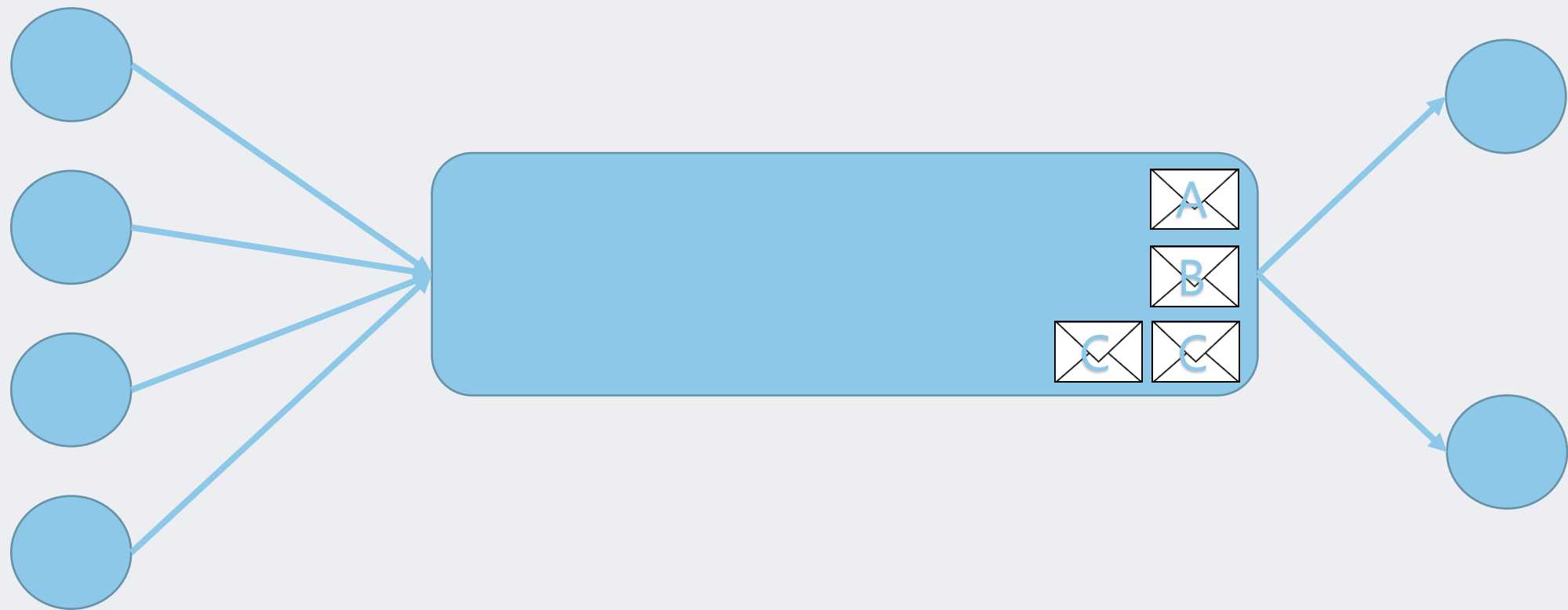
# Sequential Convoy



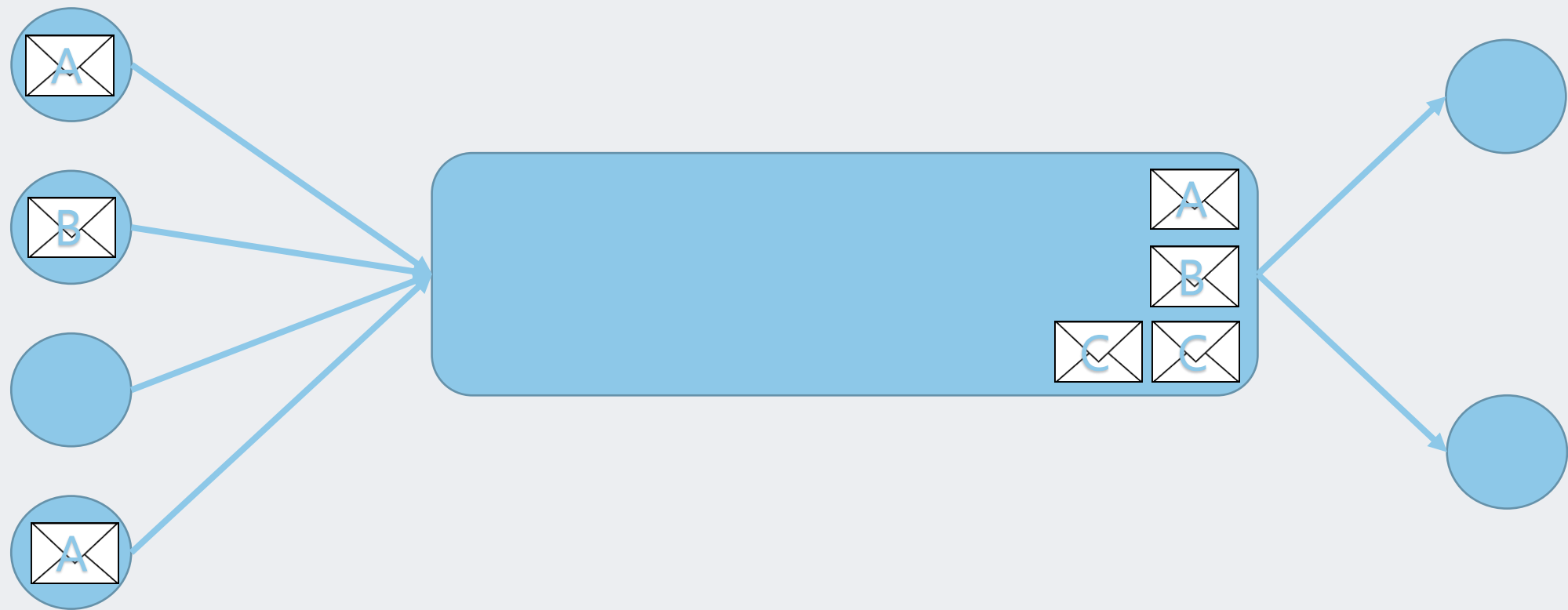
# Sequential Convoy



# Sequential Convoy

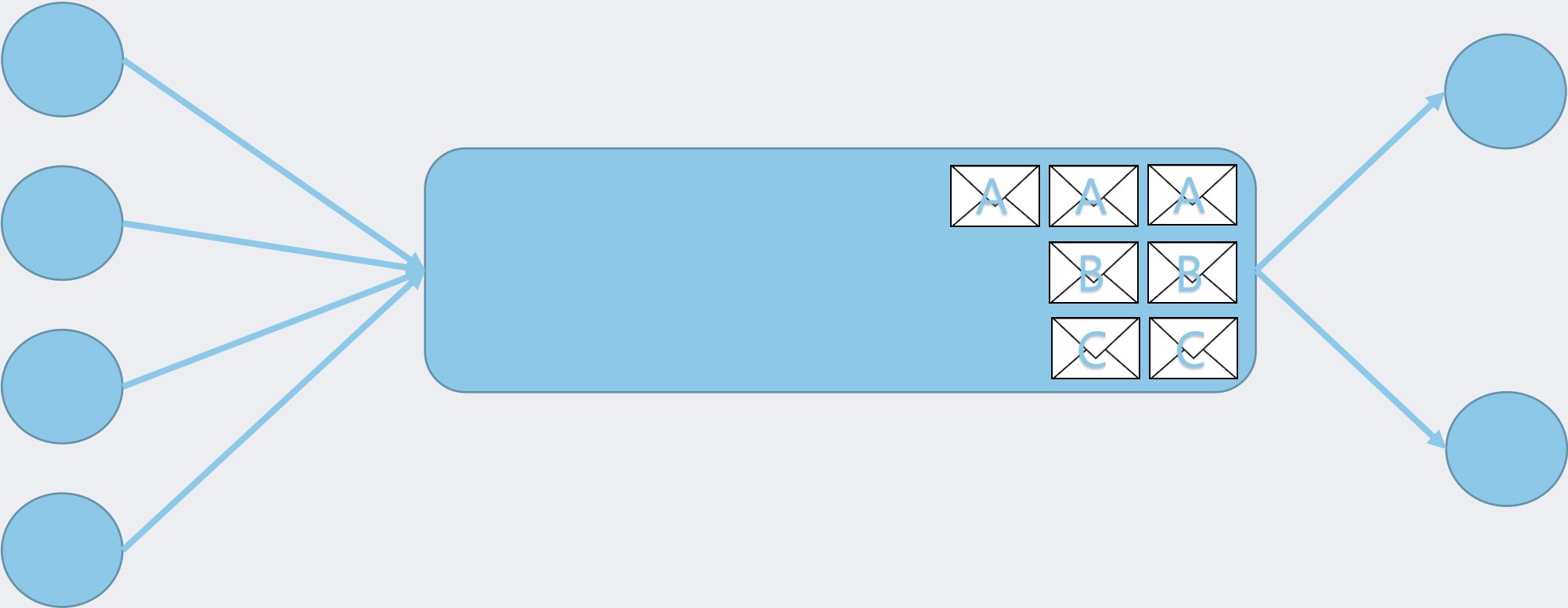


# Sequential Convoy

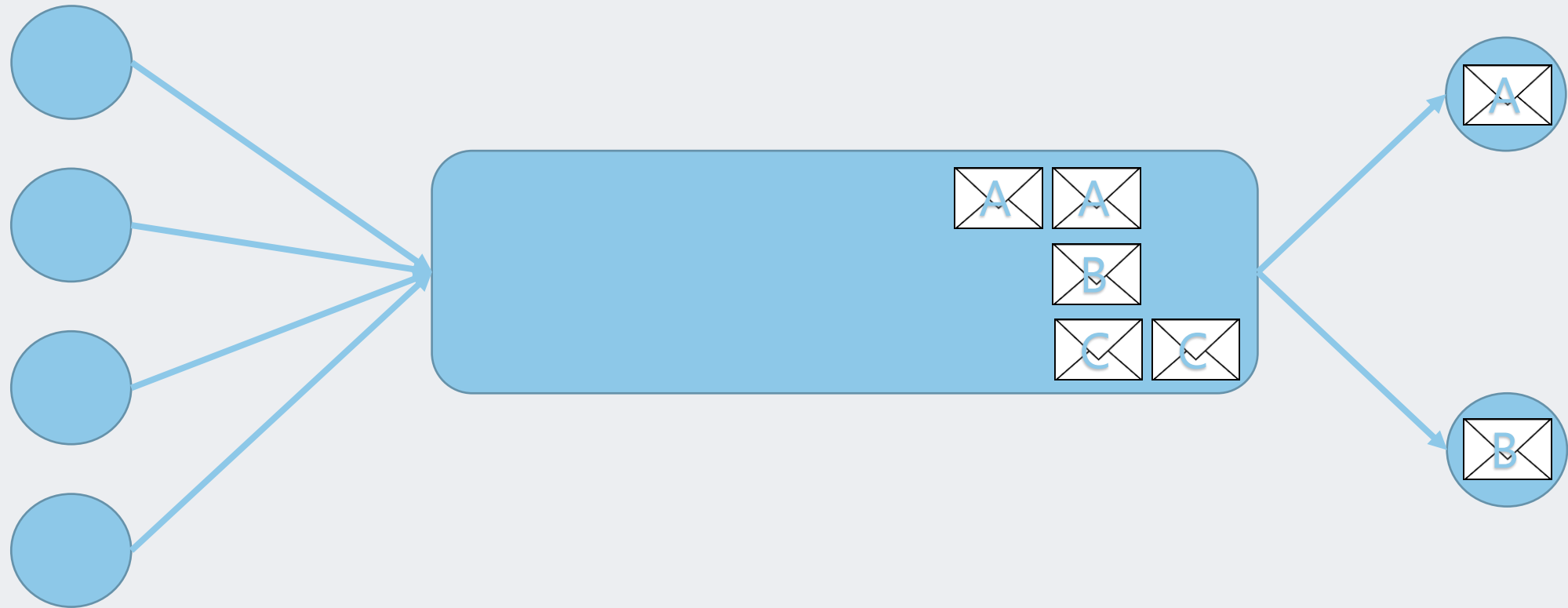




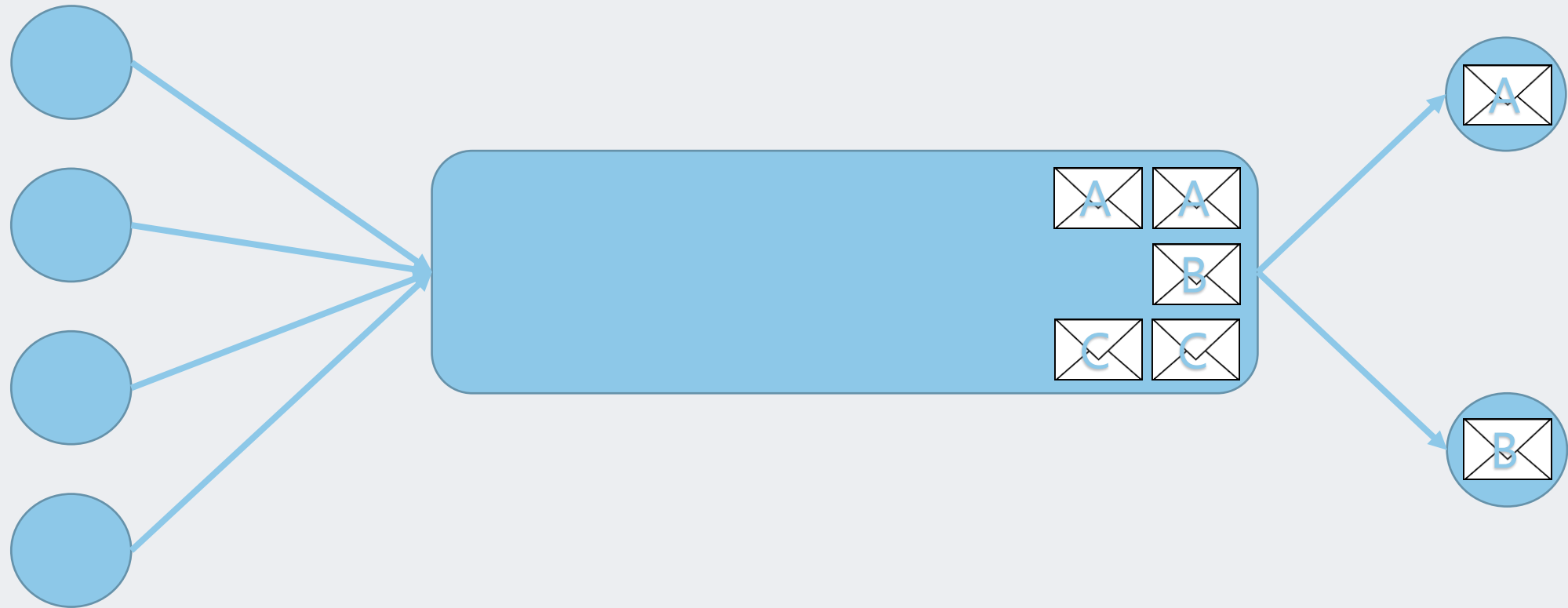
# Sequential Convoy



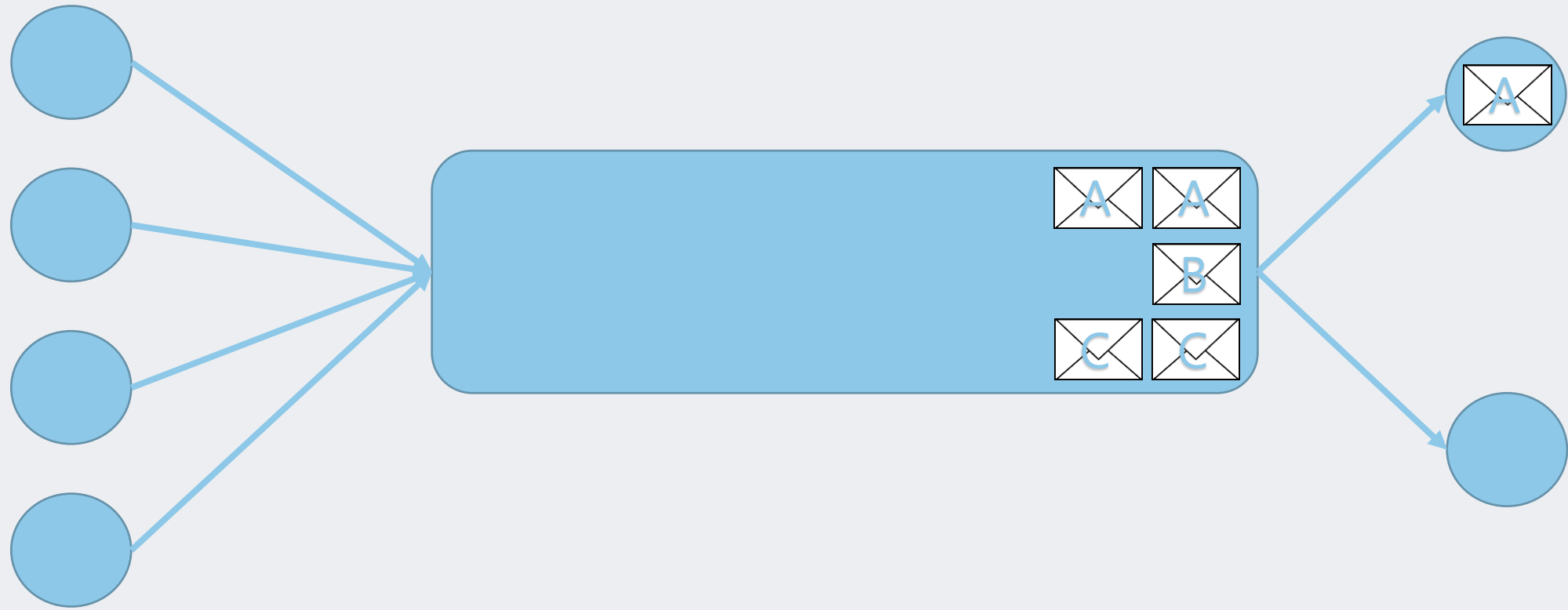
# Sequential Convoy



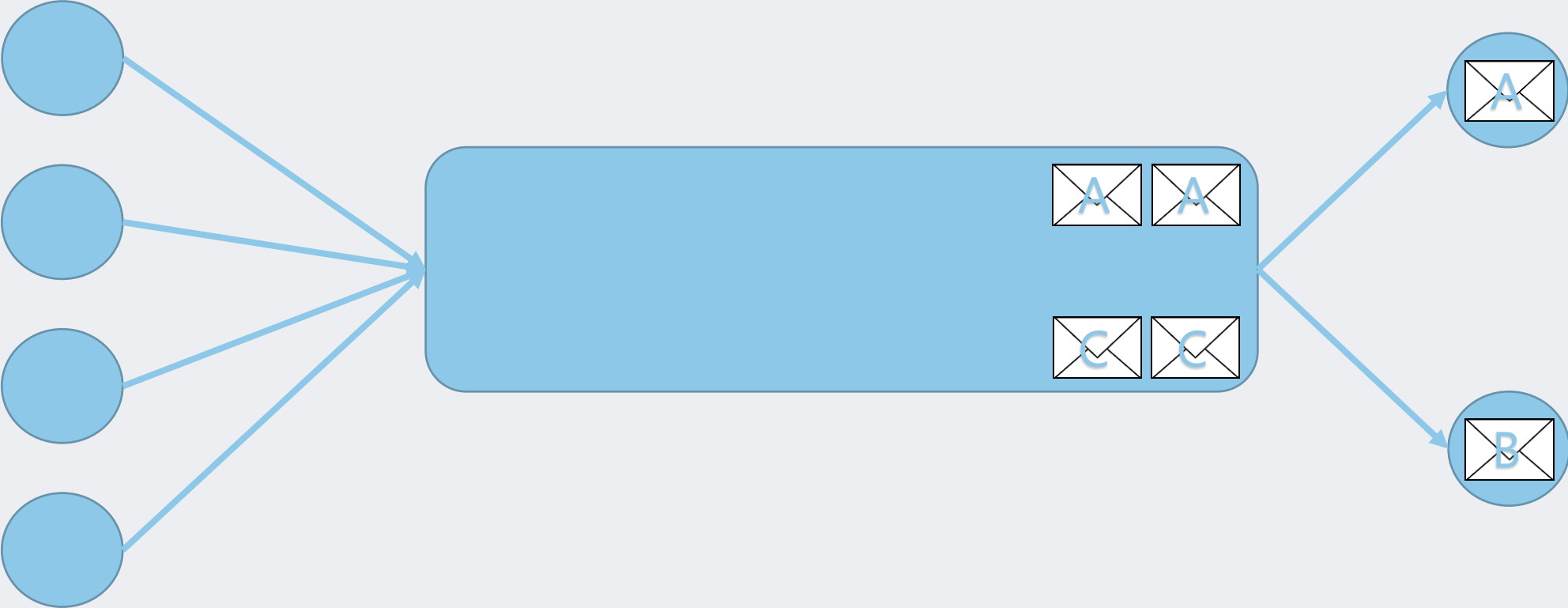
# Sequential Convoy



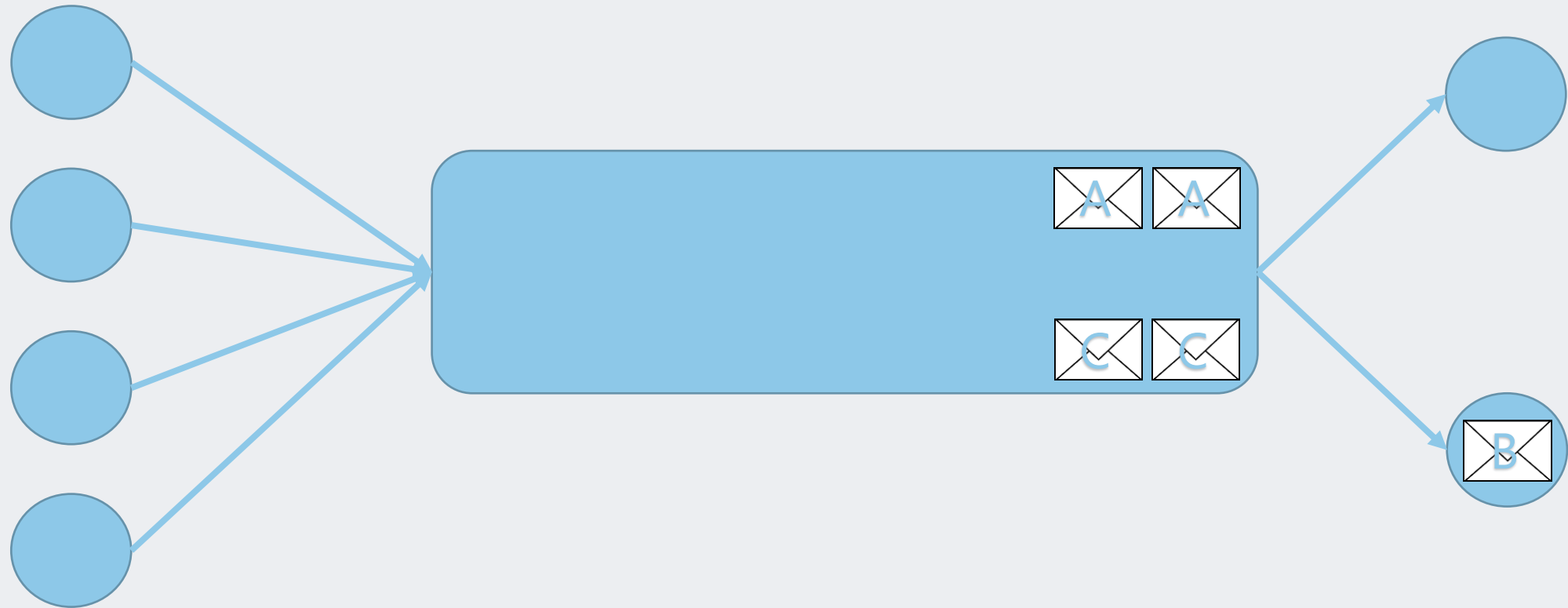
# Sequential Convoy



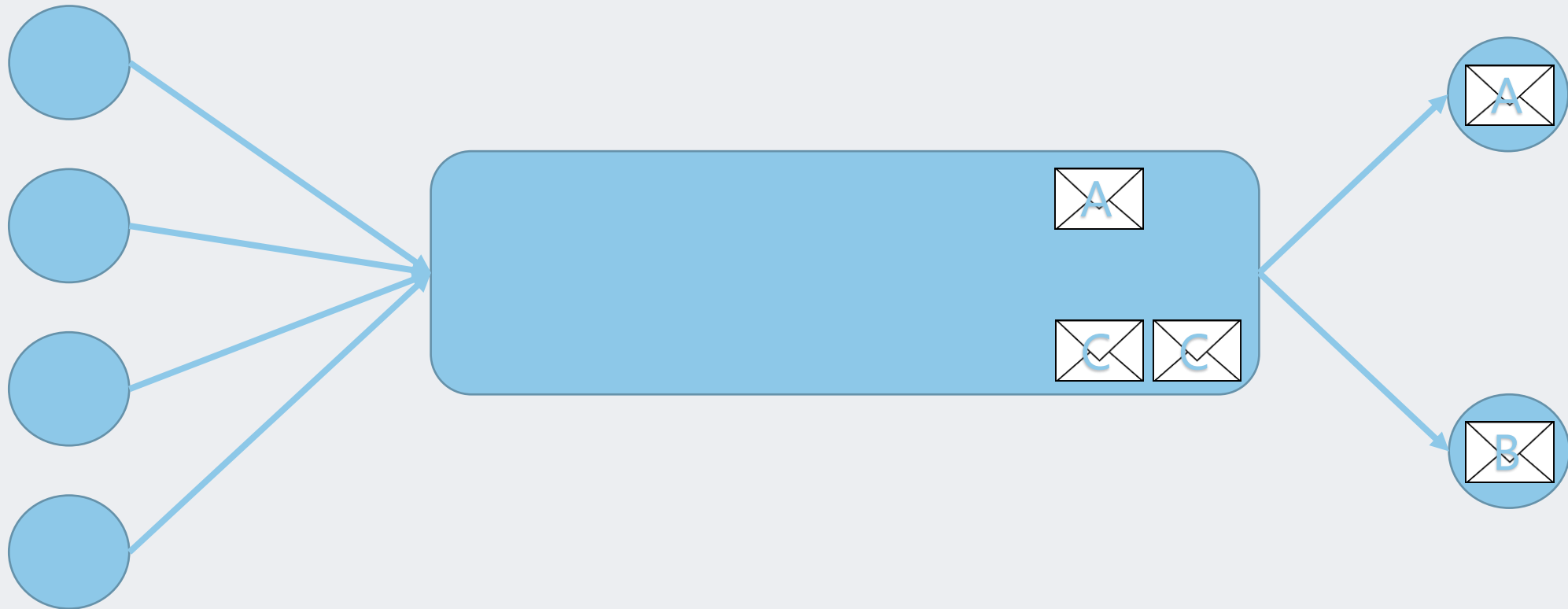
# Sequential Convoy



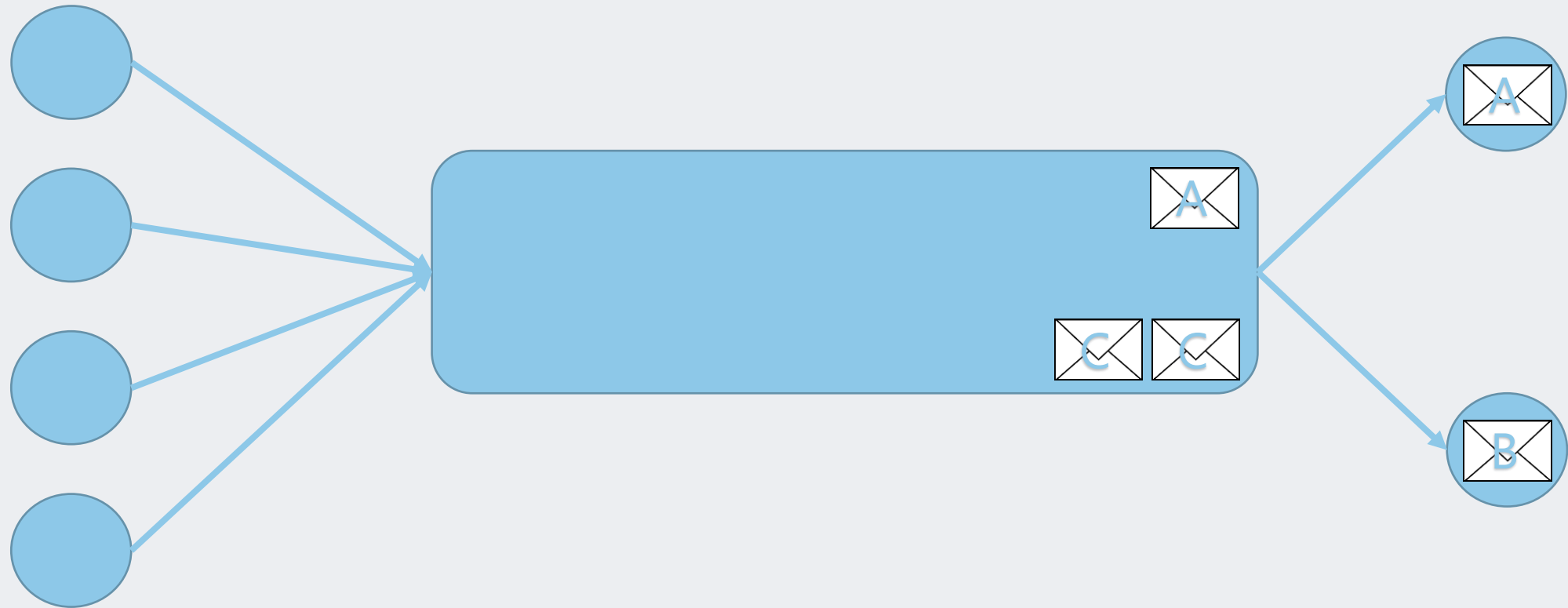
# Sequential Convoy



# Sequential Convoy

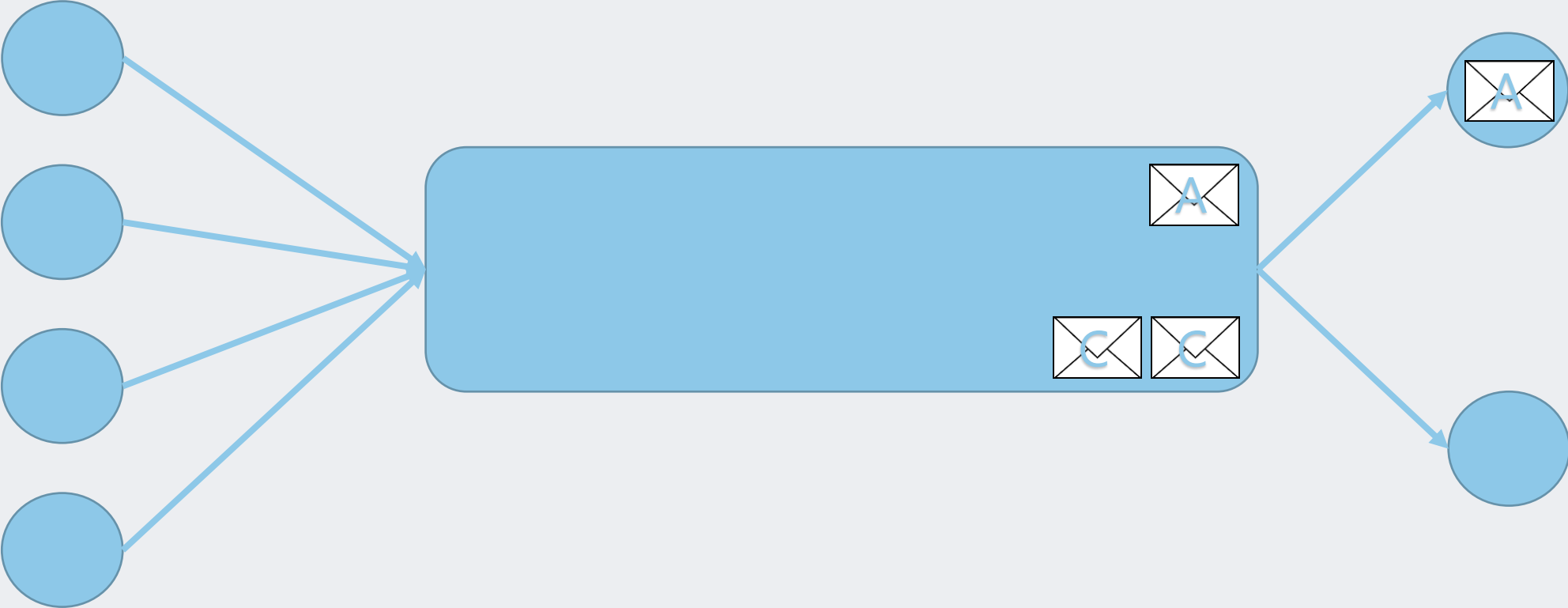


# Sequential Convoy

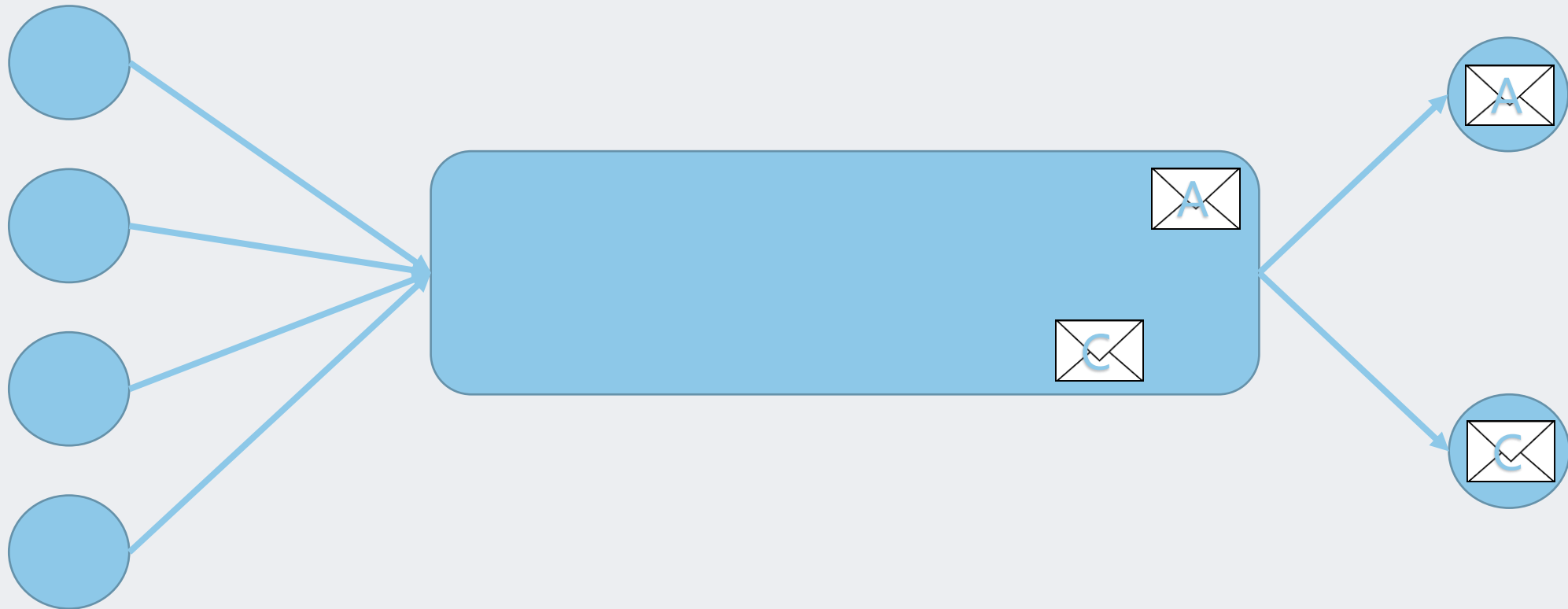




# Sequential Convoy



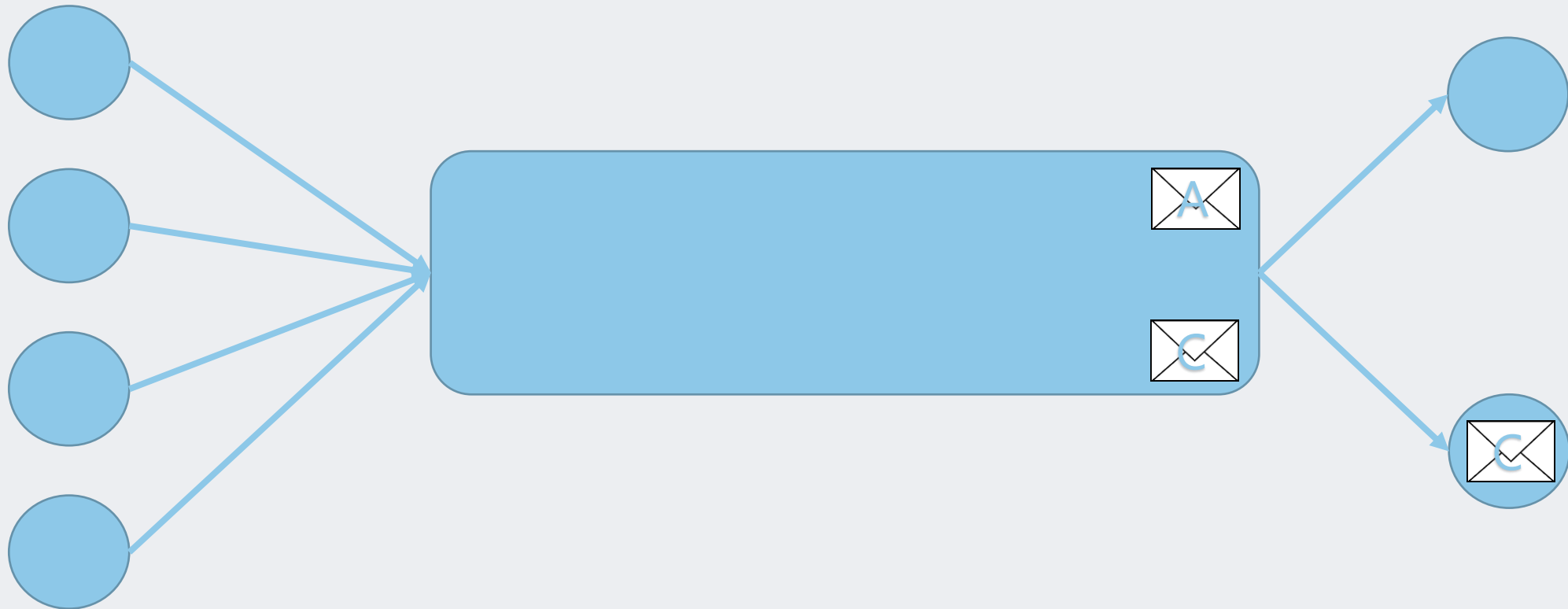
# Sequential Convoy



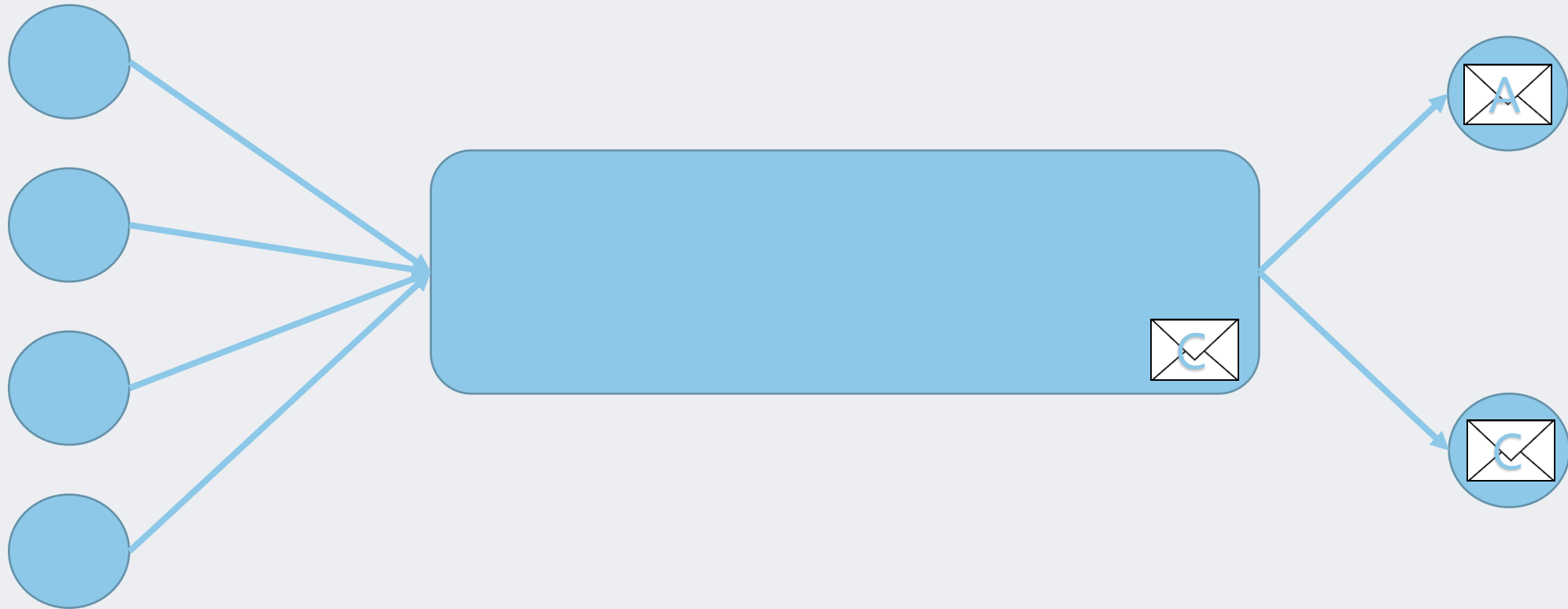
# Sequential Convoy



# Sequential Convoy



# Sequential Convoy



# Sequential Convoy



# Sequential Convoy

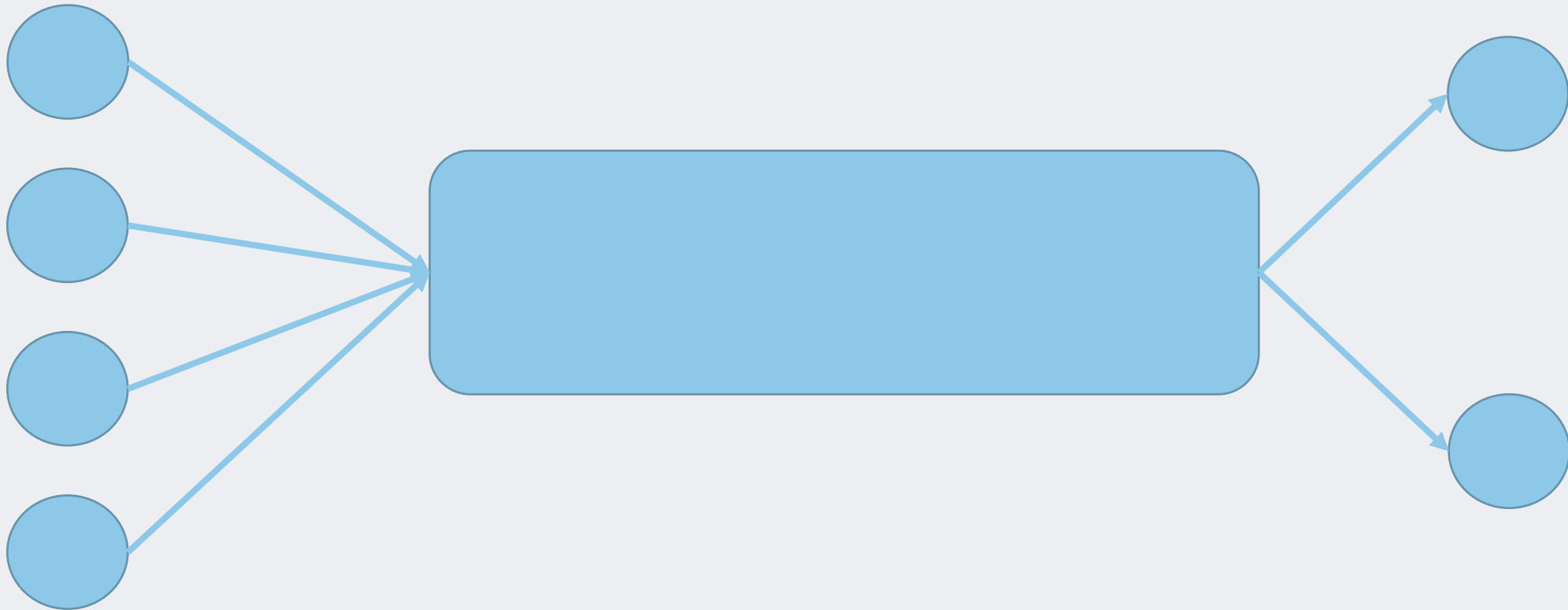


# Sequential Convoy





# Sequential Convoy

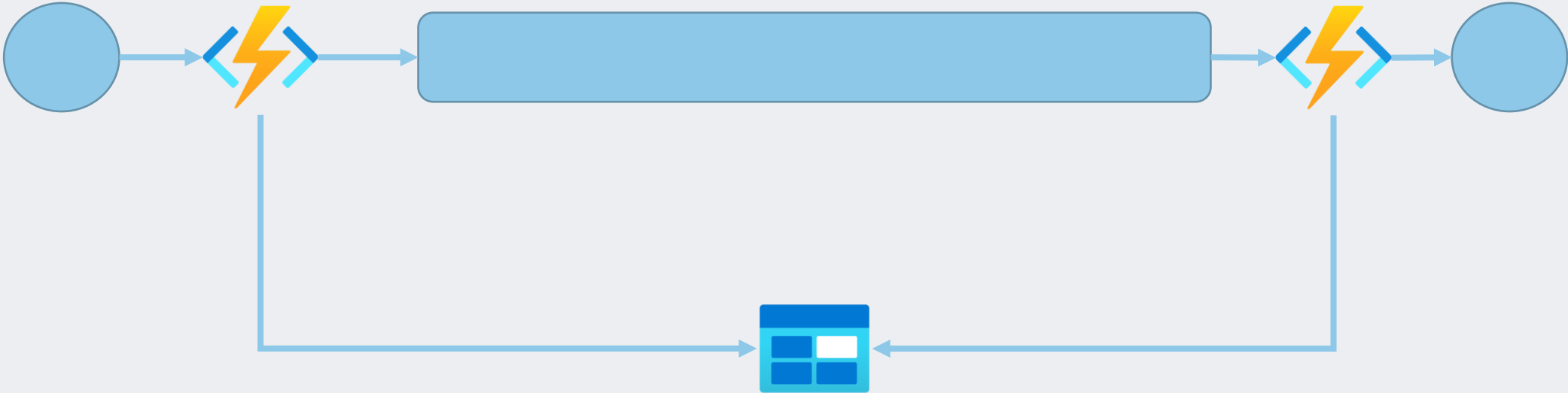




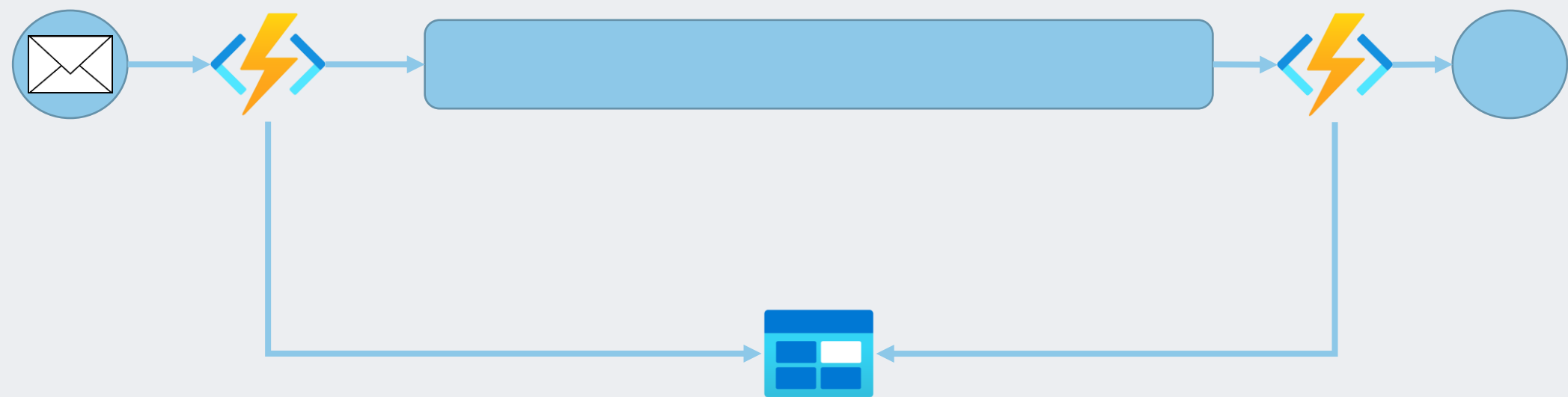
# Claim Check

<https://docs.microsoft.com/en-us/azure/architecture/patterns/claim-check>

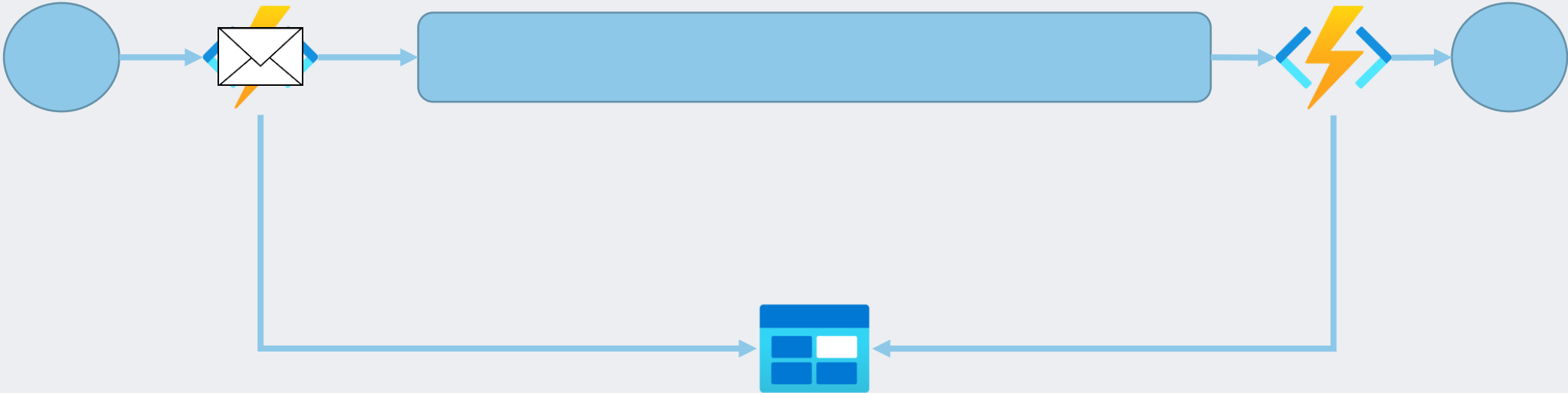
# Claim Check



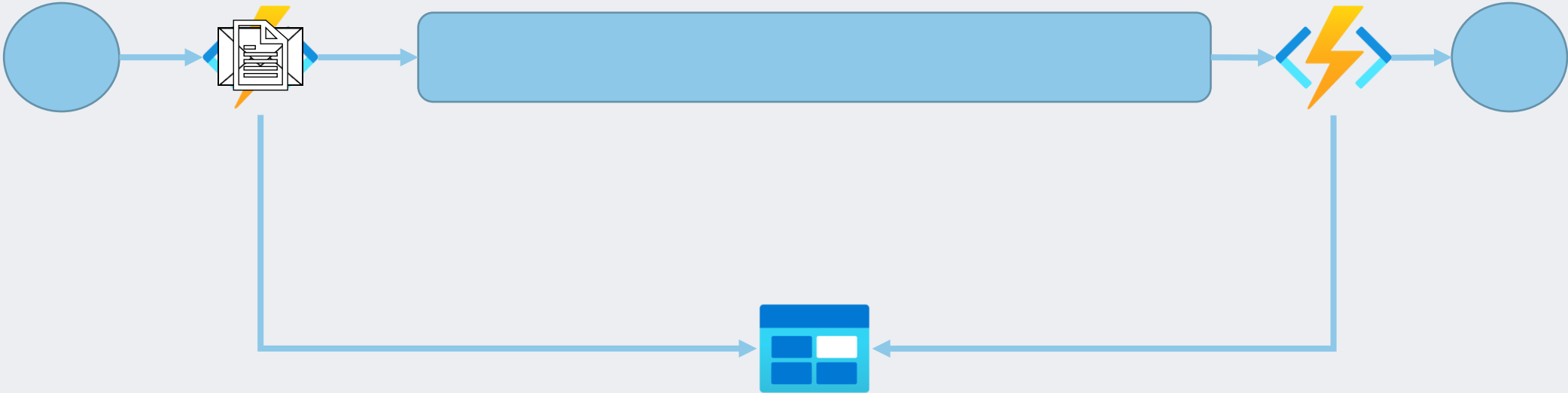
# Claim Check



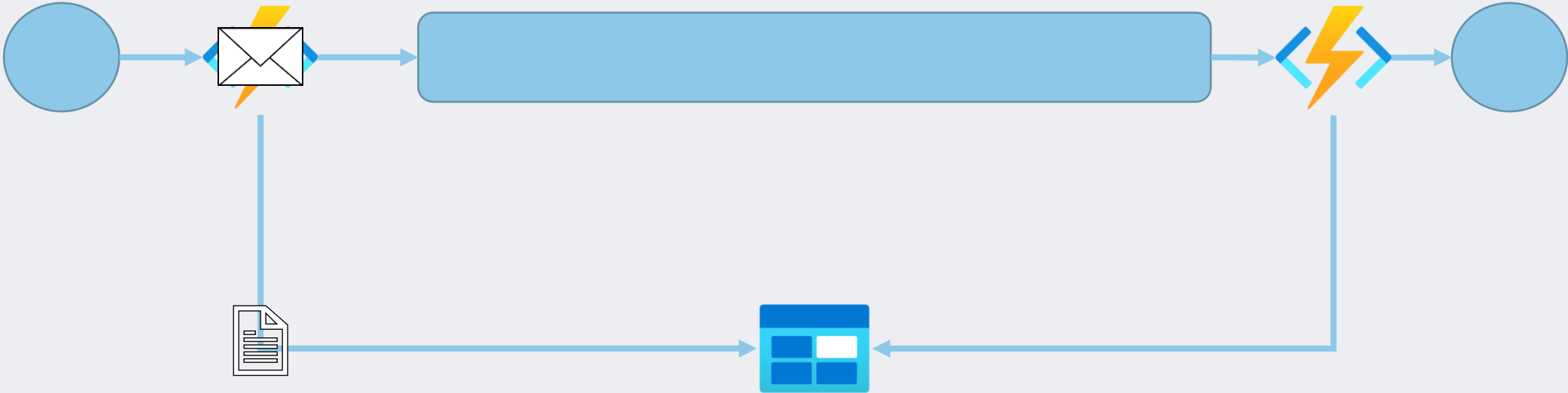
# Claim Check



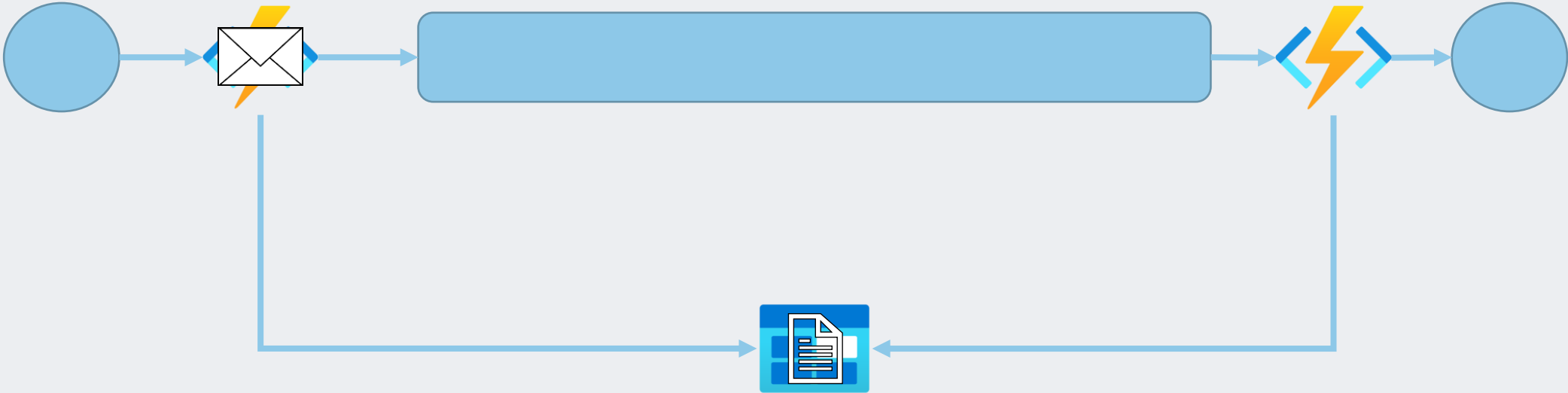
# Claim Check



# Claim Check

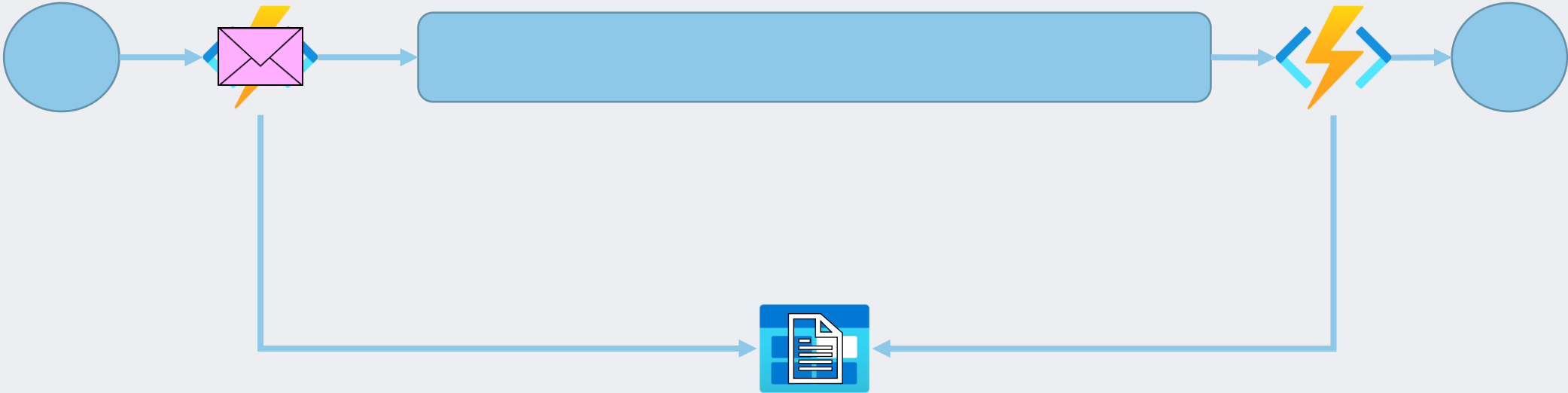


# Claim Check

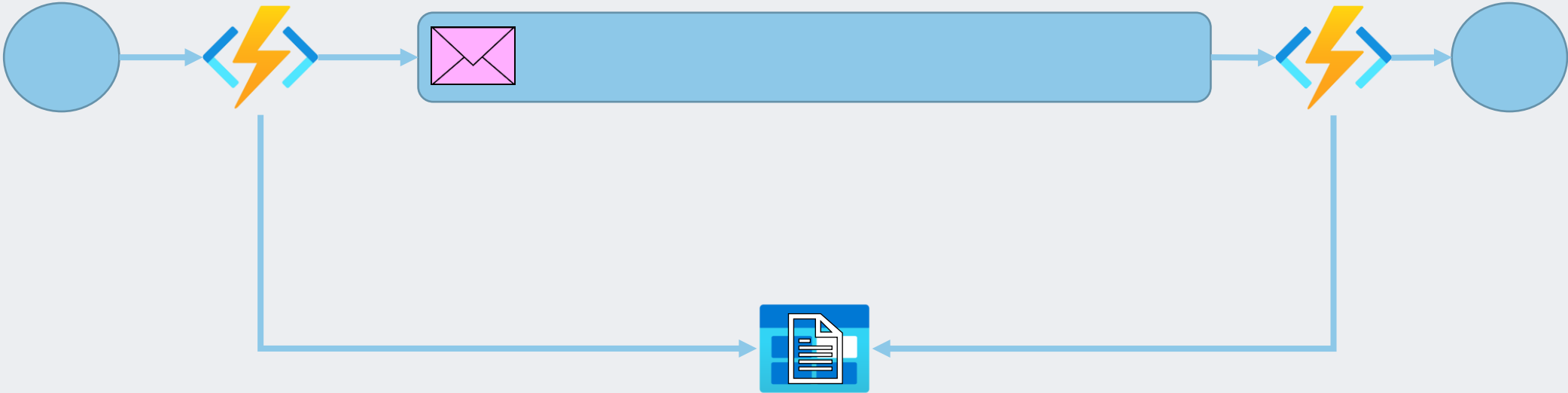




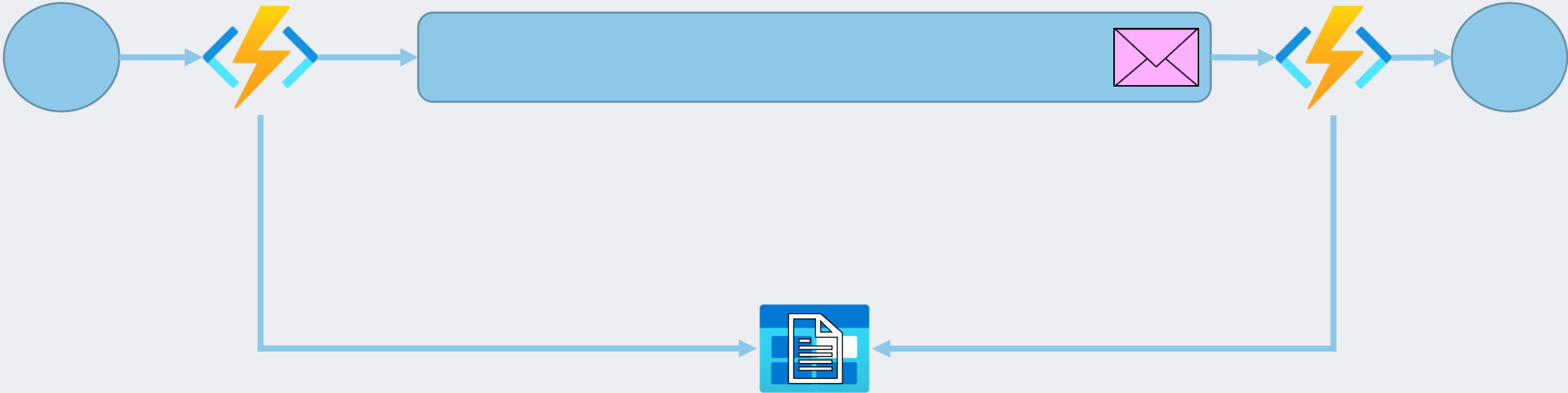
# Claim Check



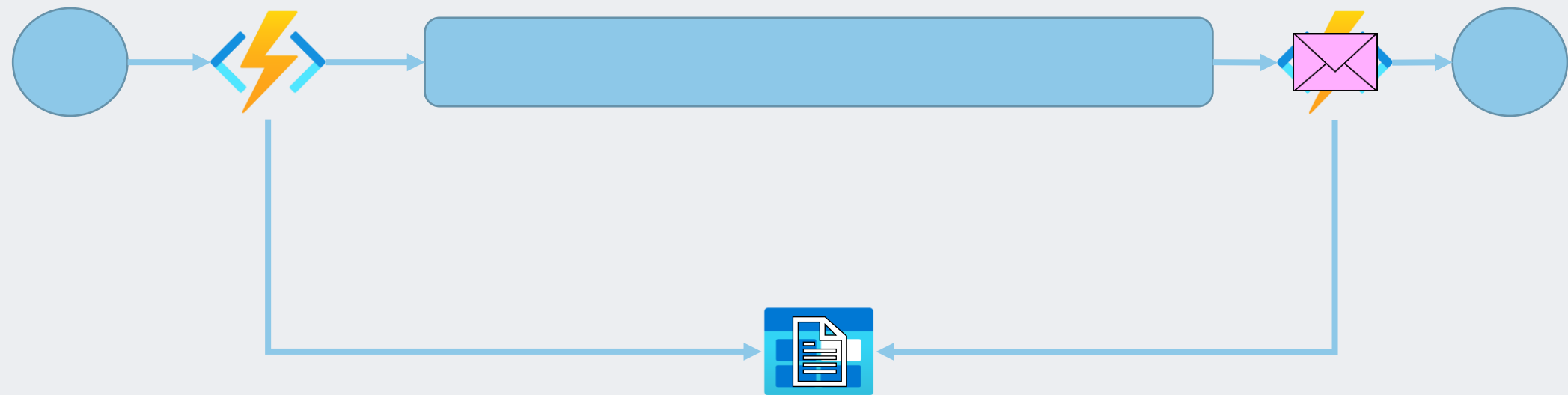
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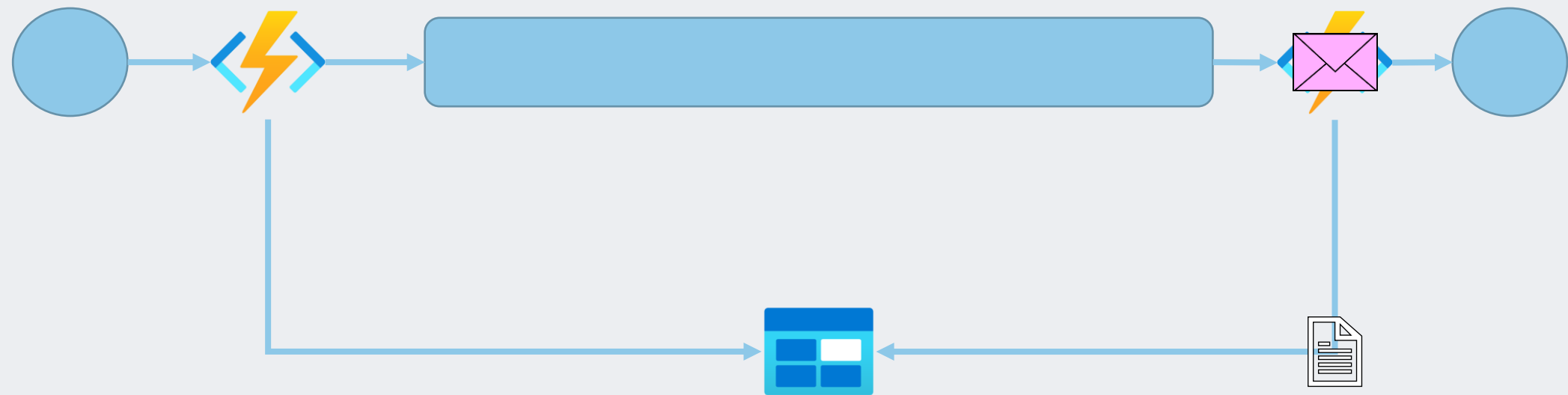
# Claim Check



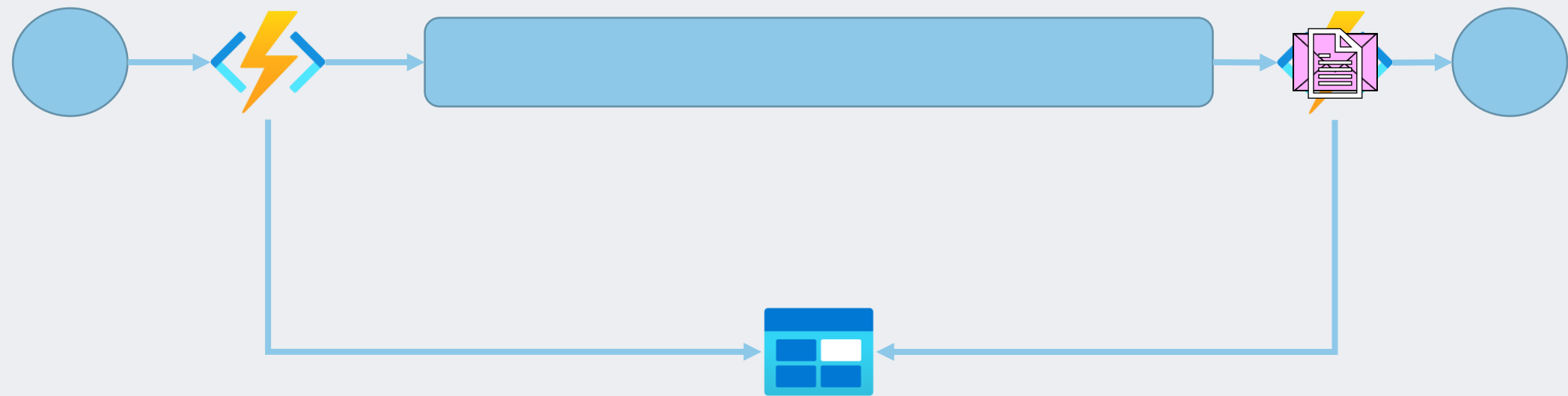
# Claim Check



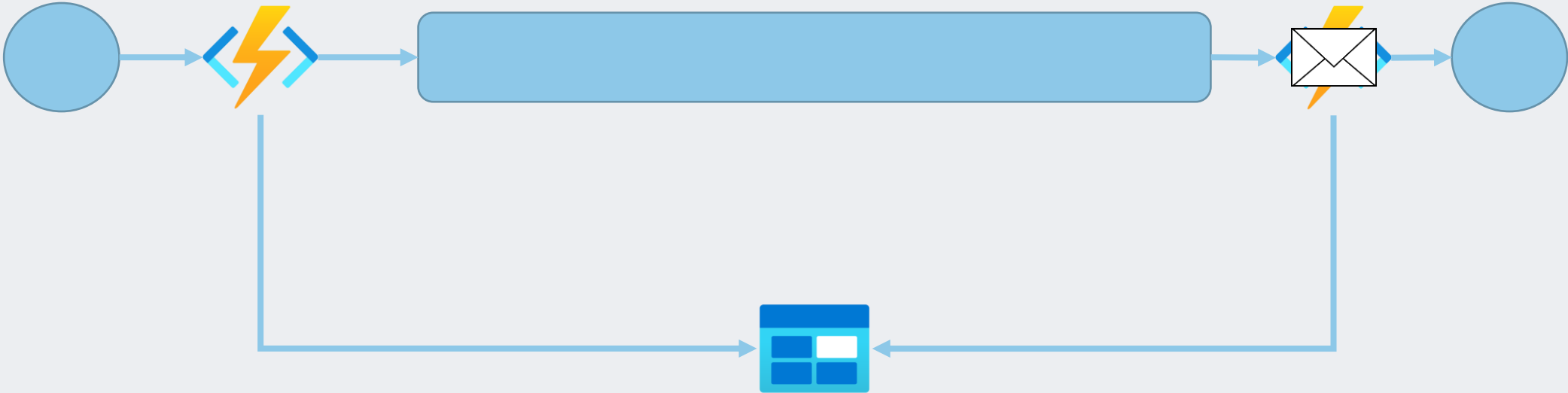
# Claim Check



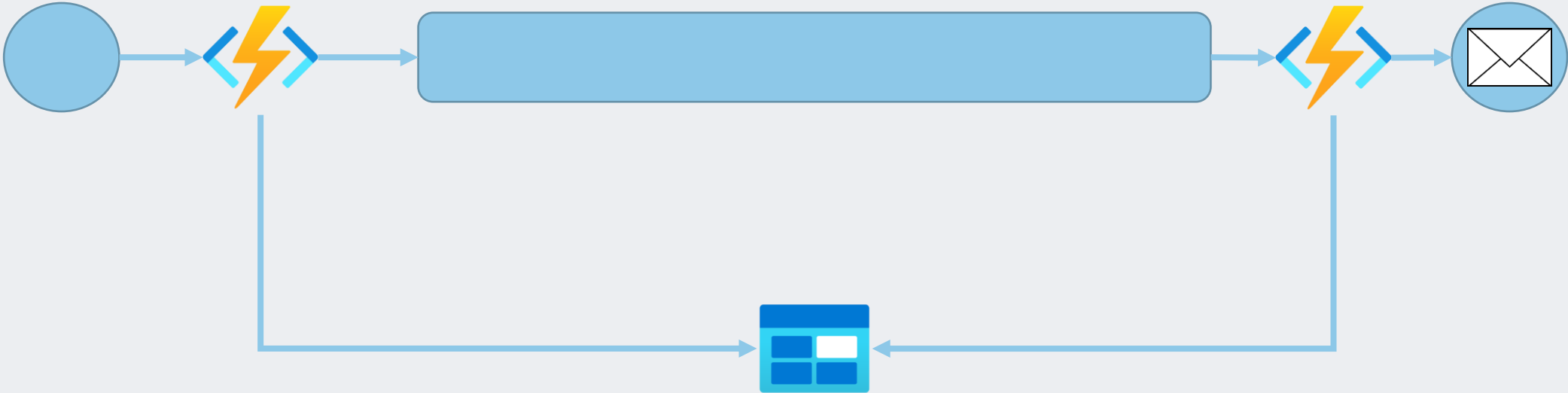
# Claim Check



# Claim Check

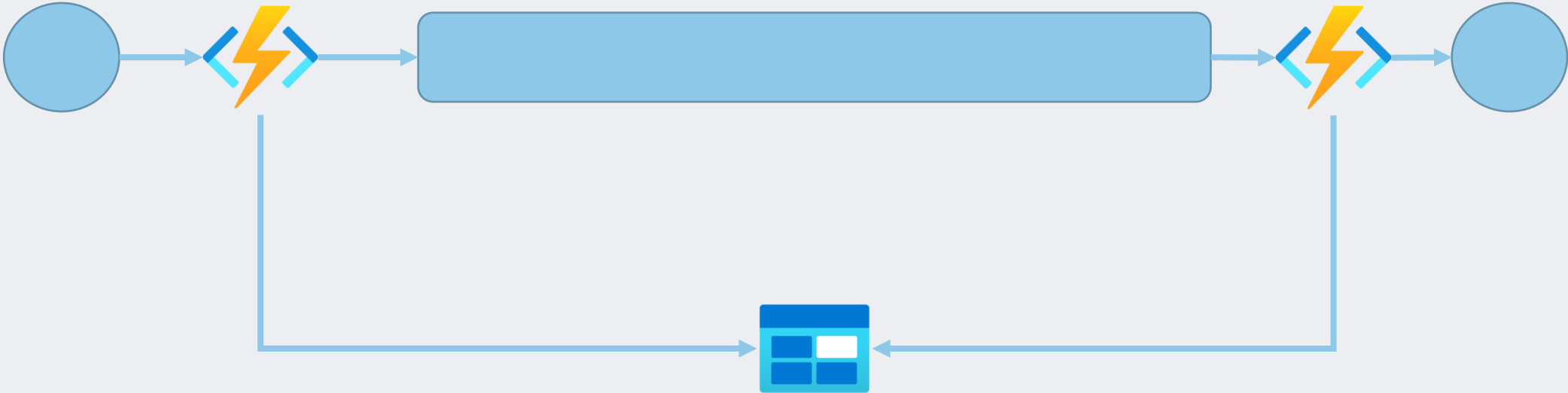


# Claim Check





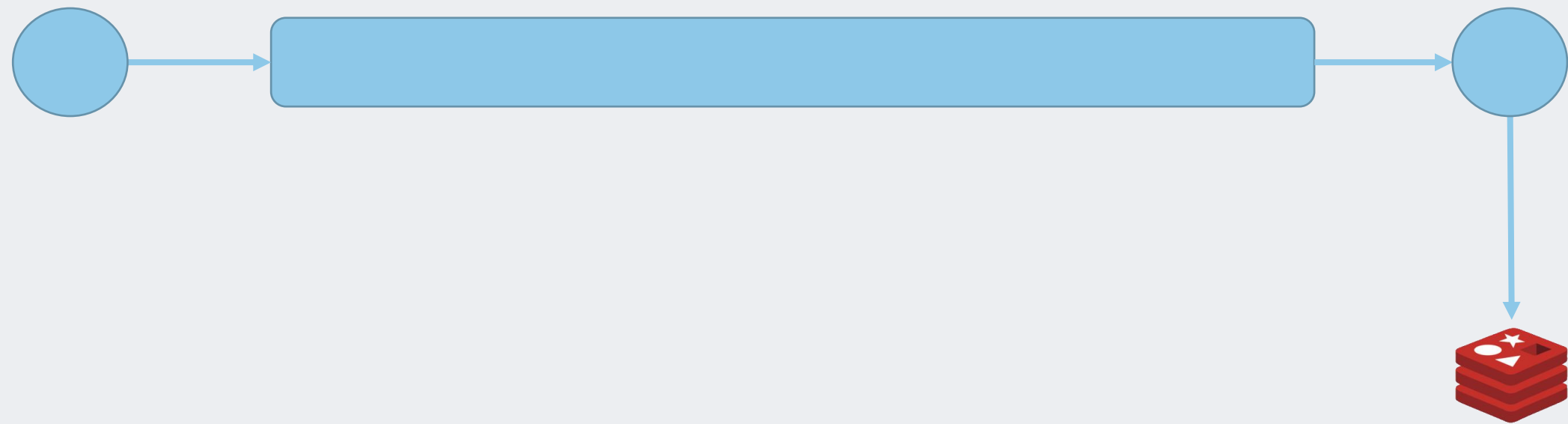
# Claim Check



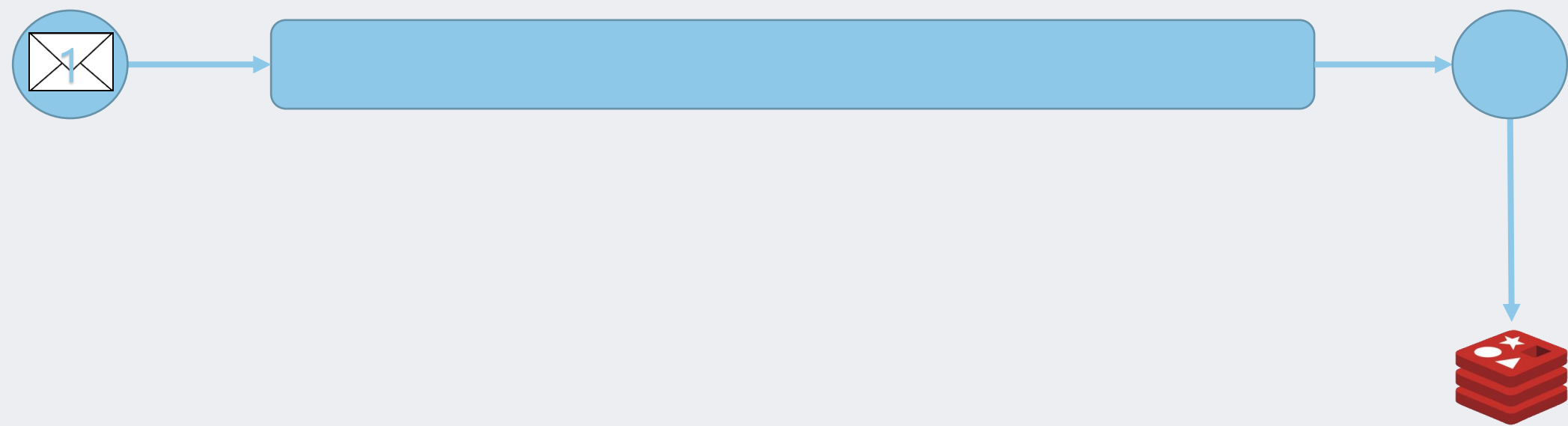
# Exactly Once Processing

[https://www.cloudcomputingpatterns.org/exactly once delivery/](https://www.cloudcomputingpatterns.org/exactly%20once%20delivery/)

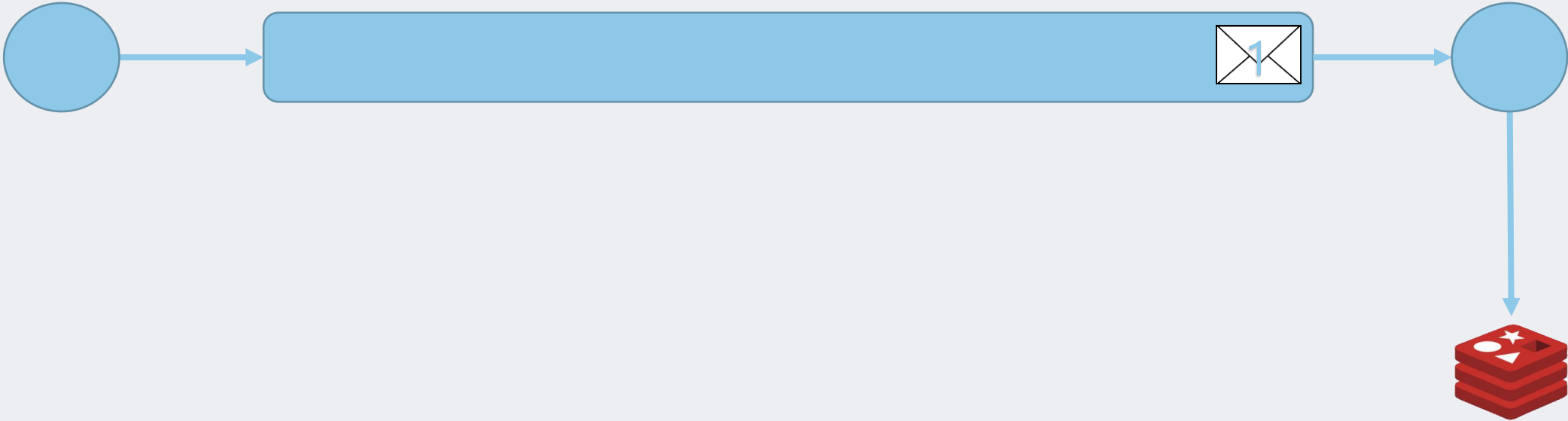
# Exactly Once Processing



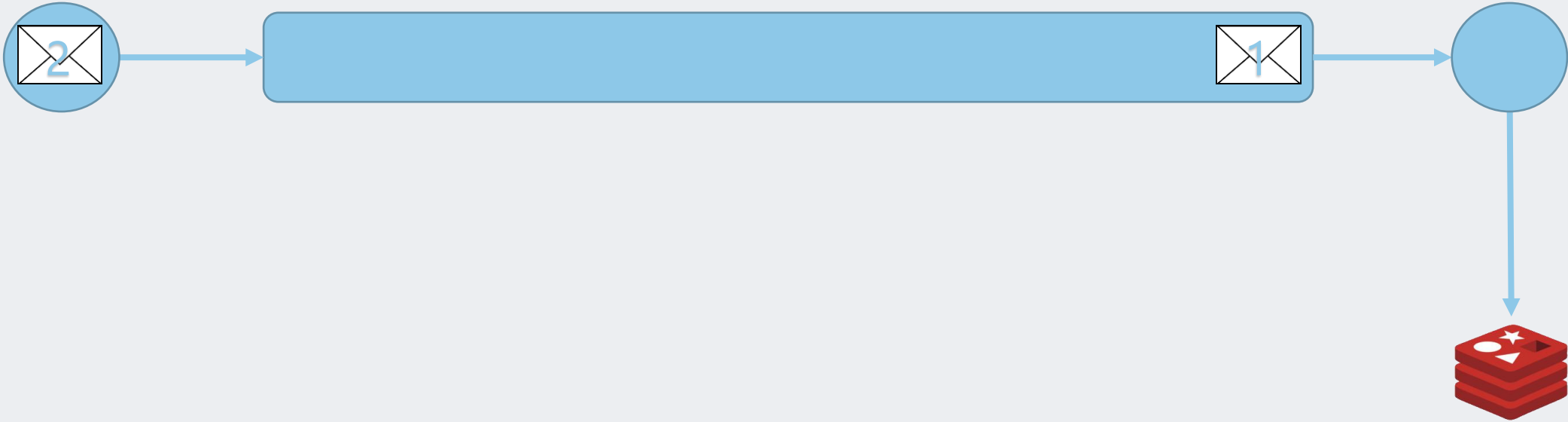
# Exactly Once Processing



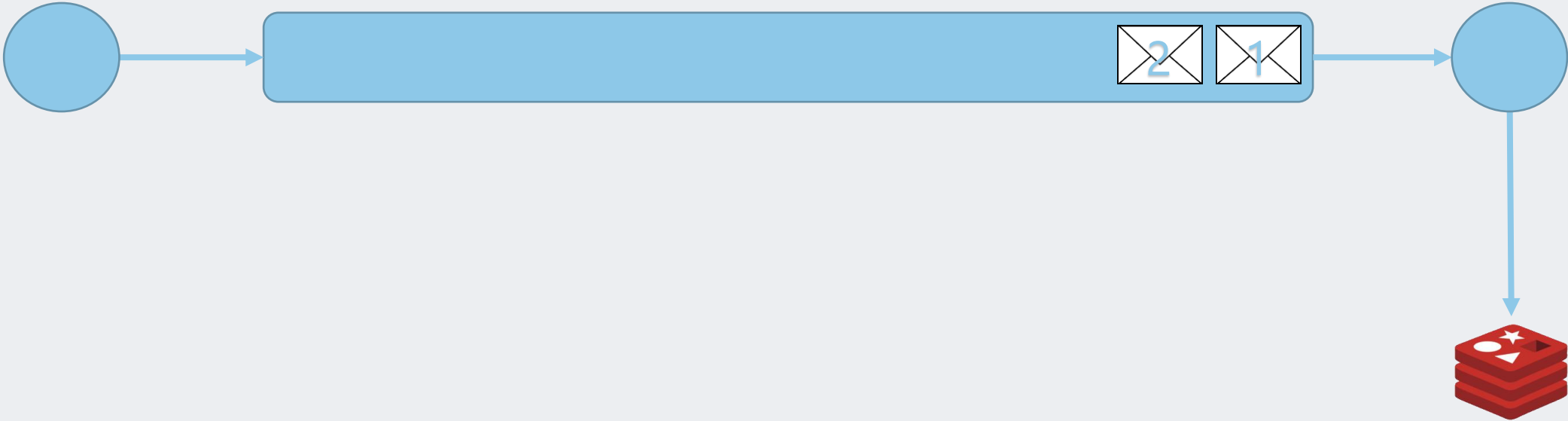
# Exactly Once Processing



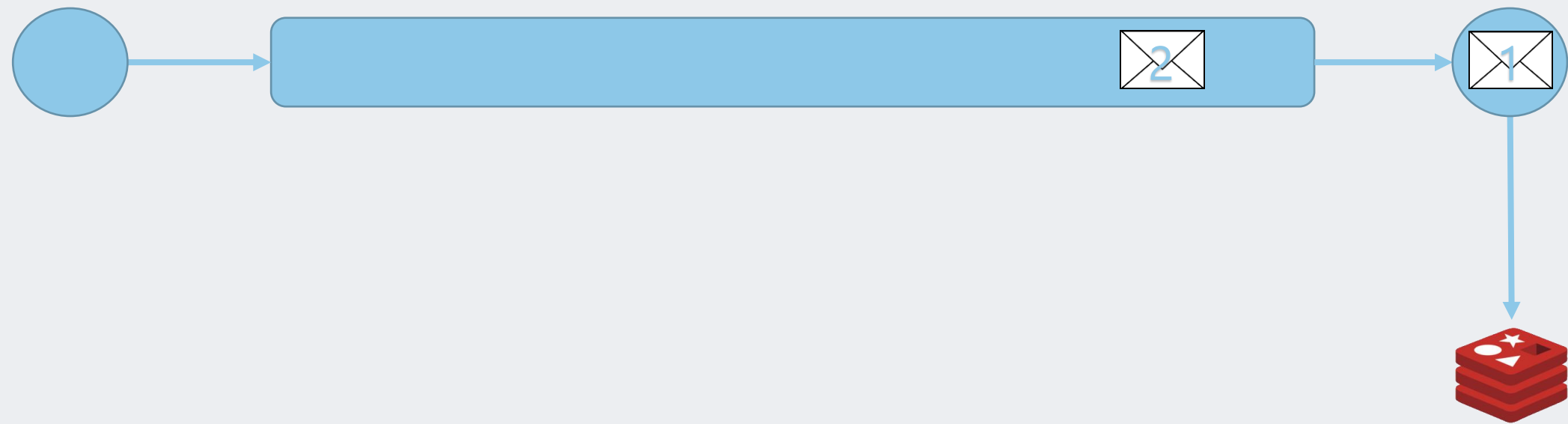
# Exactly Once Processing



# Exactly Once Processing

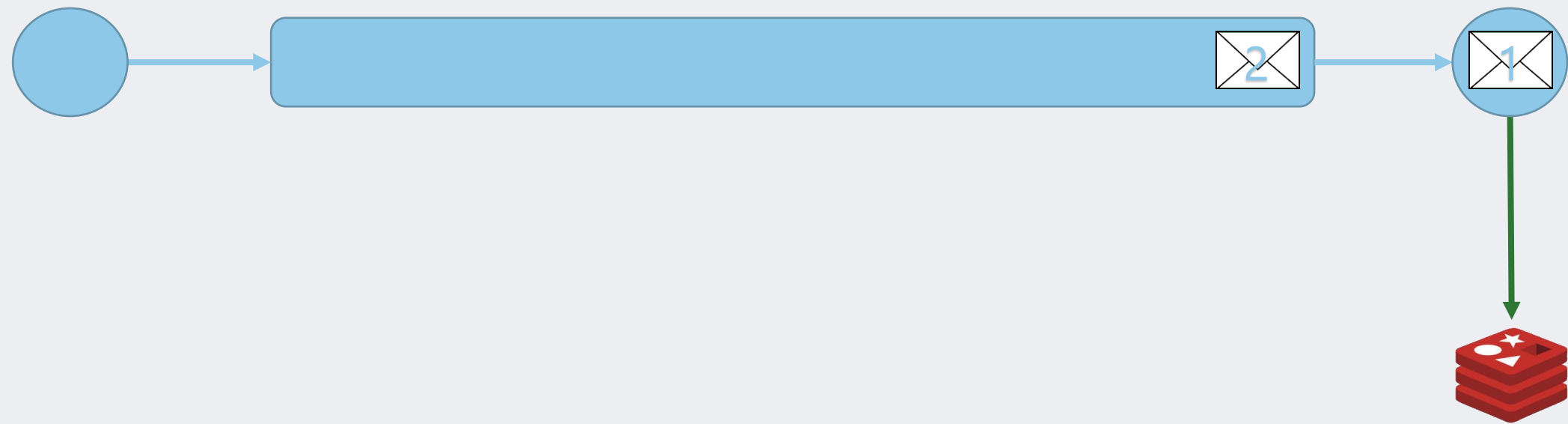


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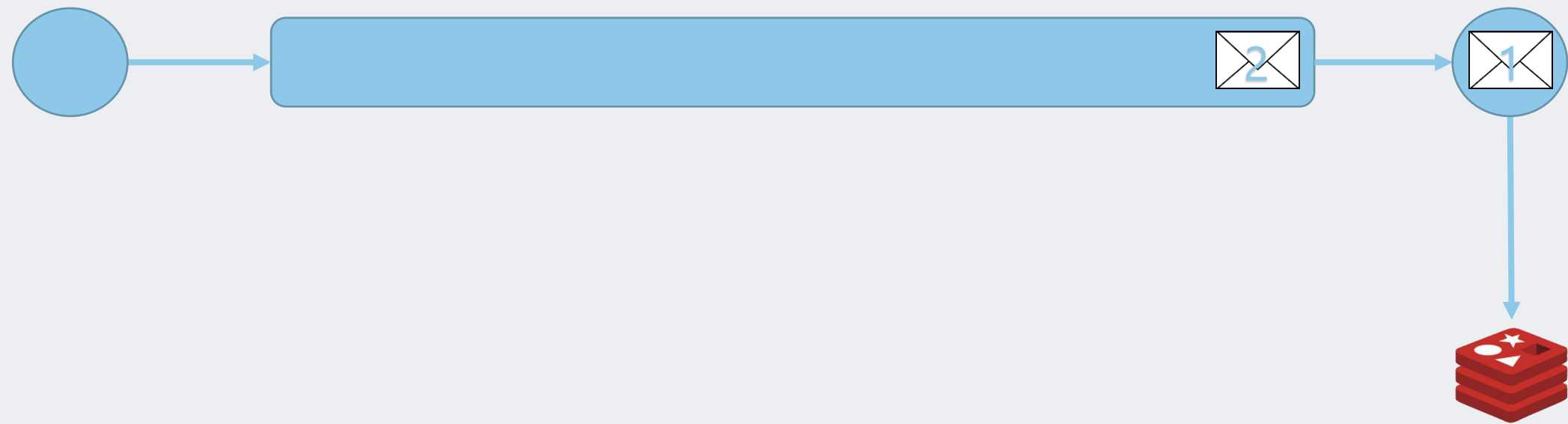




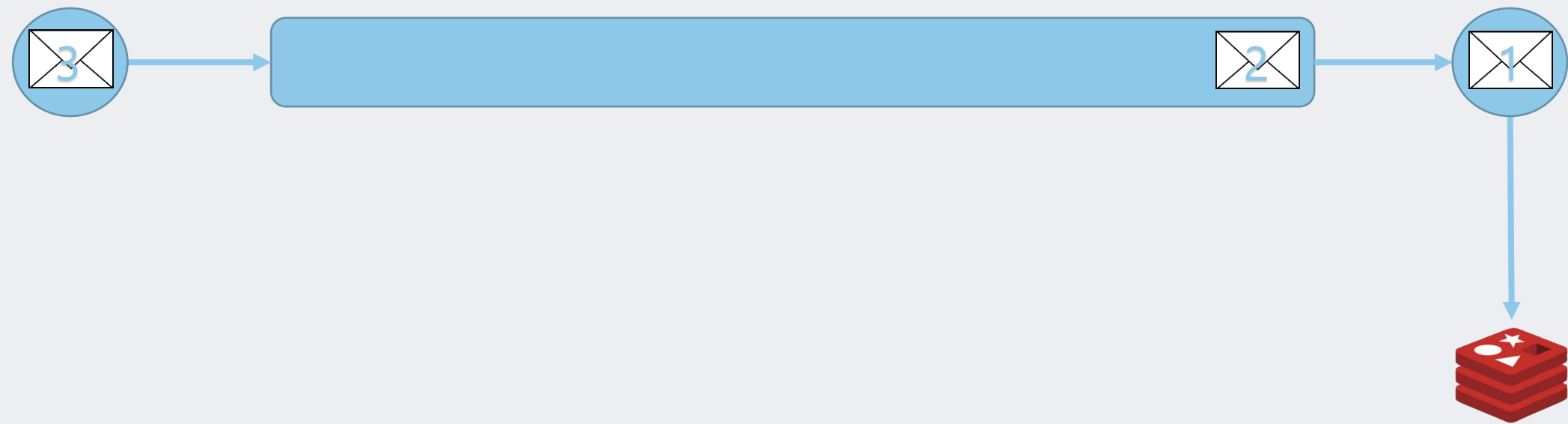
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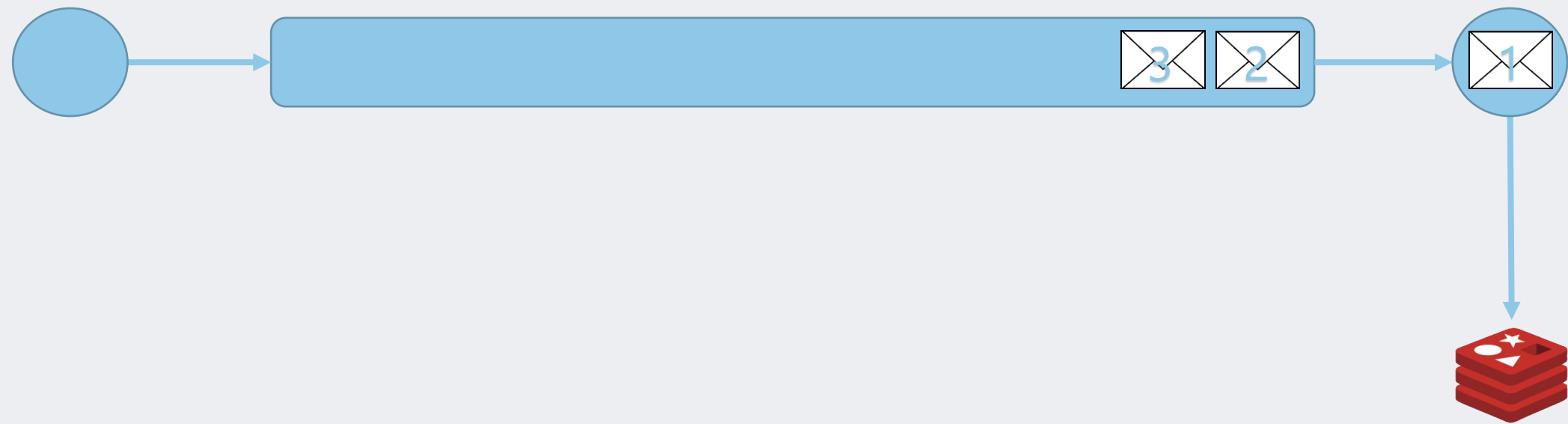
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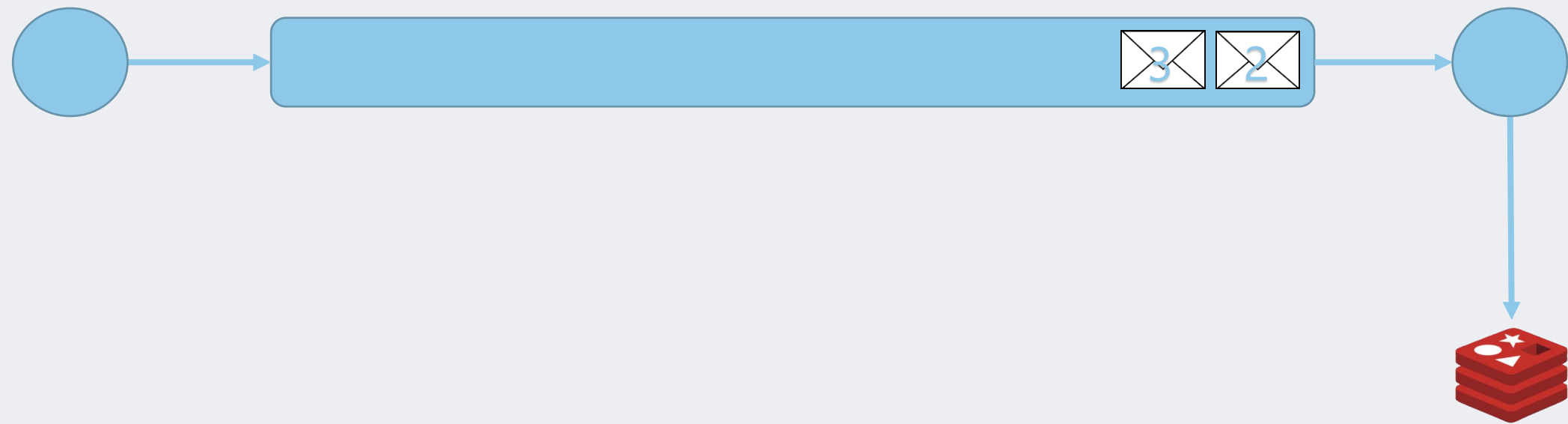
# Exactly Once Processing



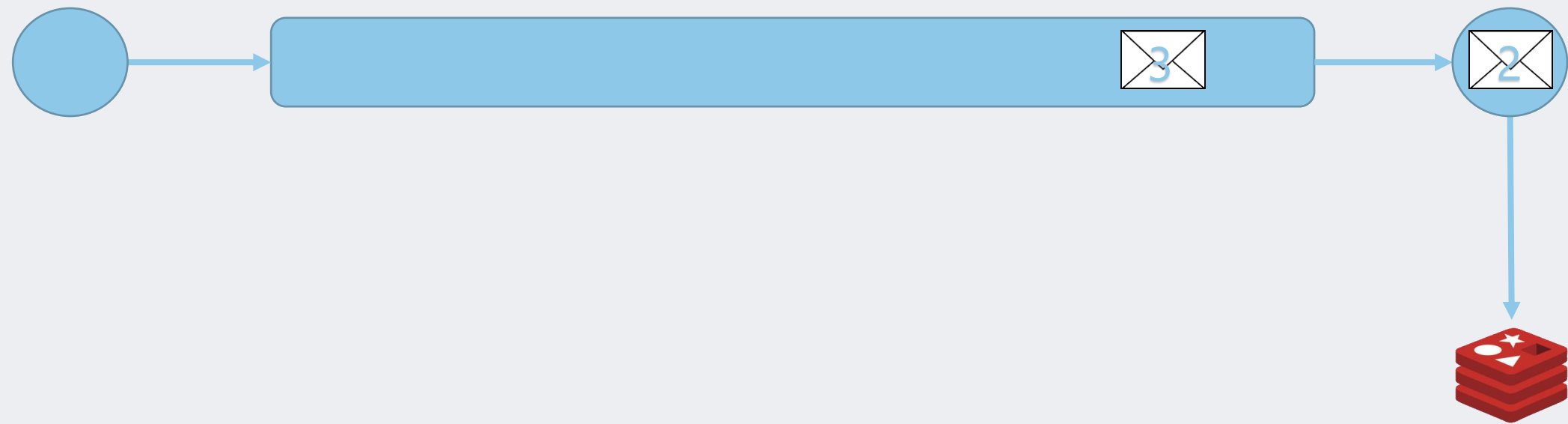
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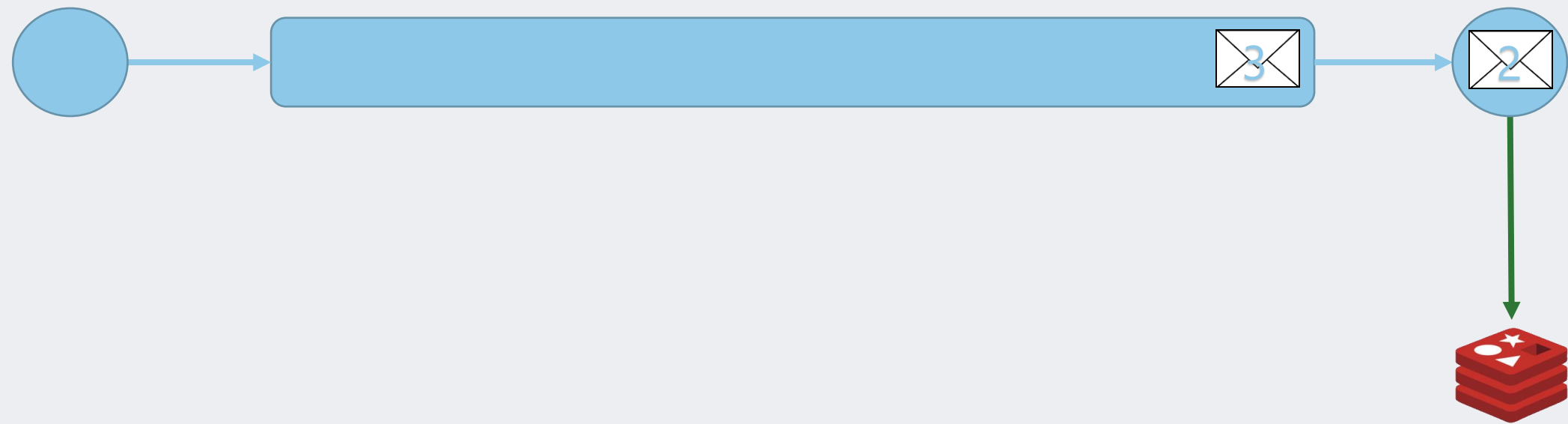
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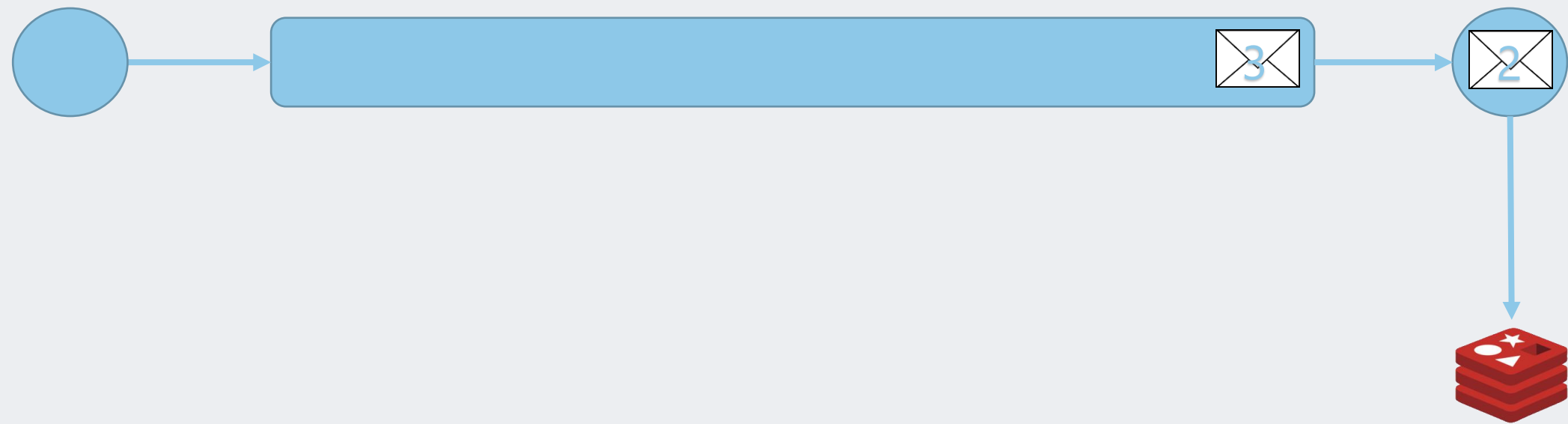
# Exactly Once Processing



# Exactly Once Processing

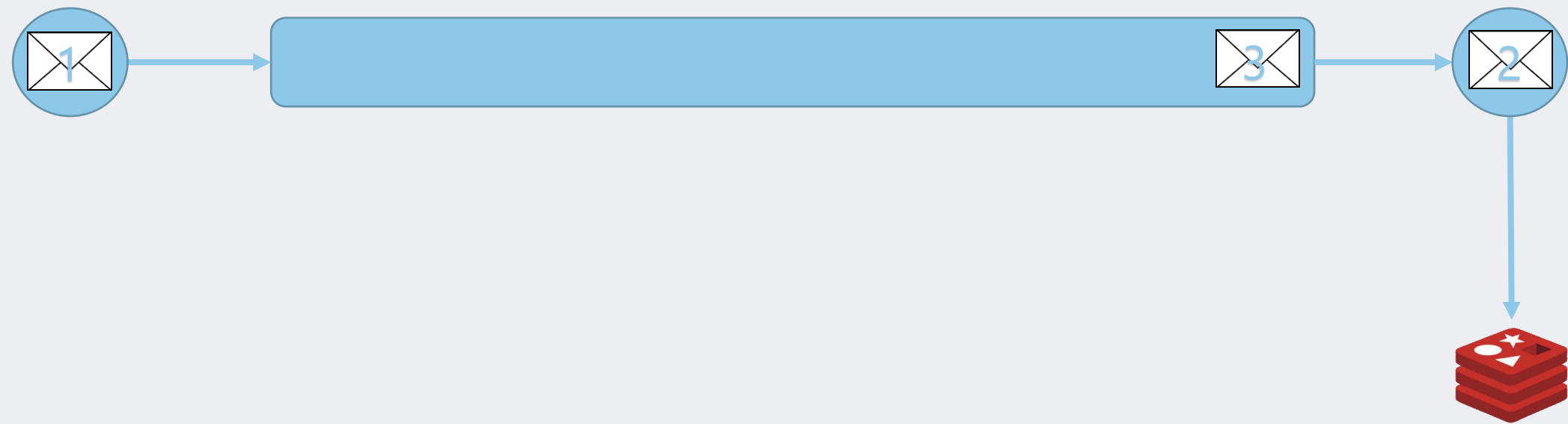


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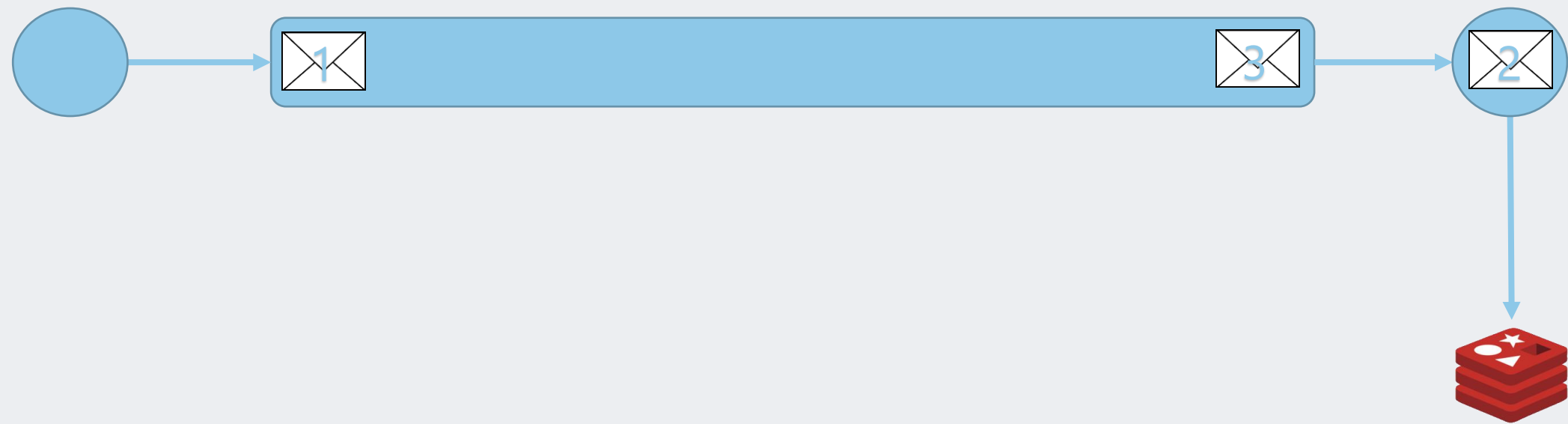




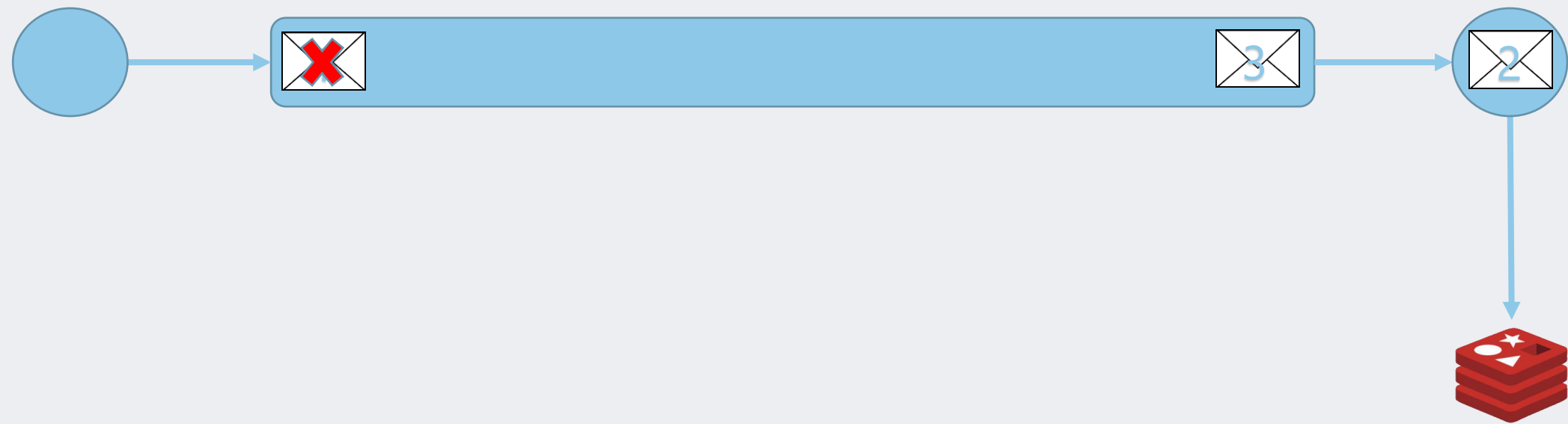
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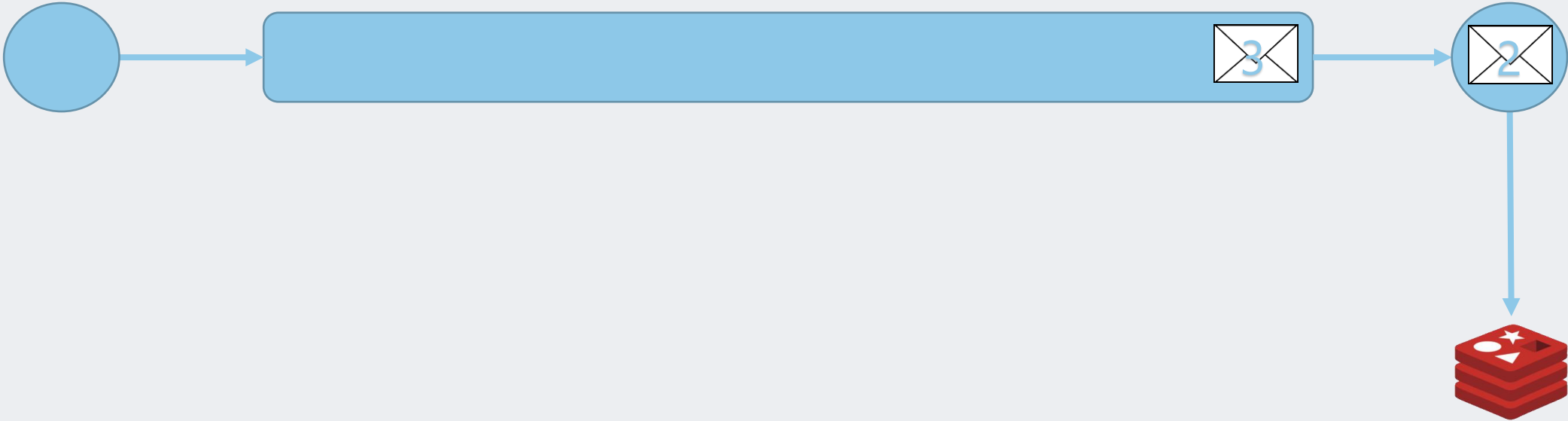
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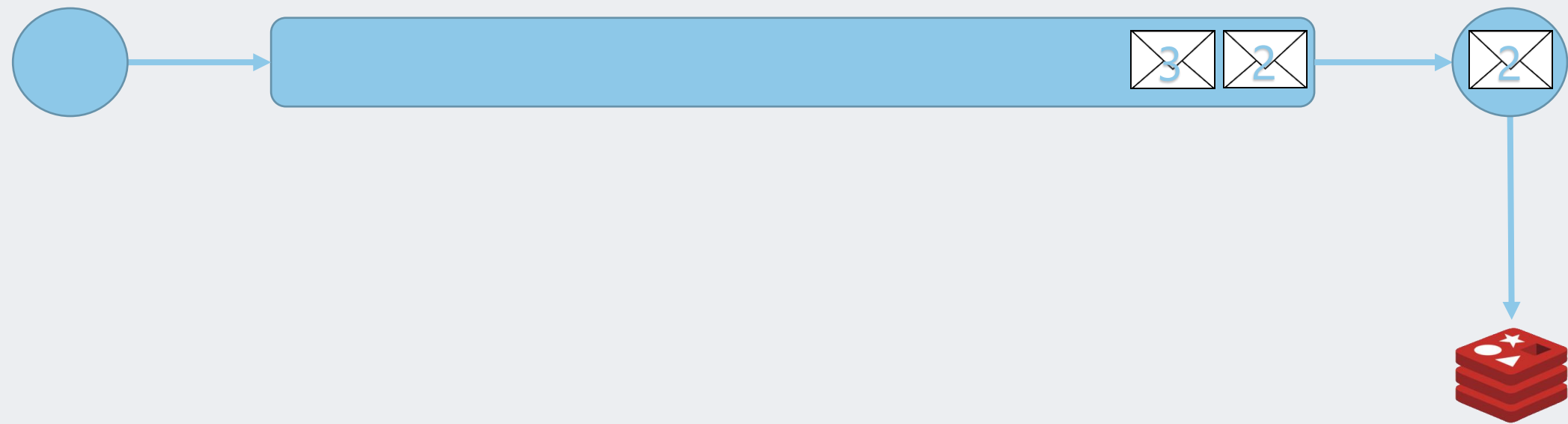
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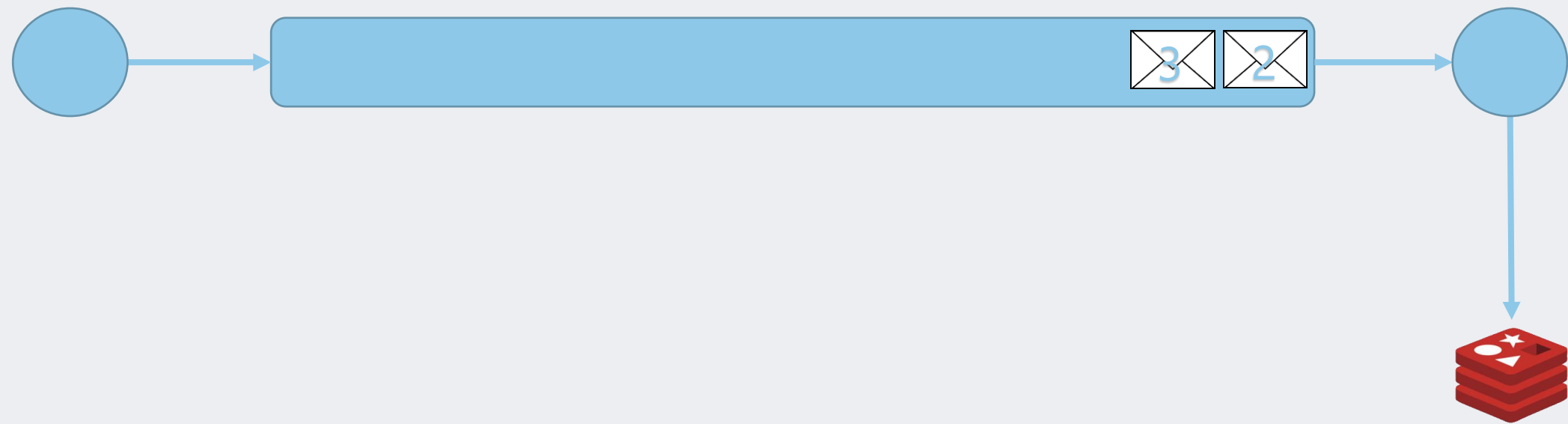
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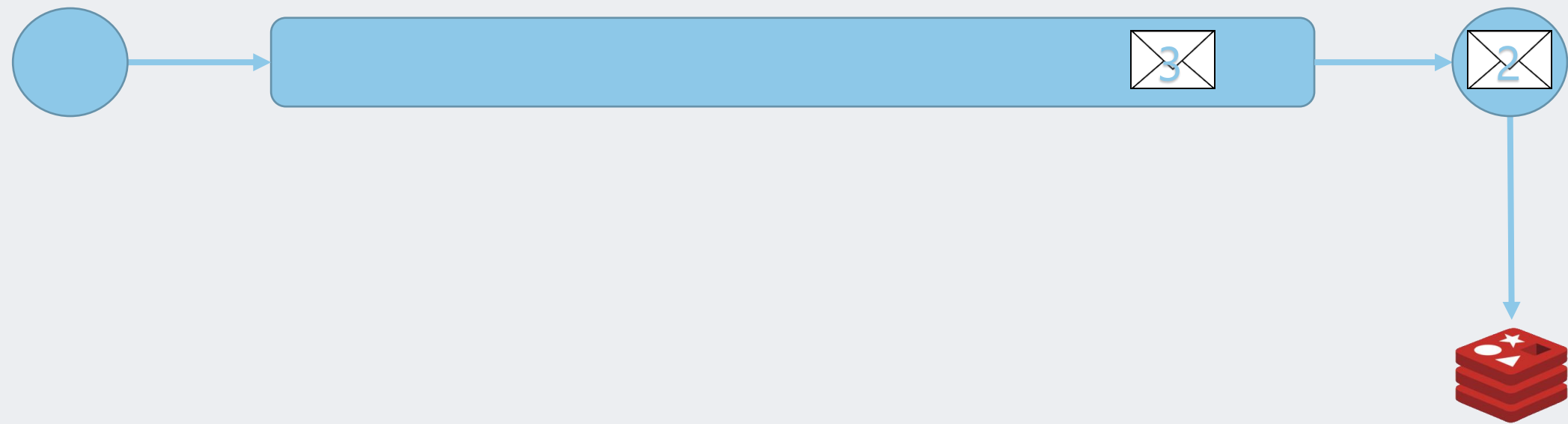
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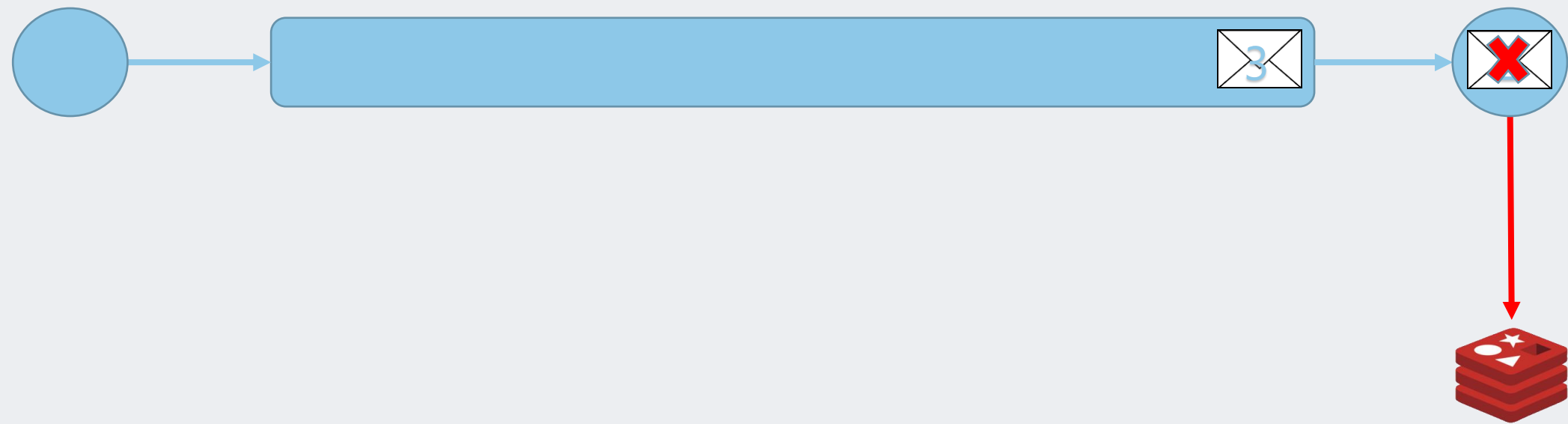
# Exactly Once Processing



# Exactly Once Processing

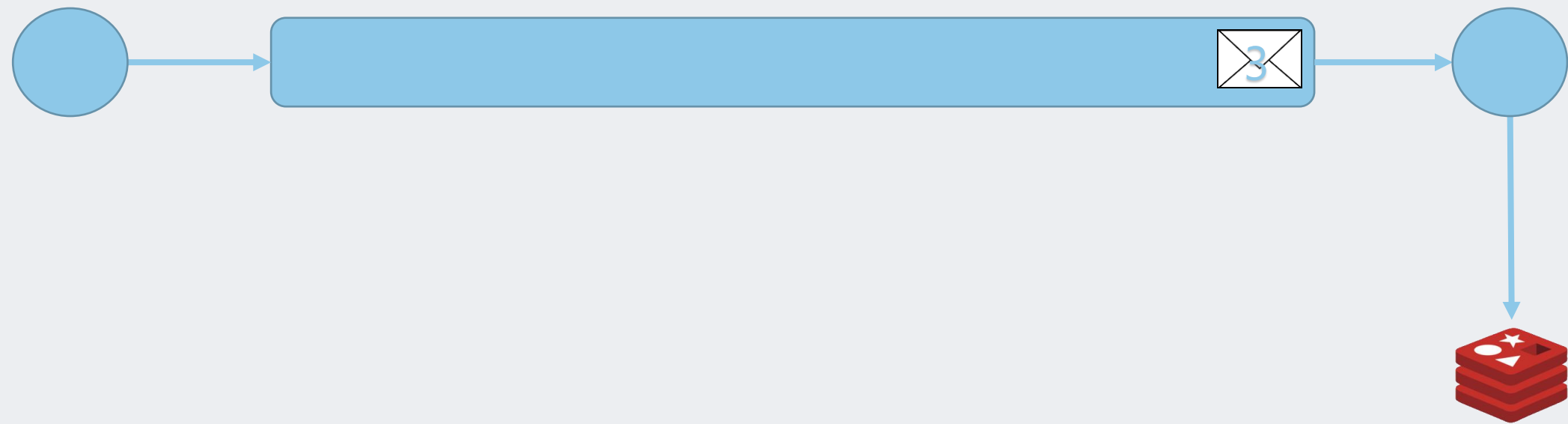


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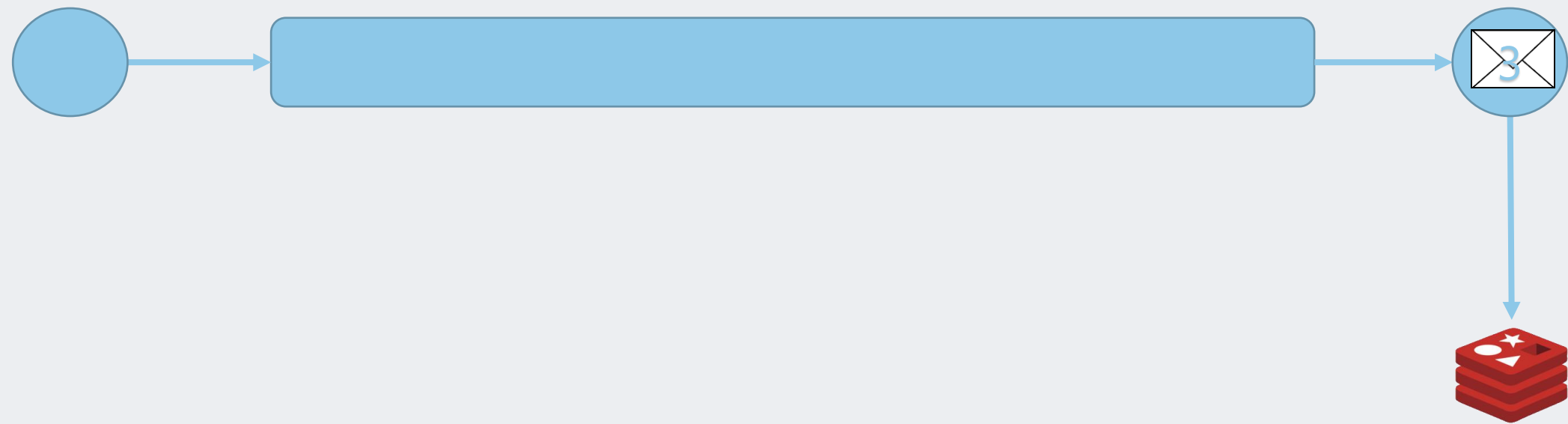




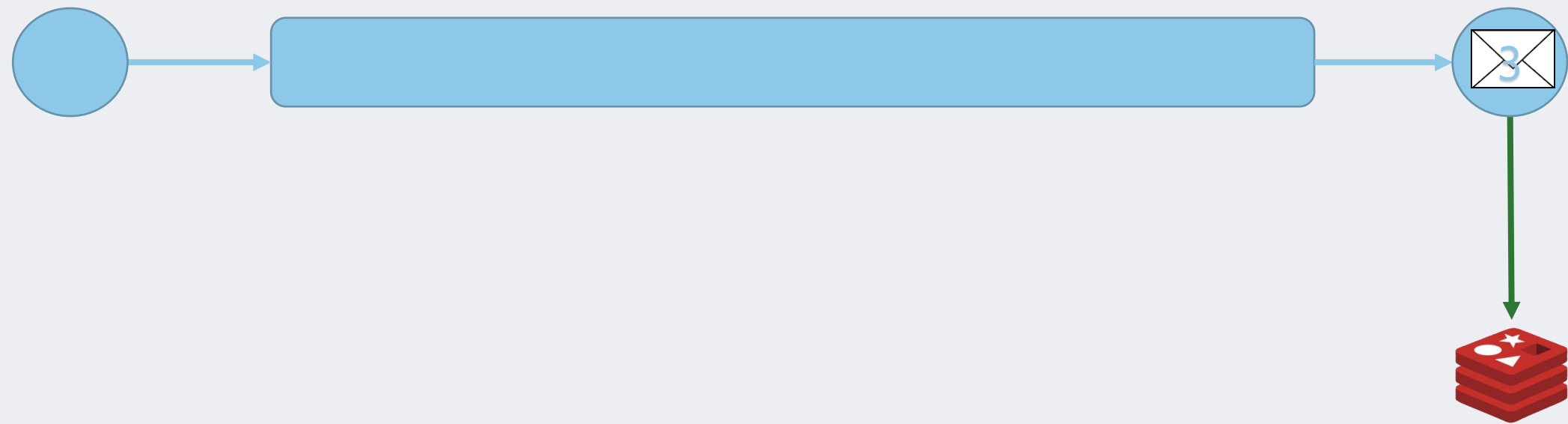
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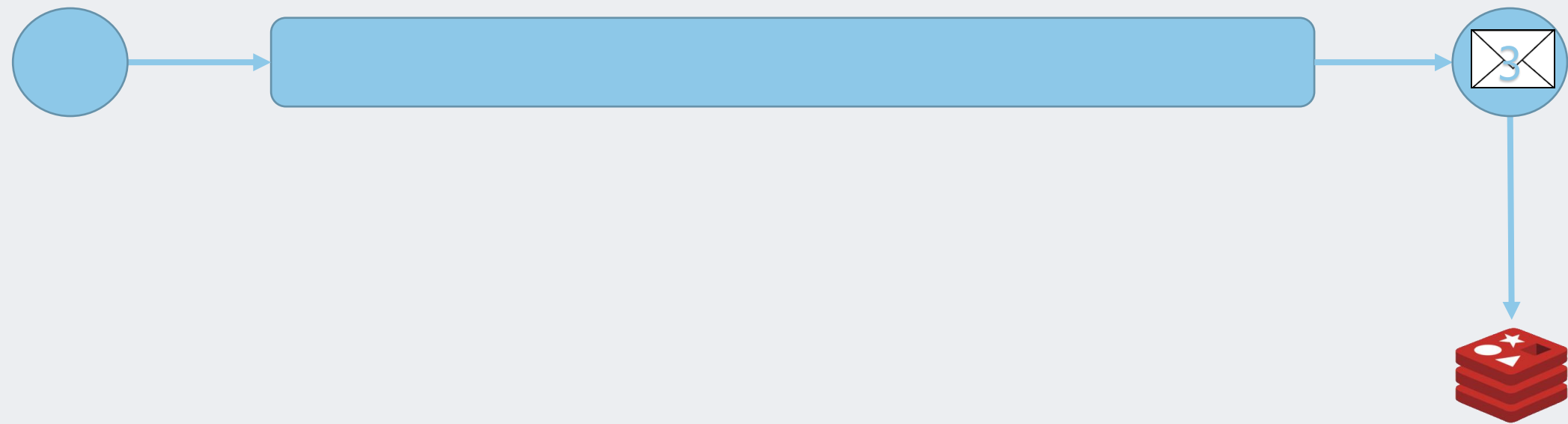
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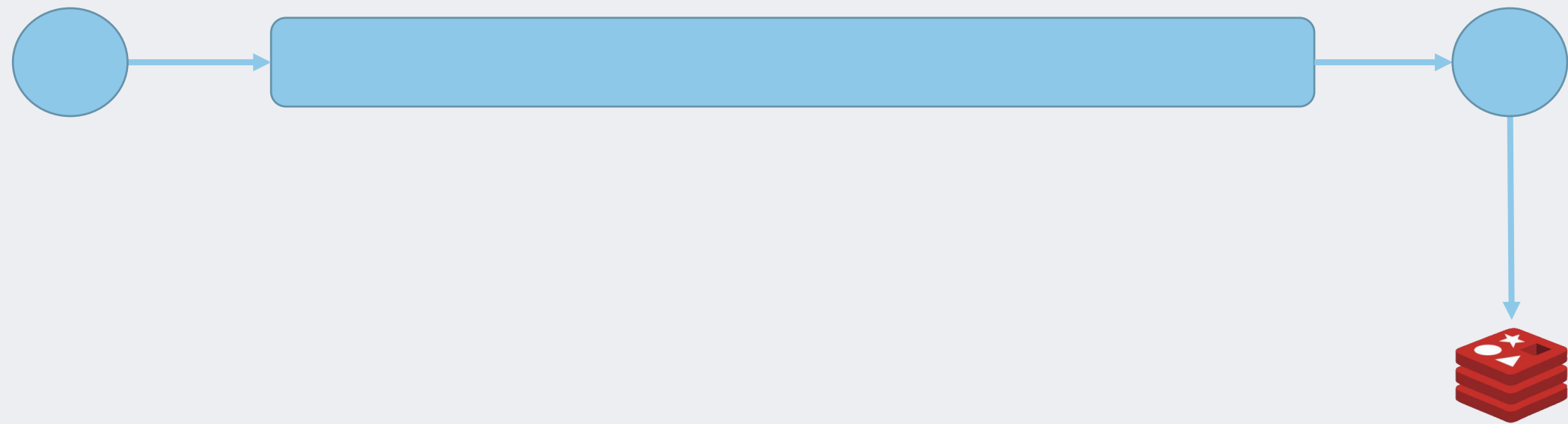
# Exactly Once Processing



# Exactly Once Processing



# Exactly Once Processing

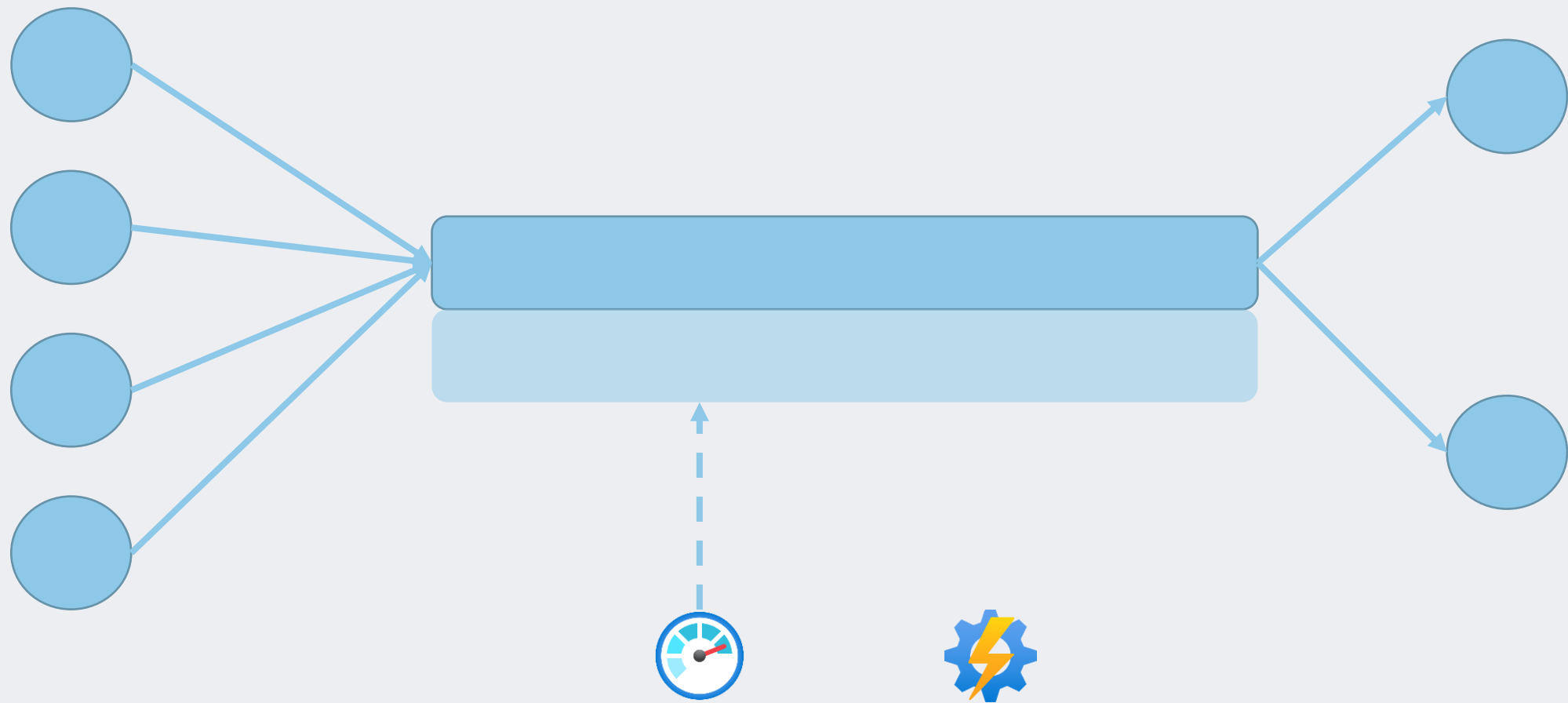




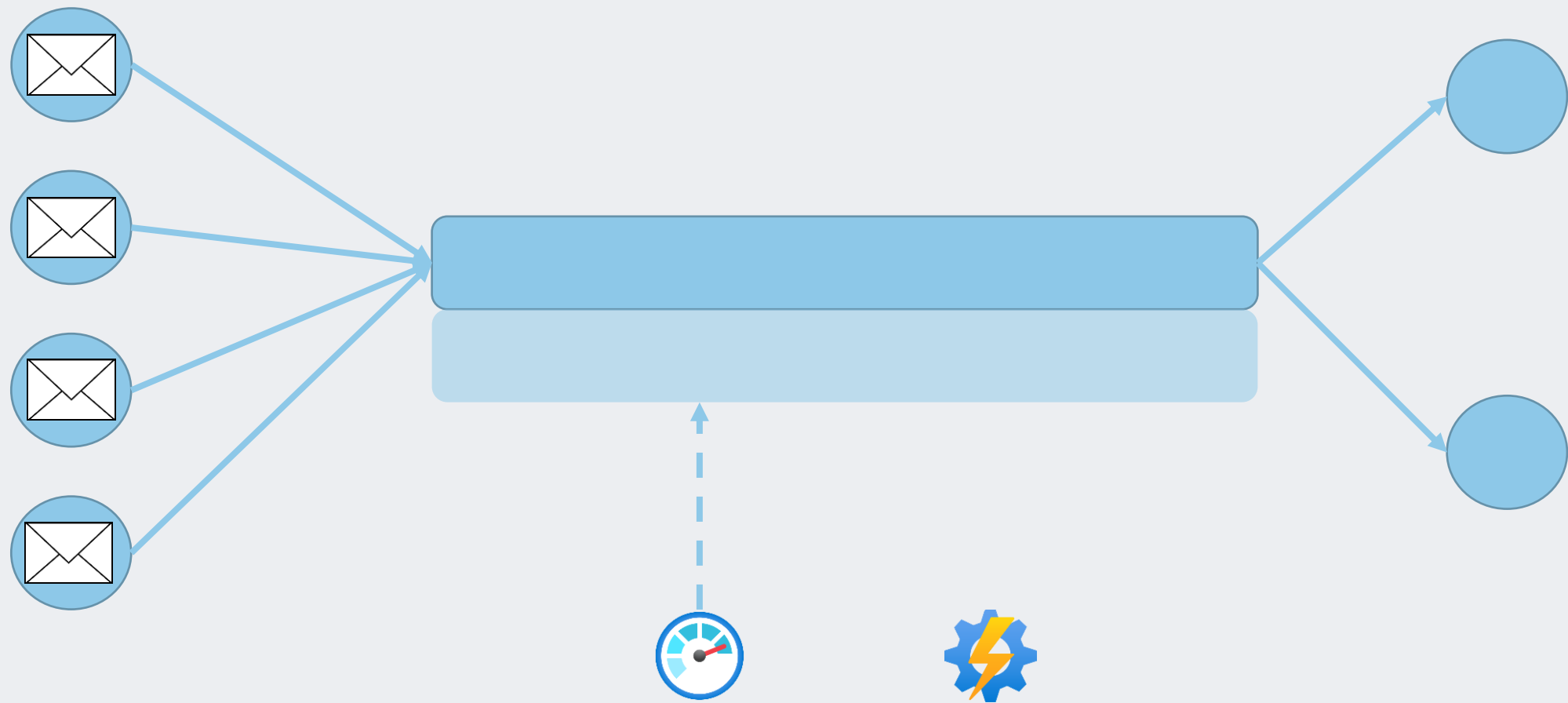
# Circuit Breaker

<https://docs.microsoft.com/en-us/azure/architecture/patterns/circuit-breaker>

# Circuit Breaker

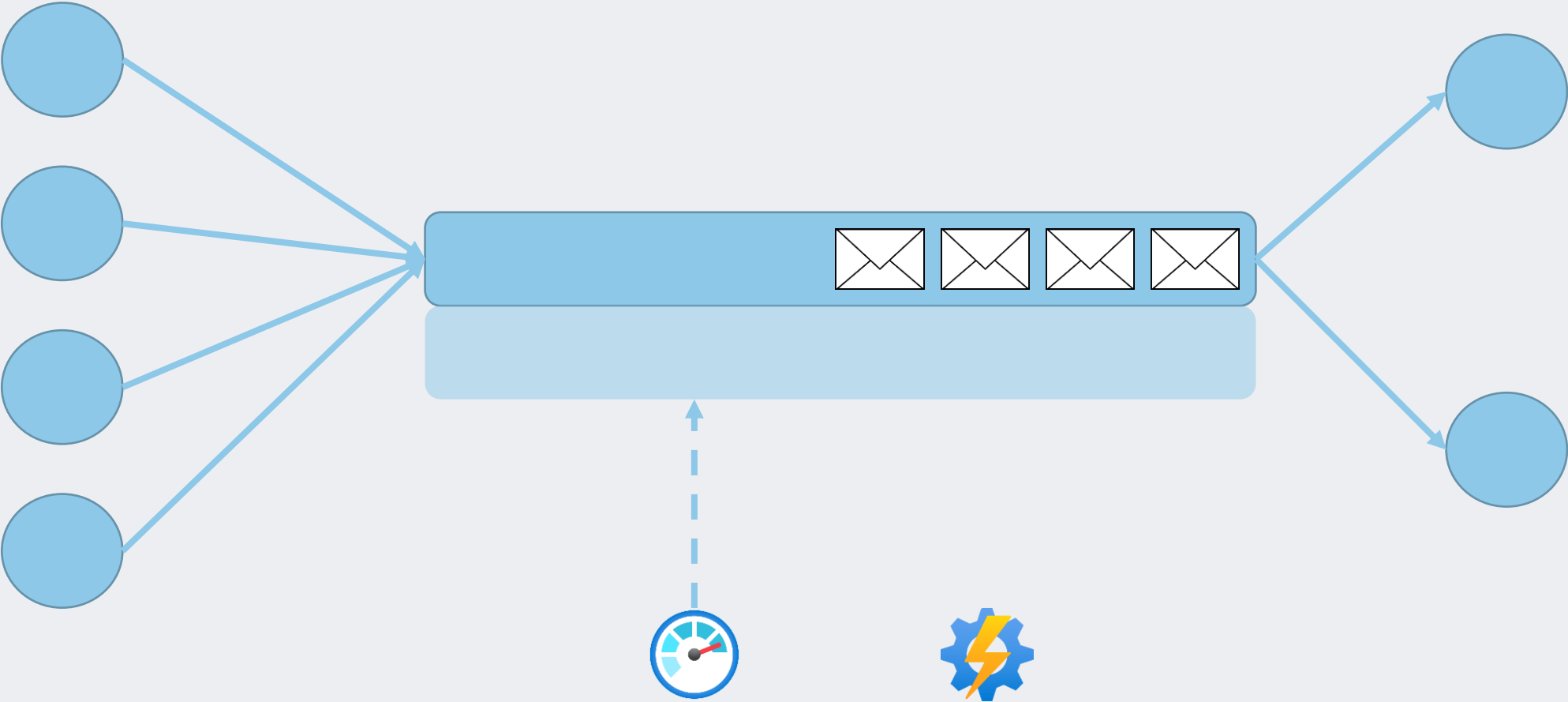


# Circuit Breaker

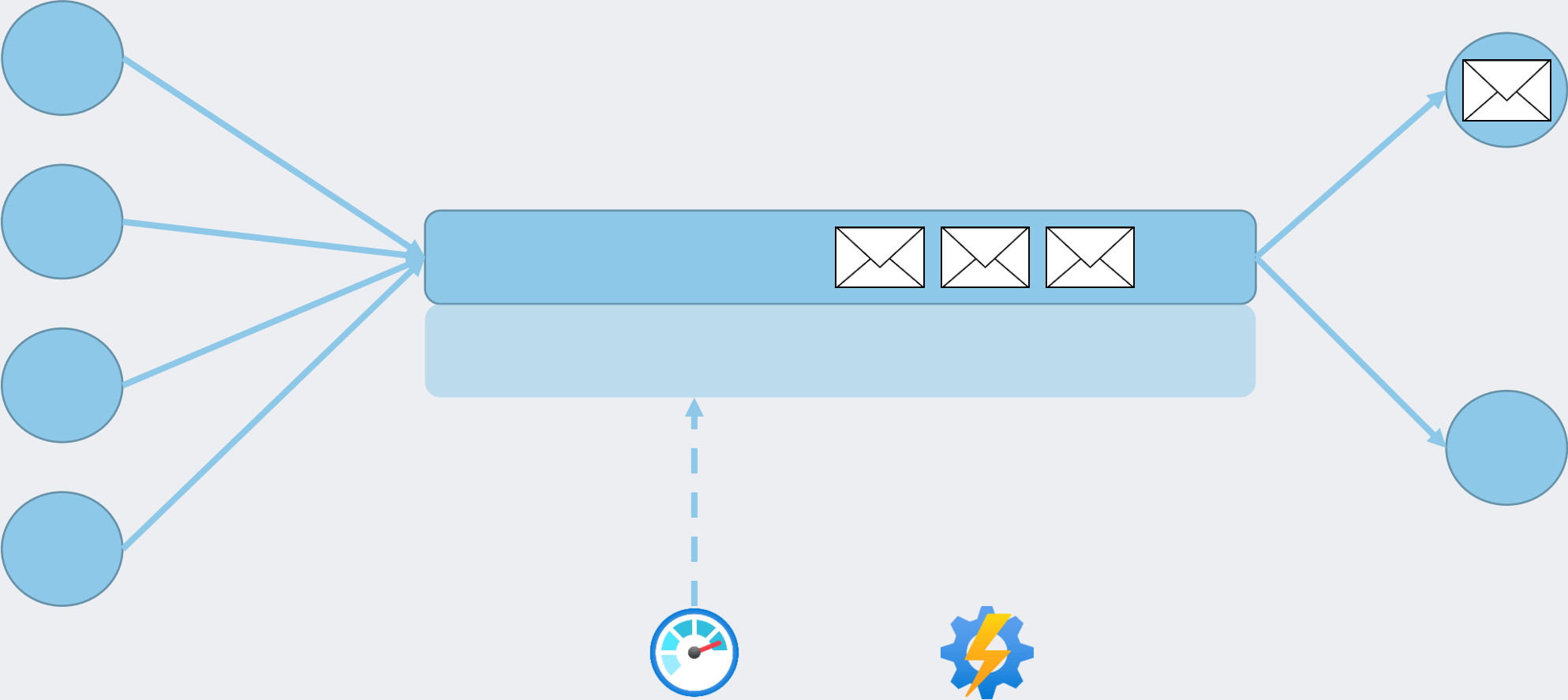




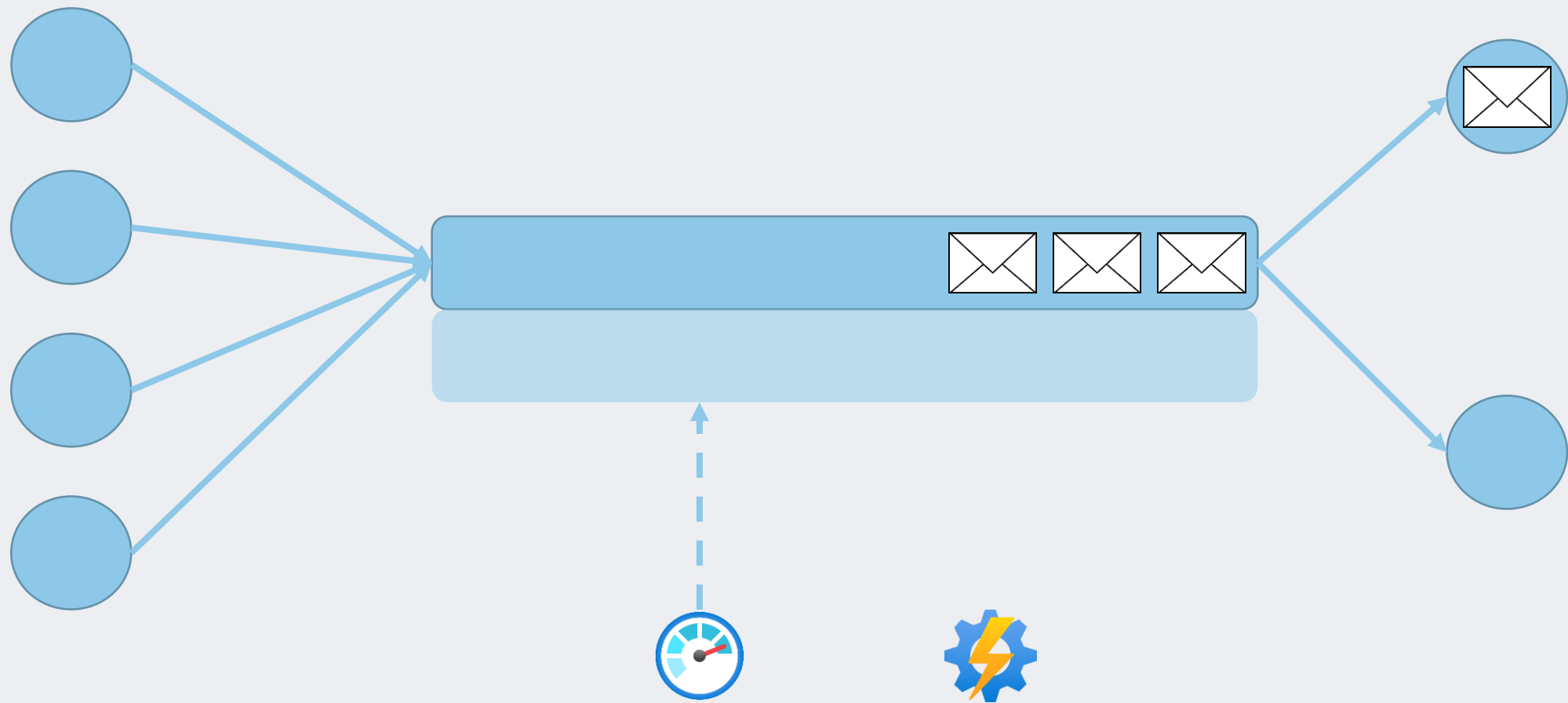
# Circuit Breaker



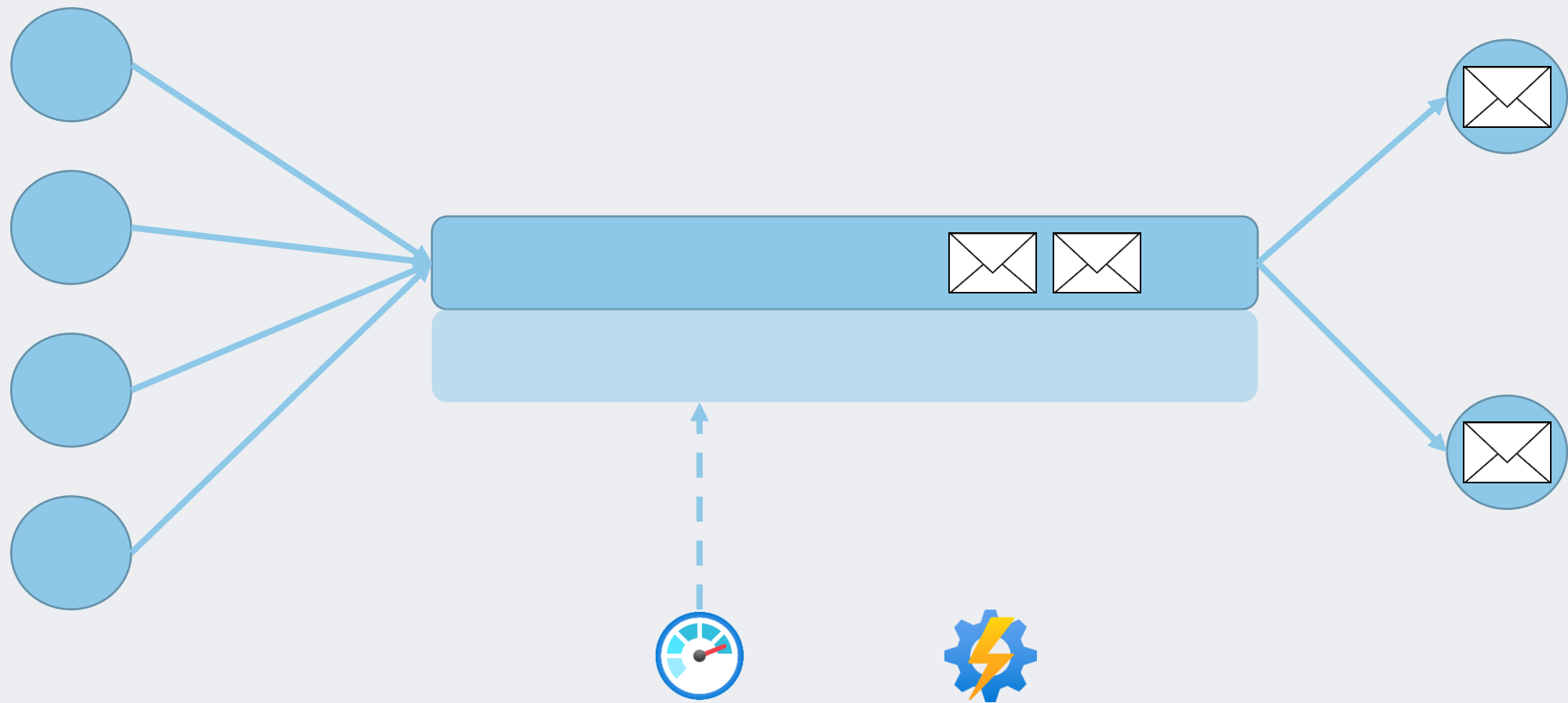
# Circuit Breaker



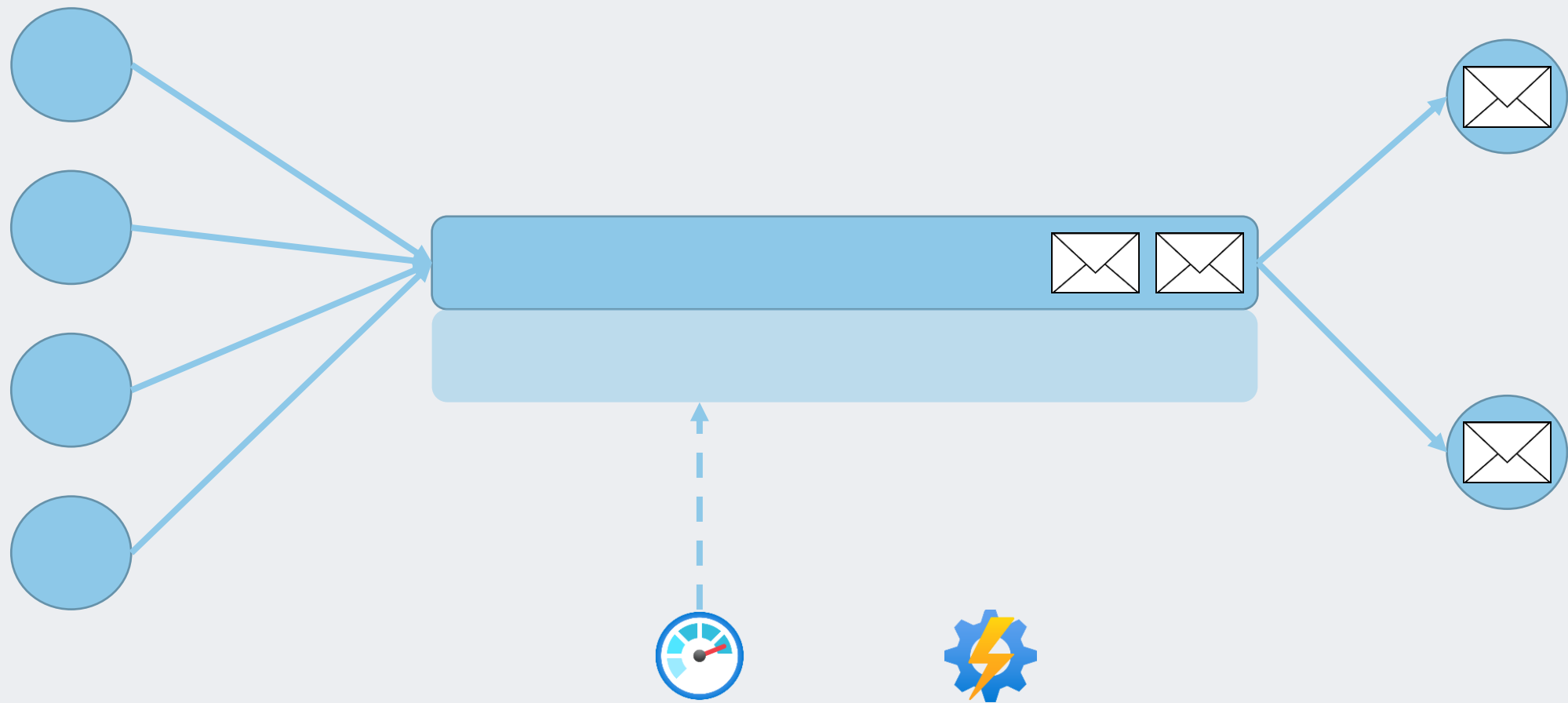
# Circuit Breaker



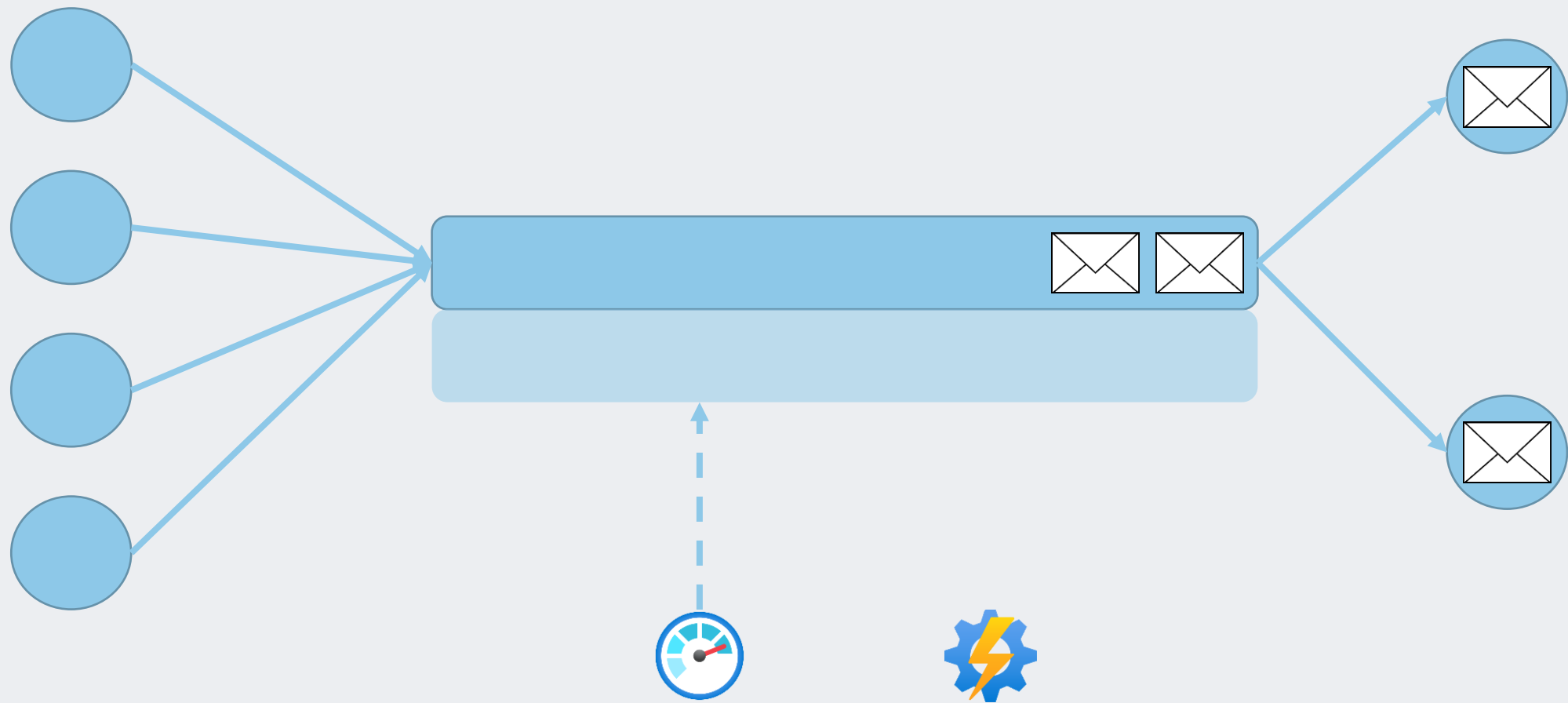
# Circuit Breaker



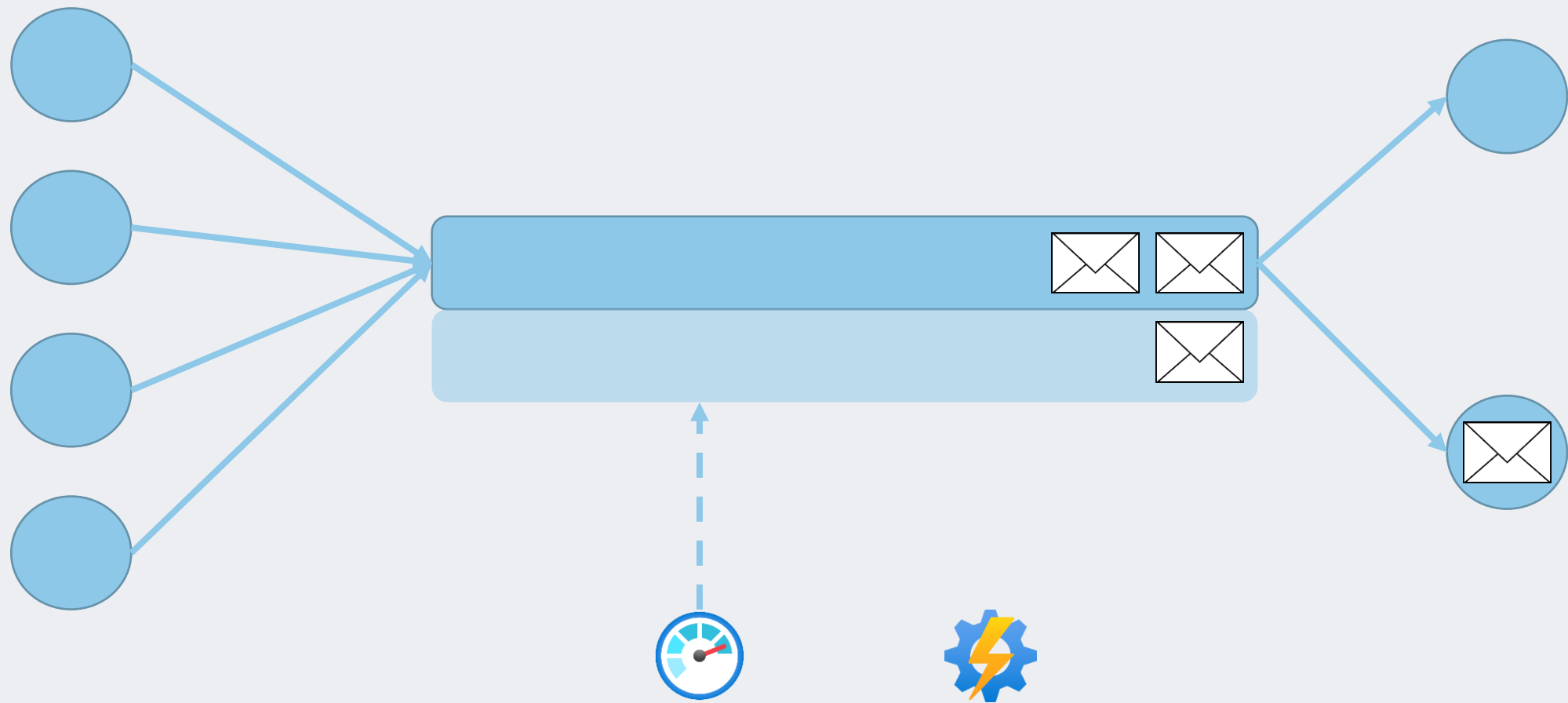
# Circuit Breaker



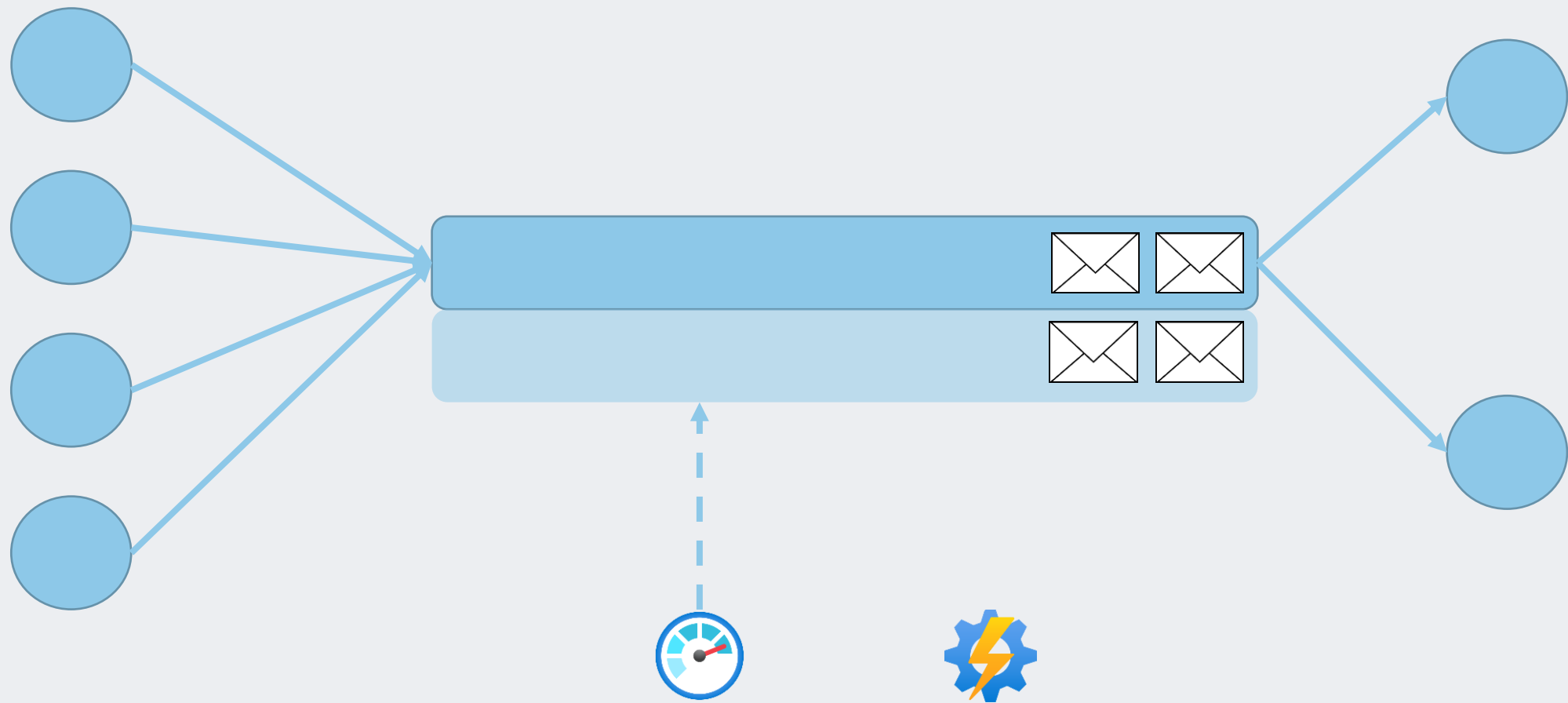
# Circuit Breaker



# Circuit Breaker

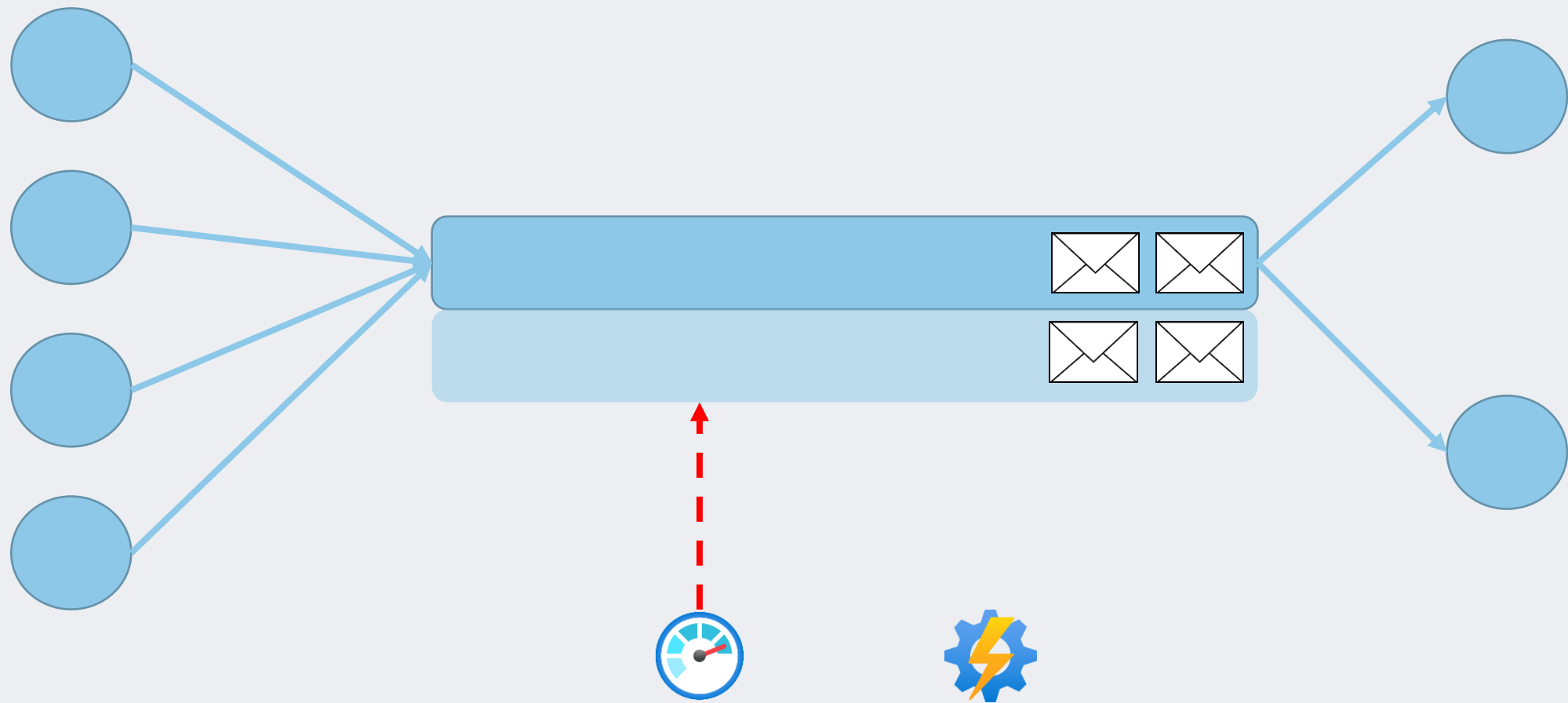


# Circuit Breaker

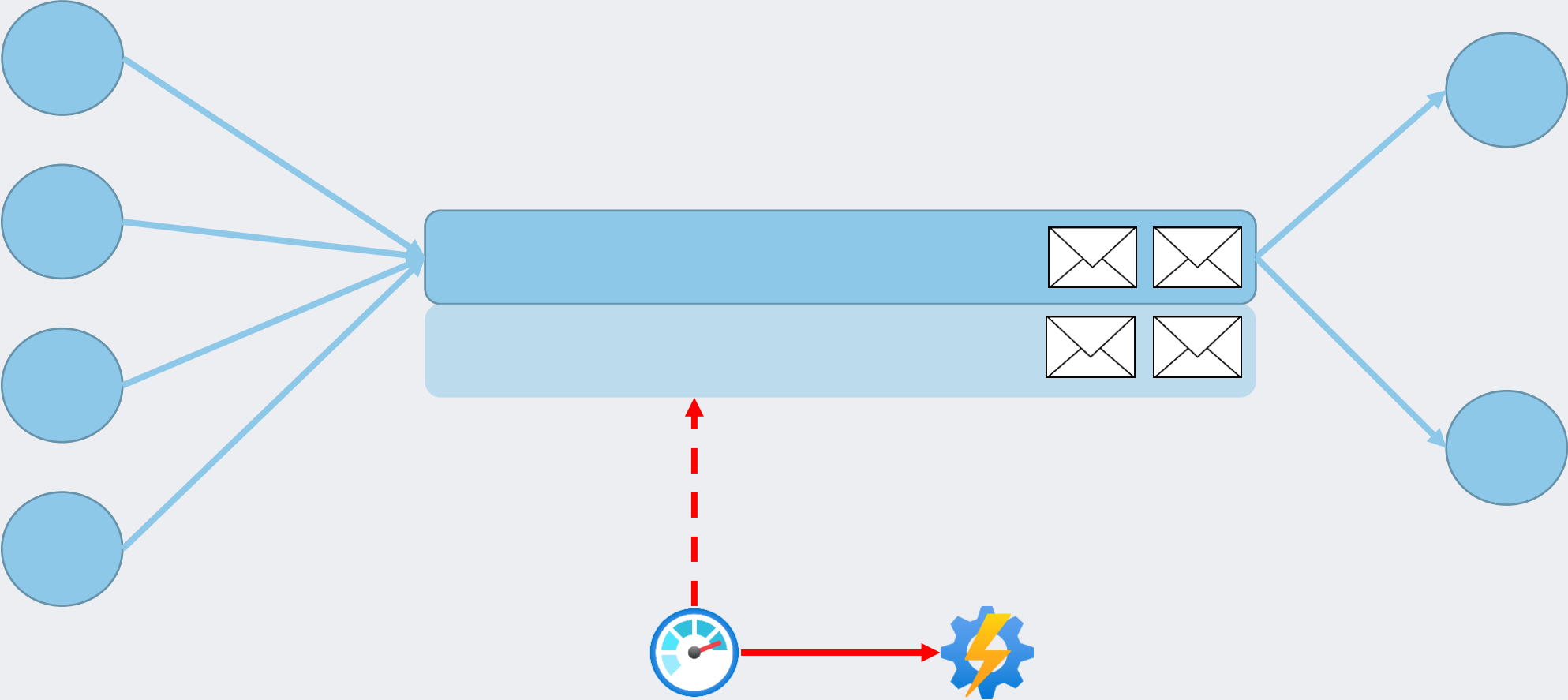




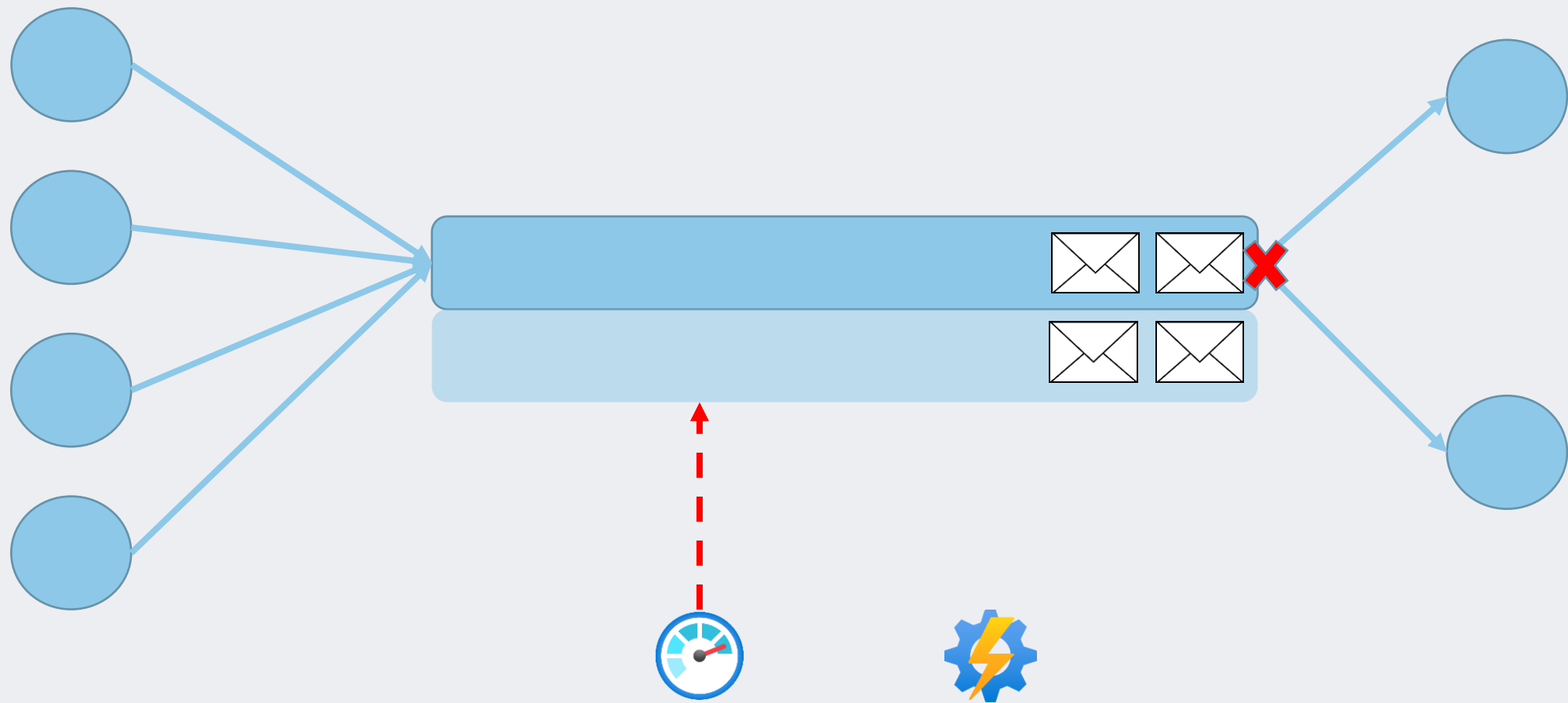
# Circuit Breaker



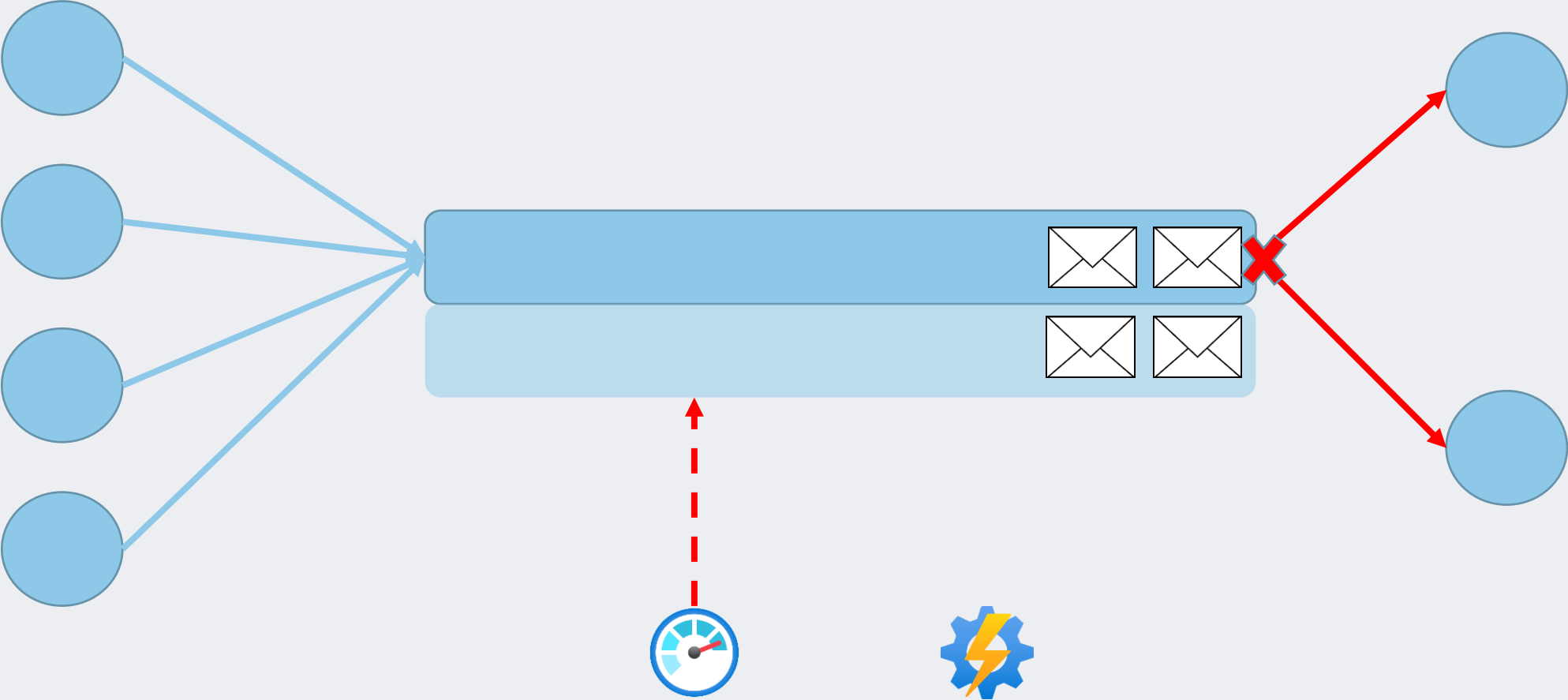
# Circuit Breaker



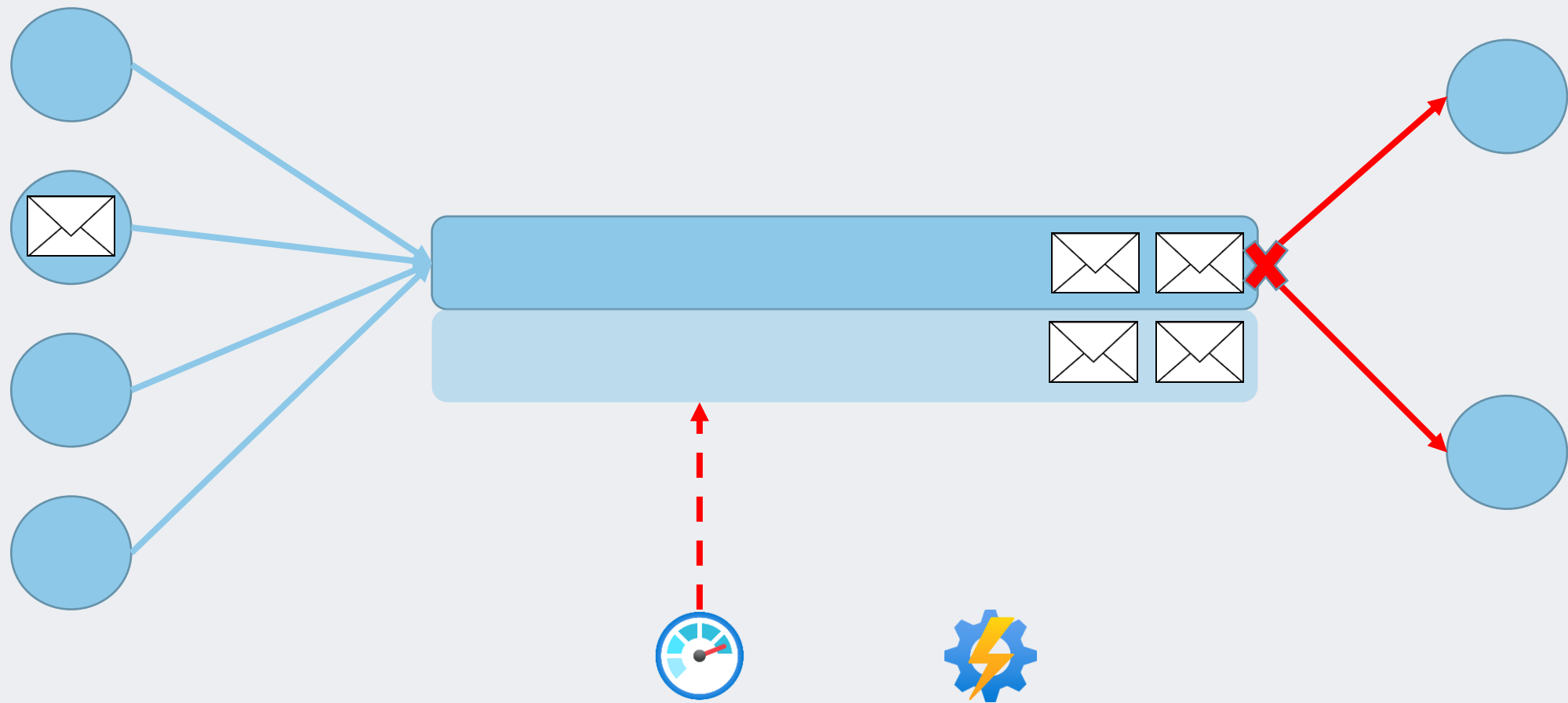
# Circuit Breaker



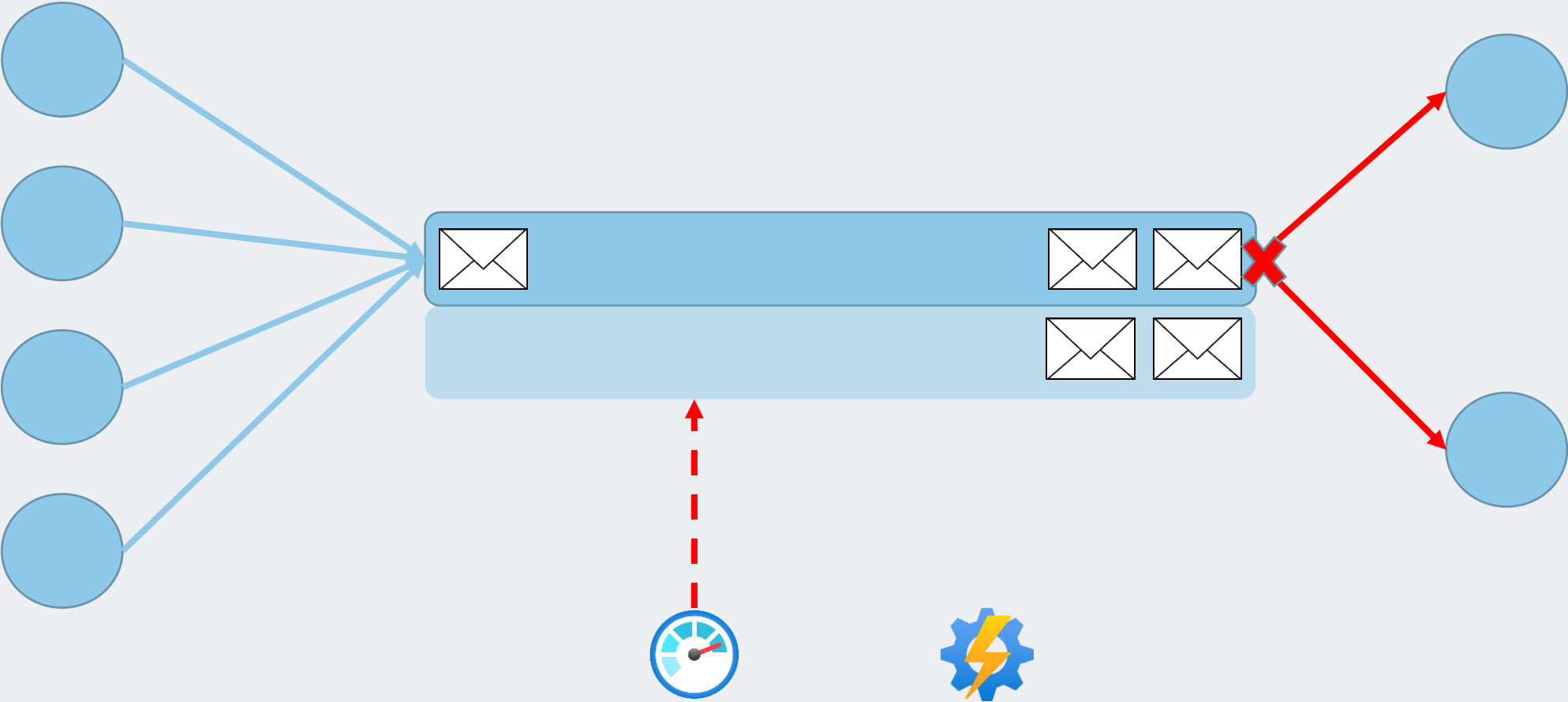
# Circuit Breaker



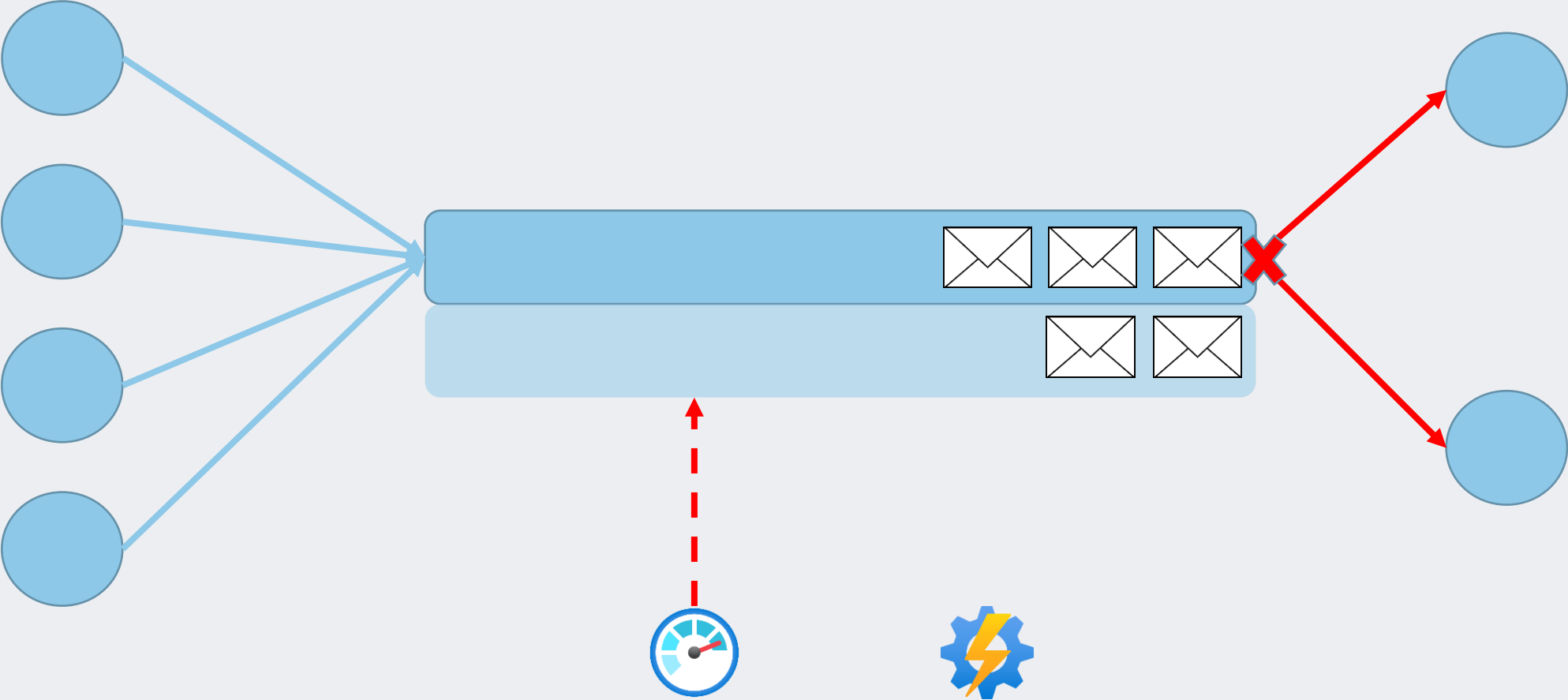
# Circuit Breaker



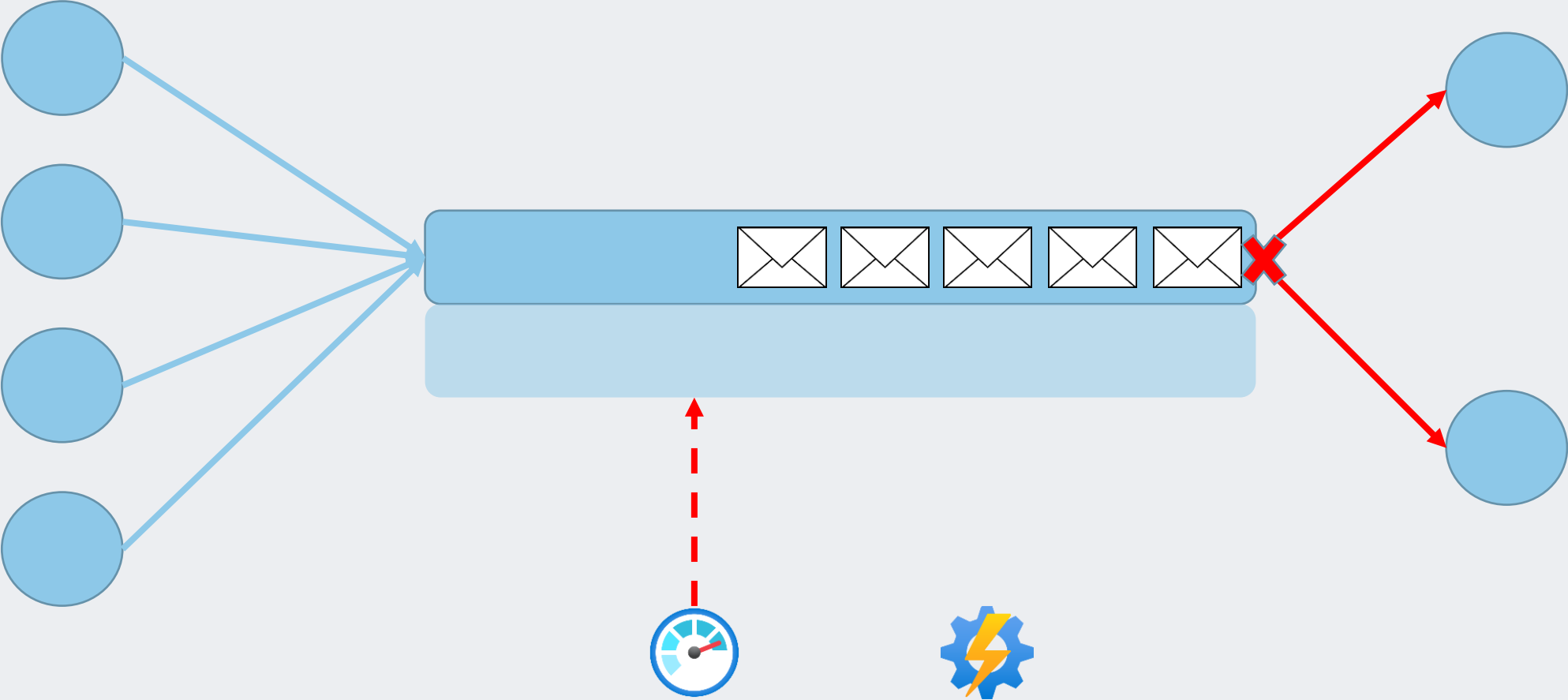
# Circuit Breaker



# Circuit Breaker

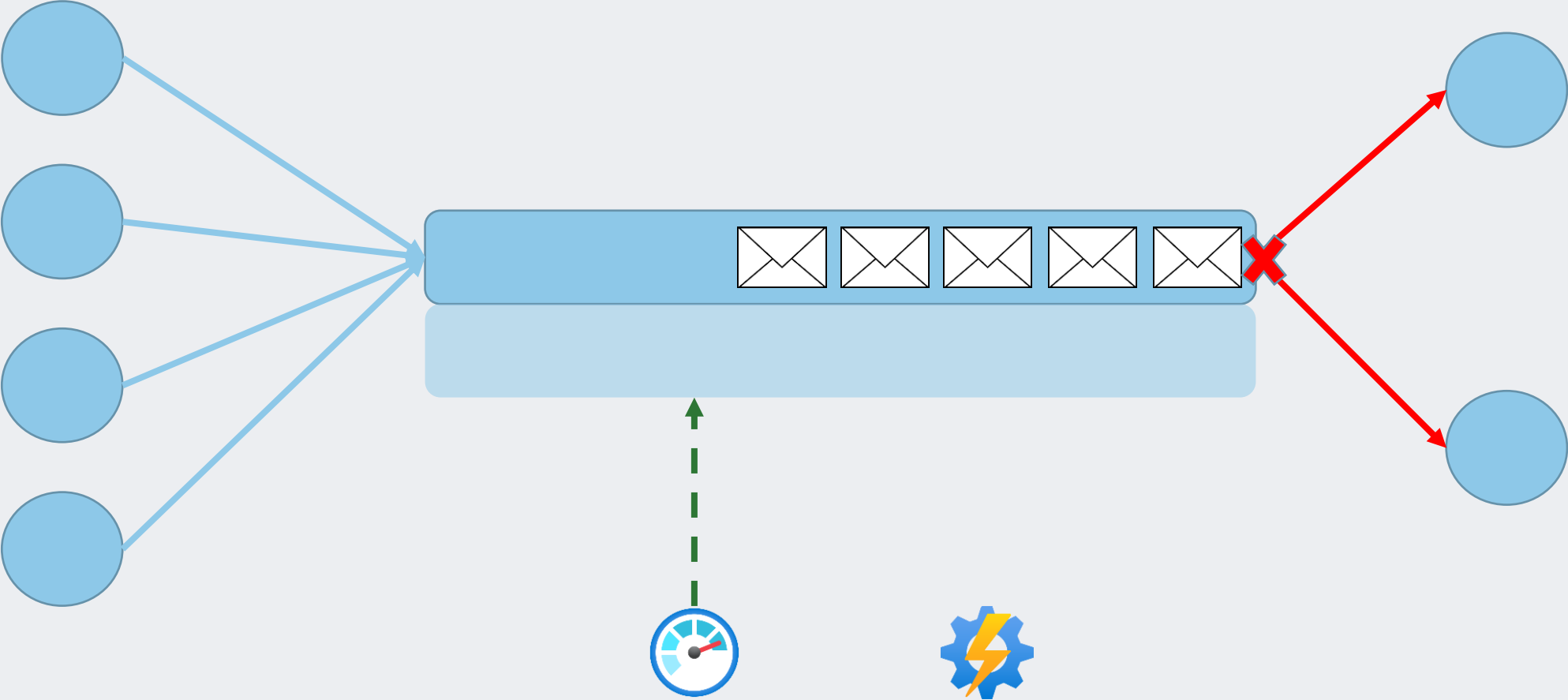


# Circuit Breaker

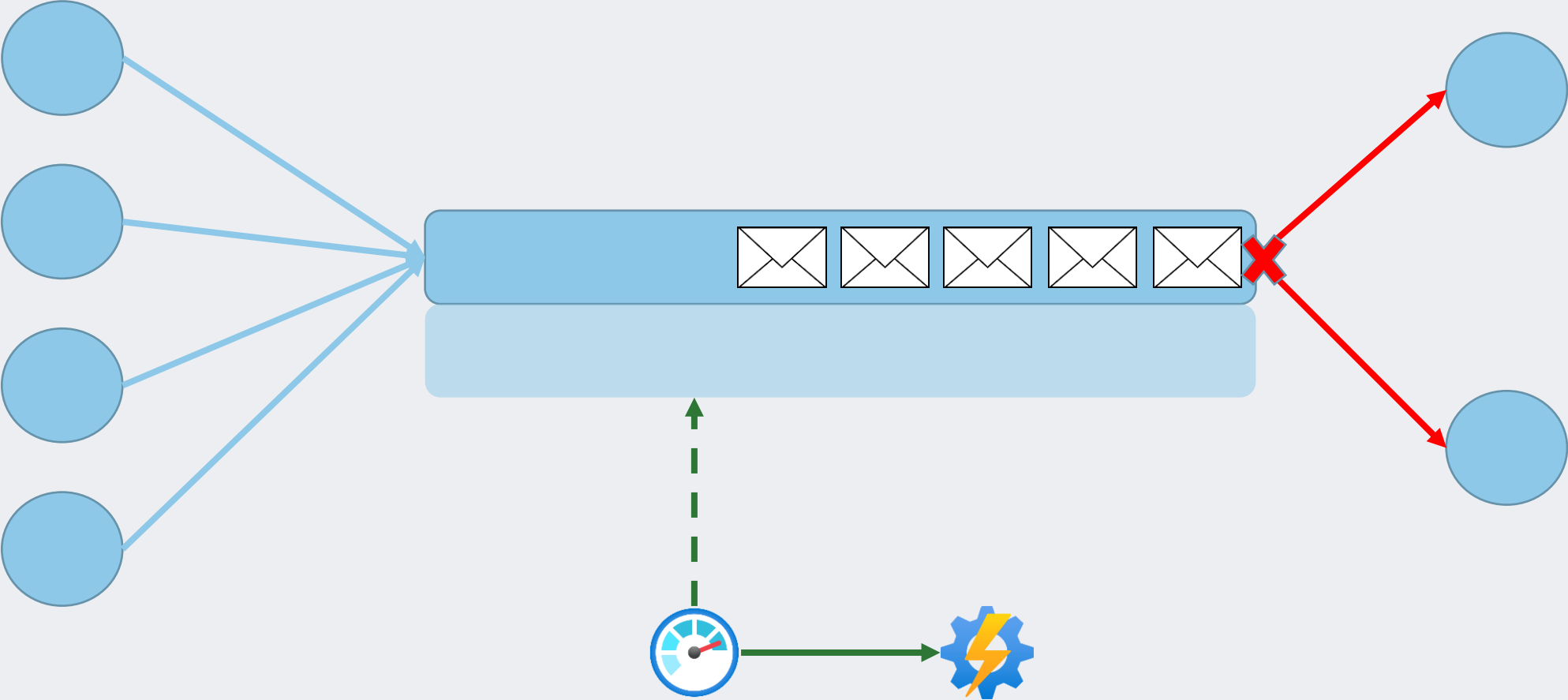




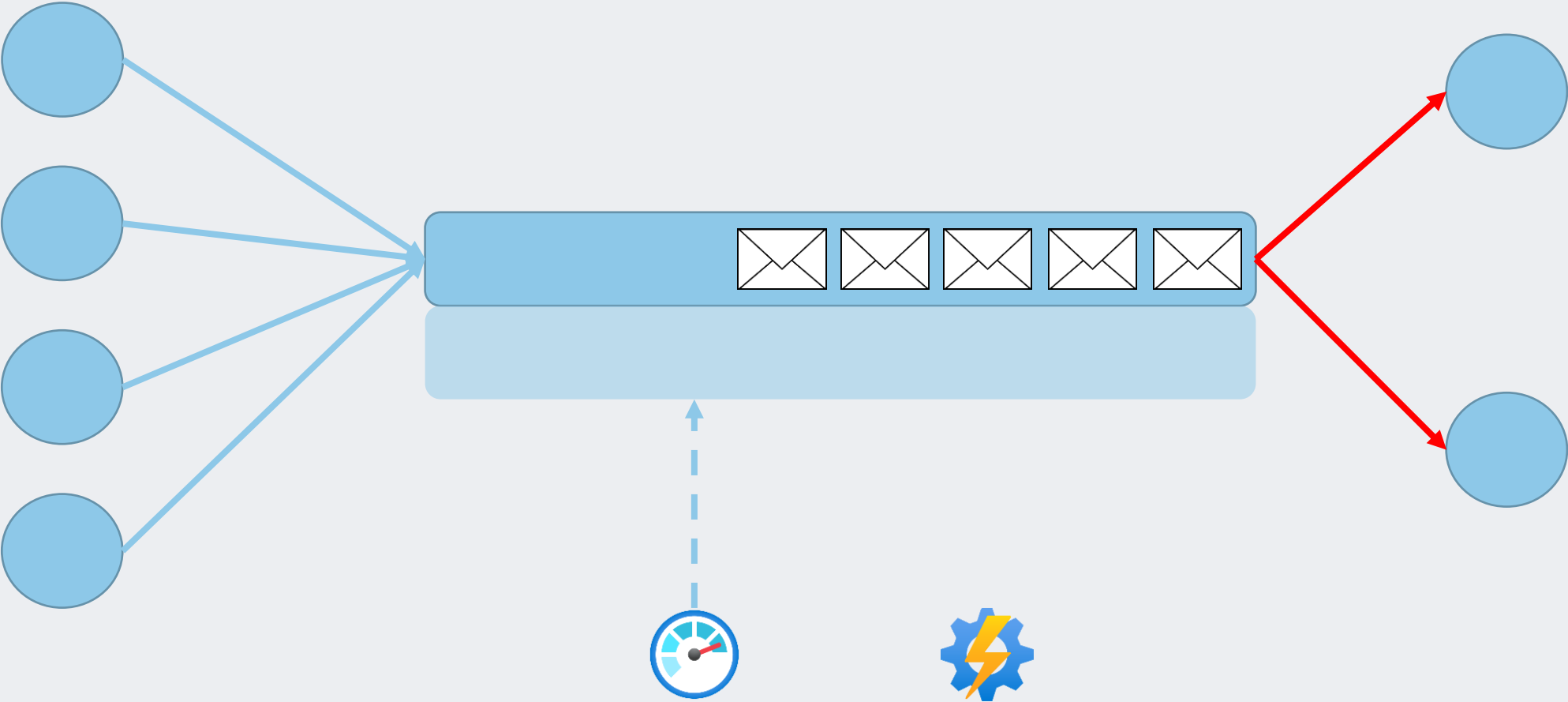
# Circuit Breaker



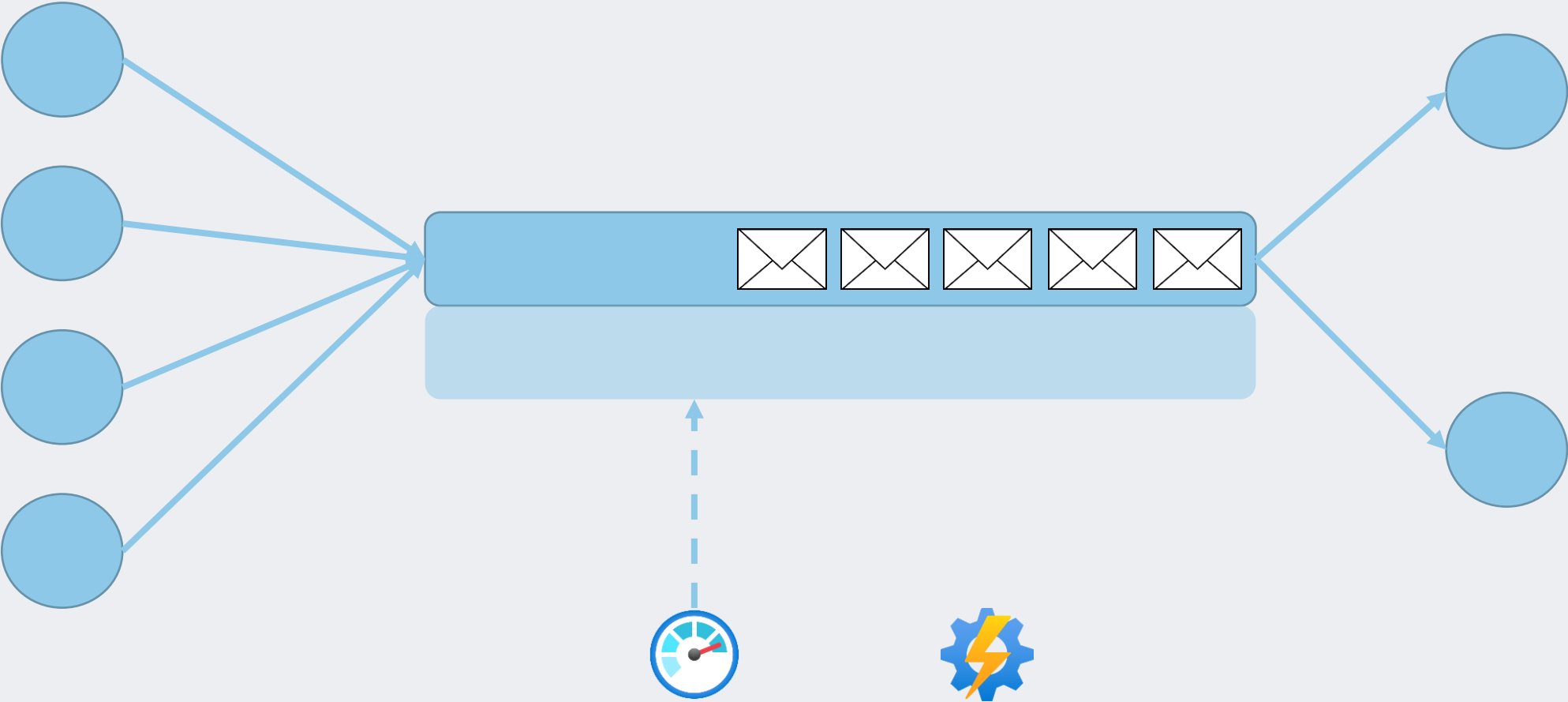
# Circuit Breaker



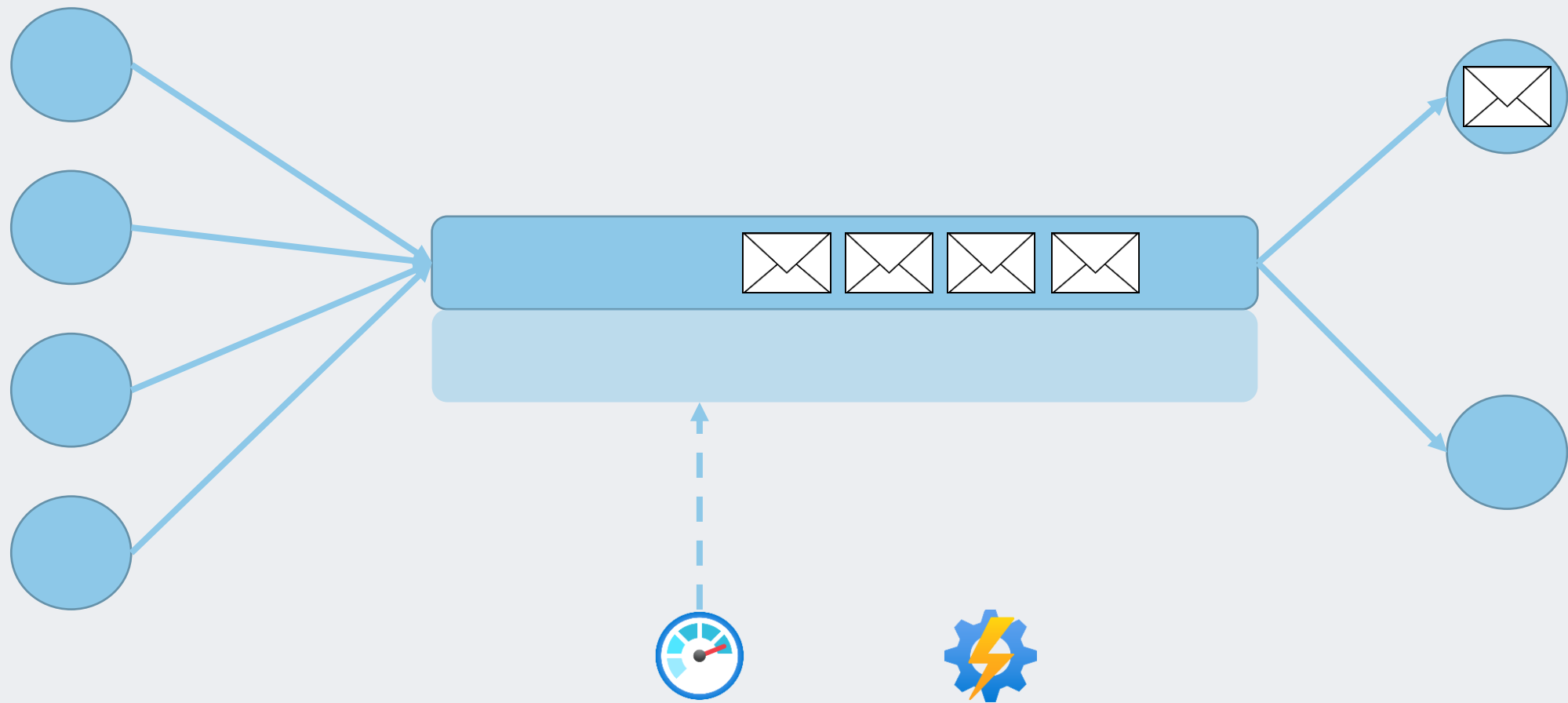
# Circuit Breaker



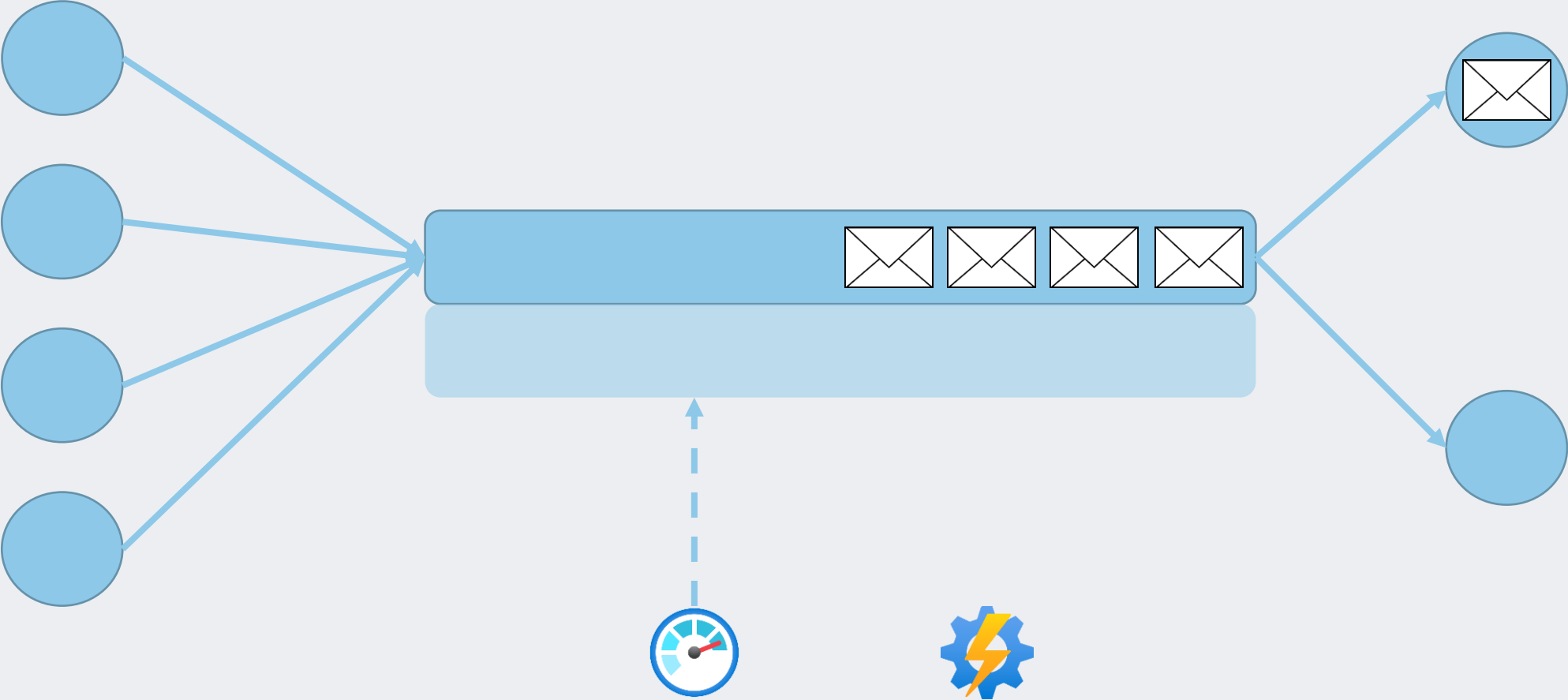
# Circuit Breaker



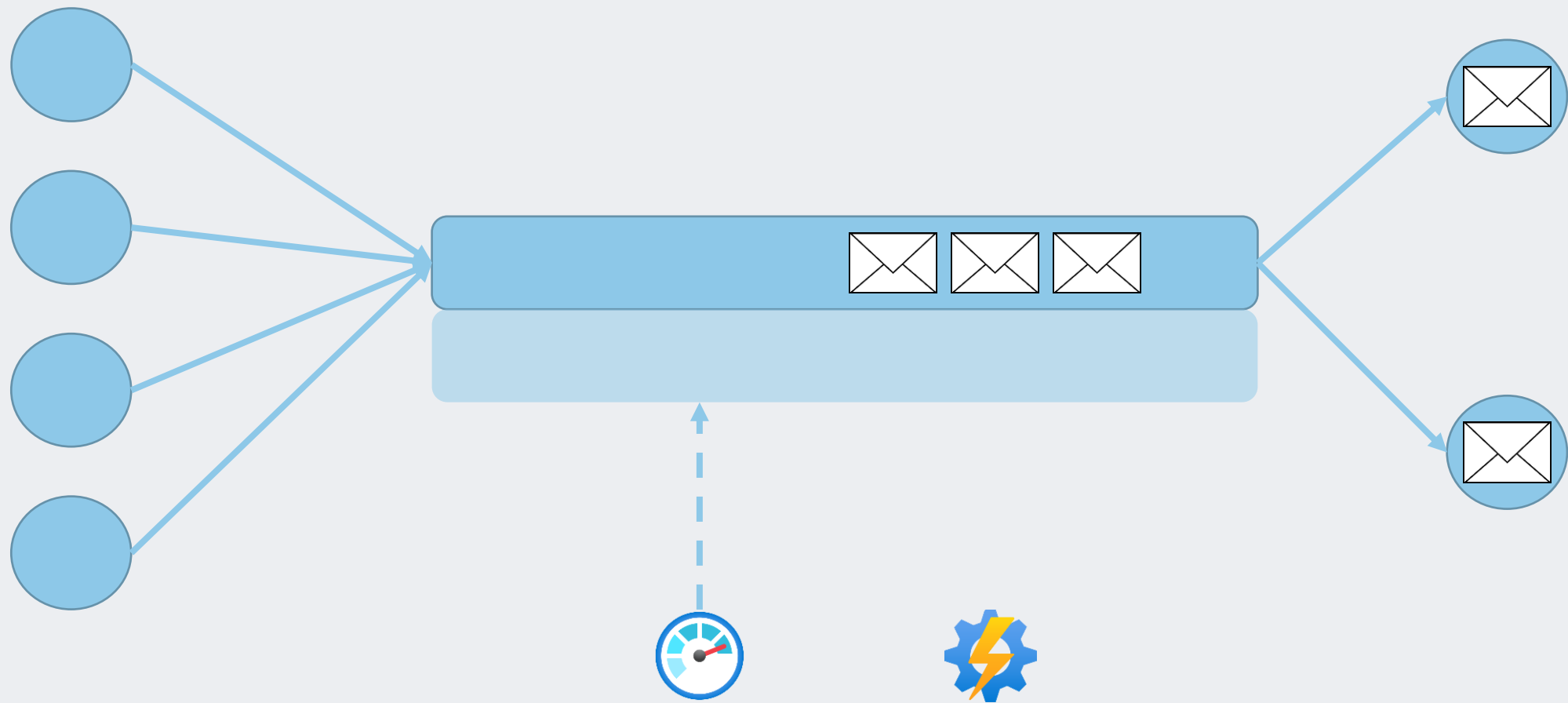
# Circuit Breaker



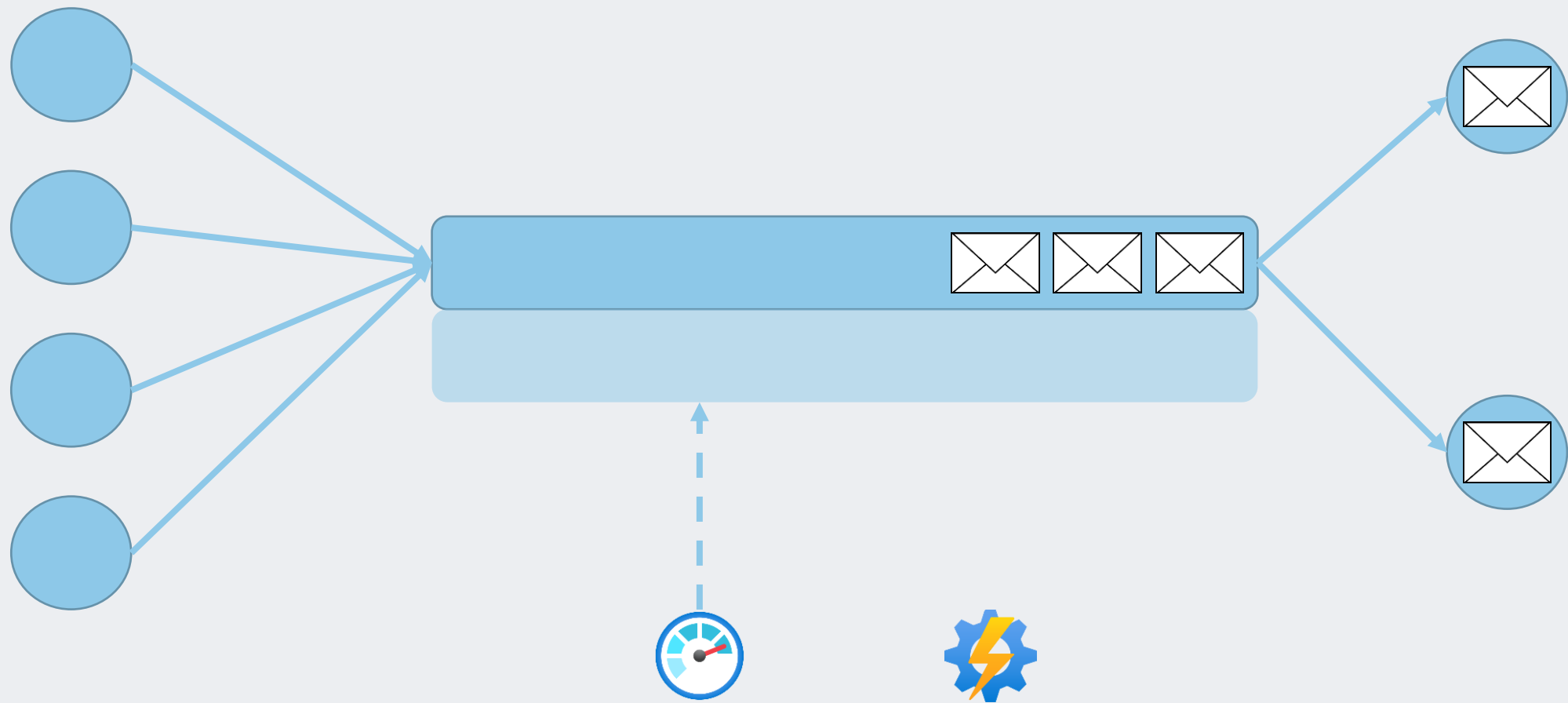
# Circuit Breaker



# Circuit Breaker

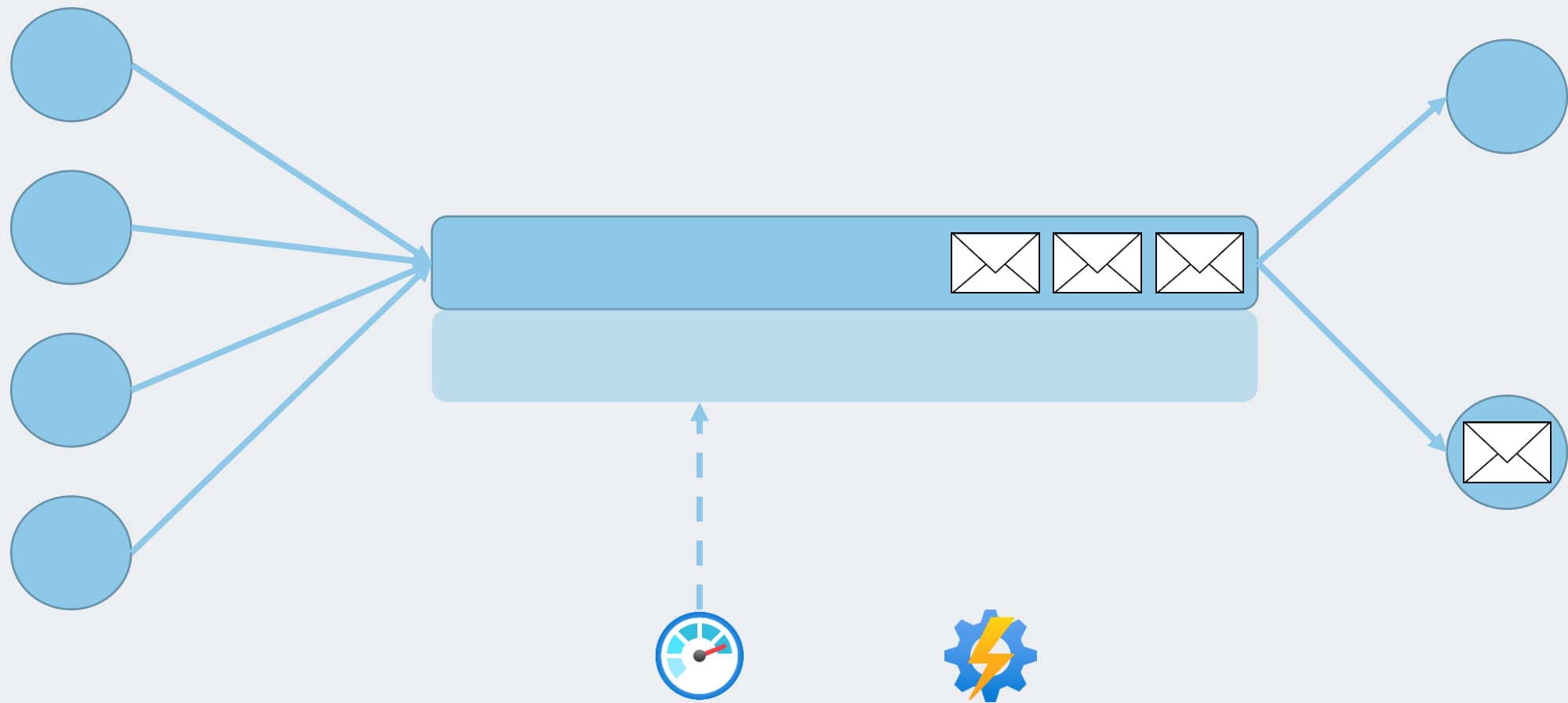


# Circuit Breaker

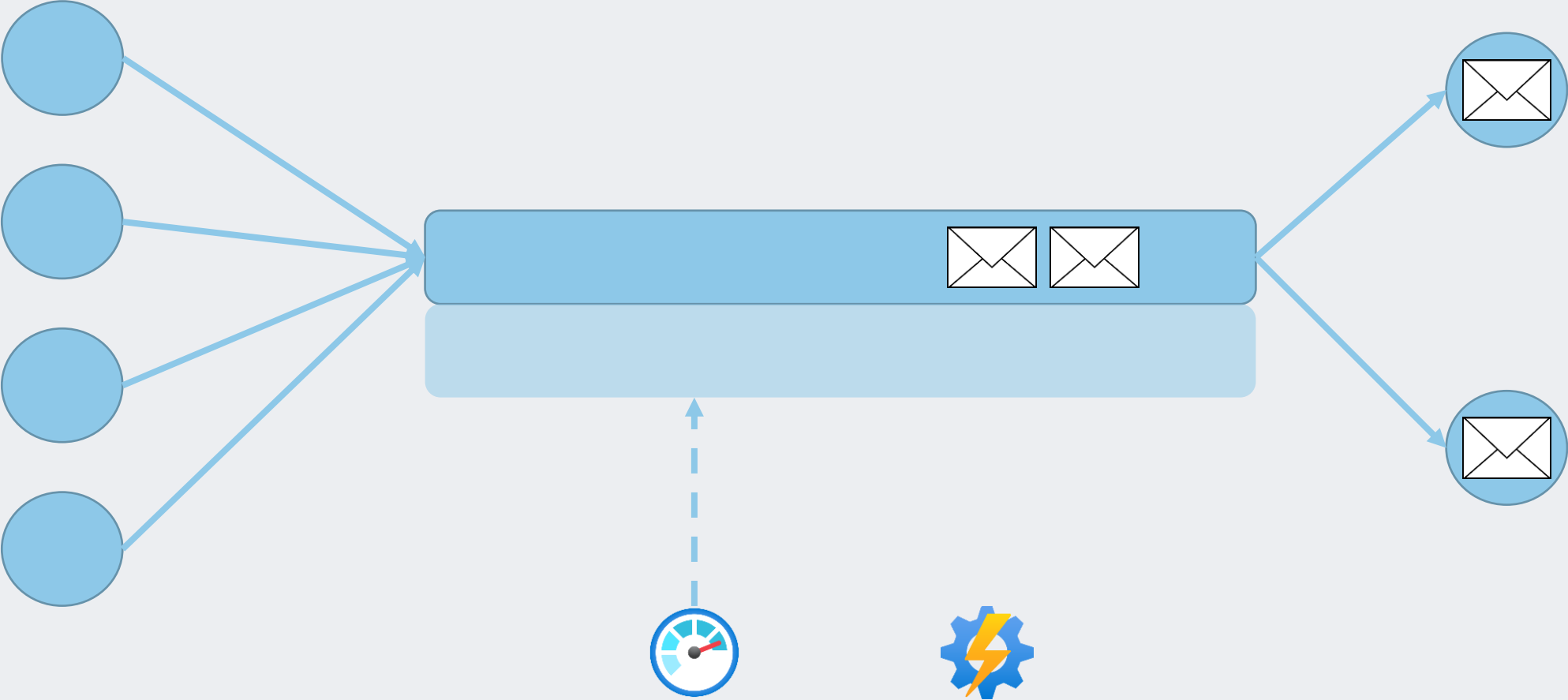




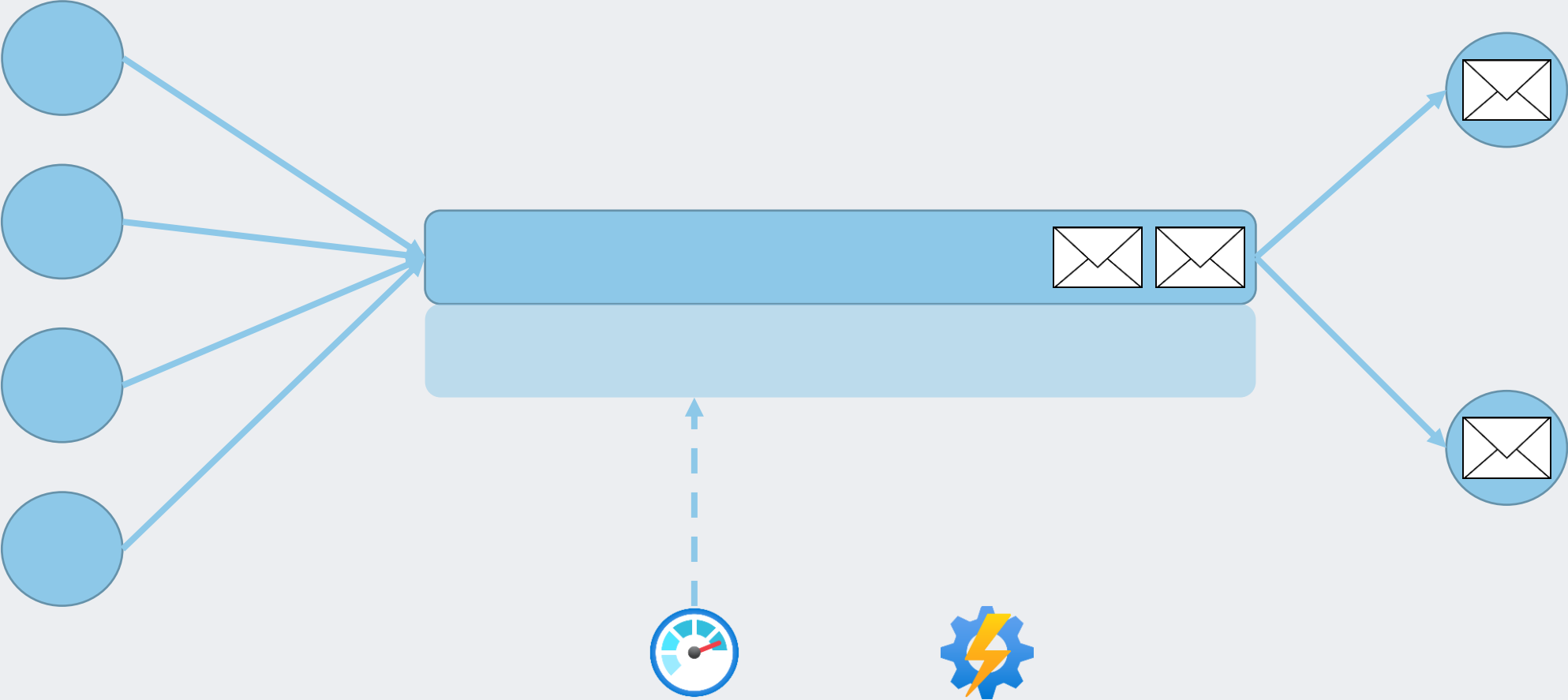
# Circuit Breaker



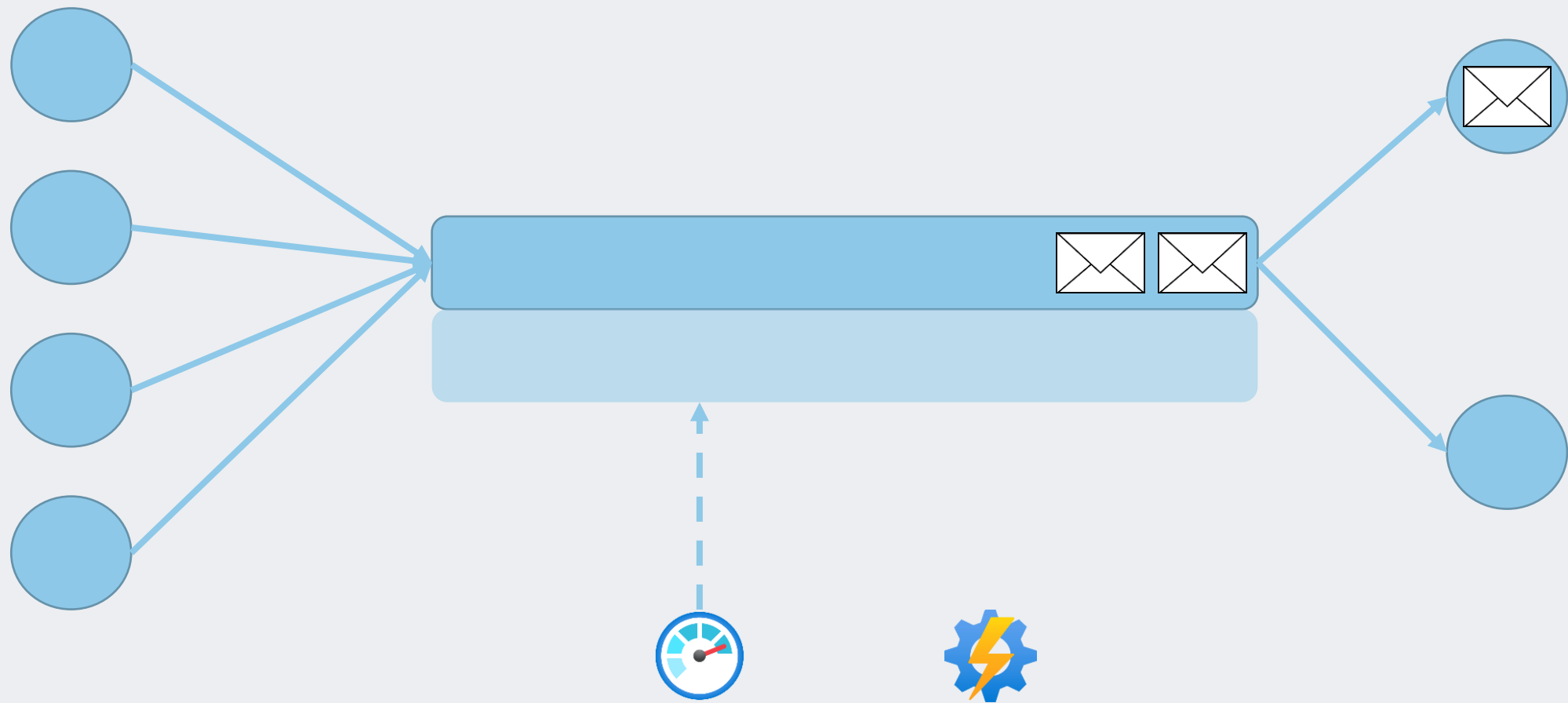
# Circuit Breaker



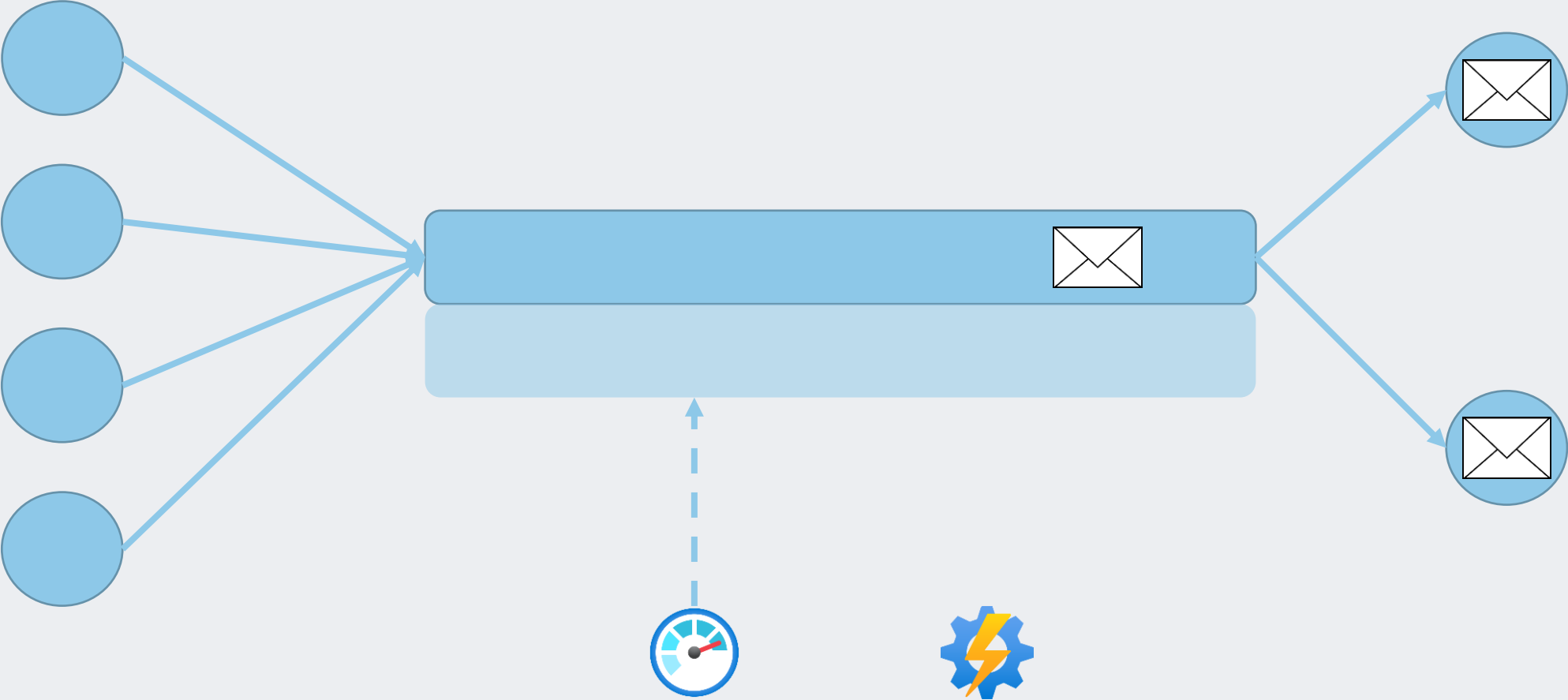
# Circuit Breaker



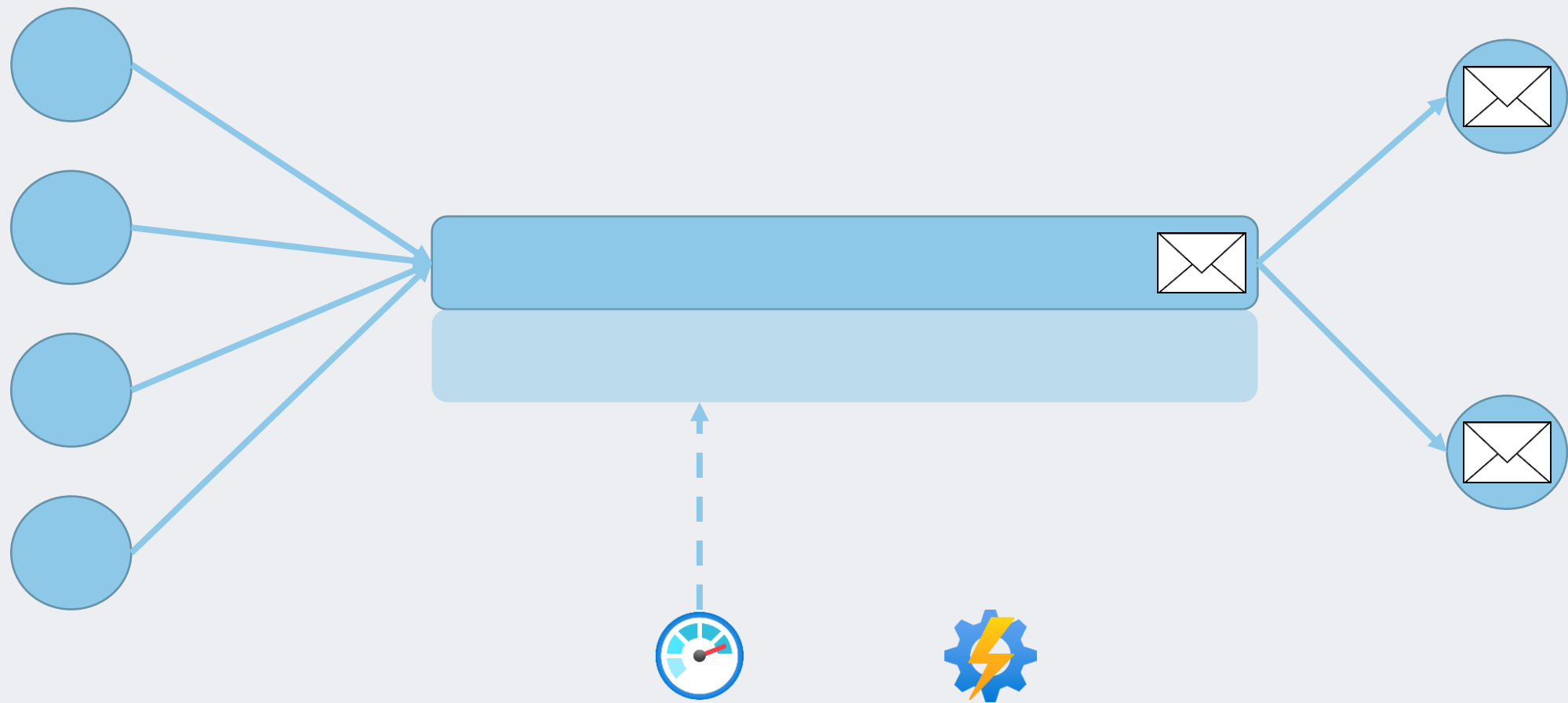
# Circuit Breaker



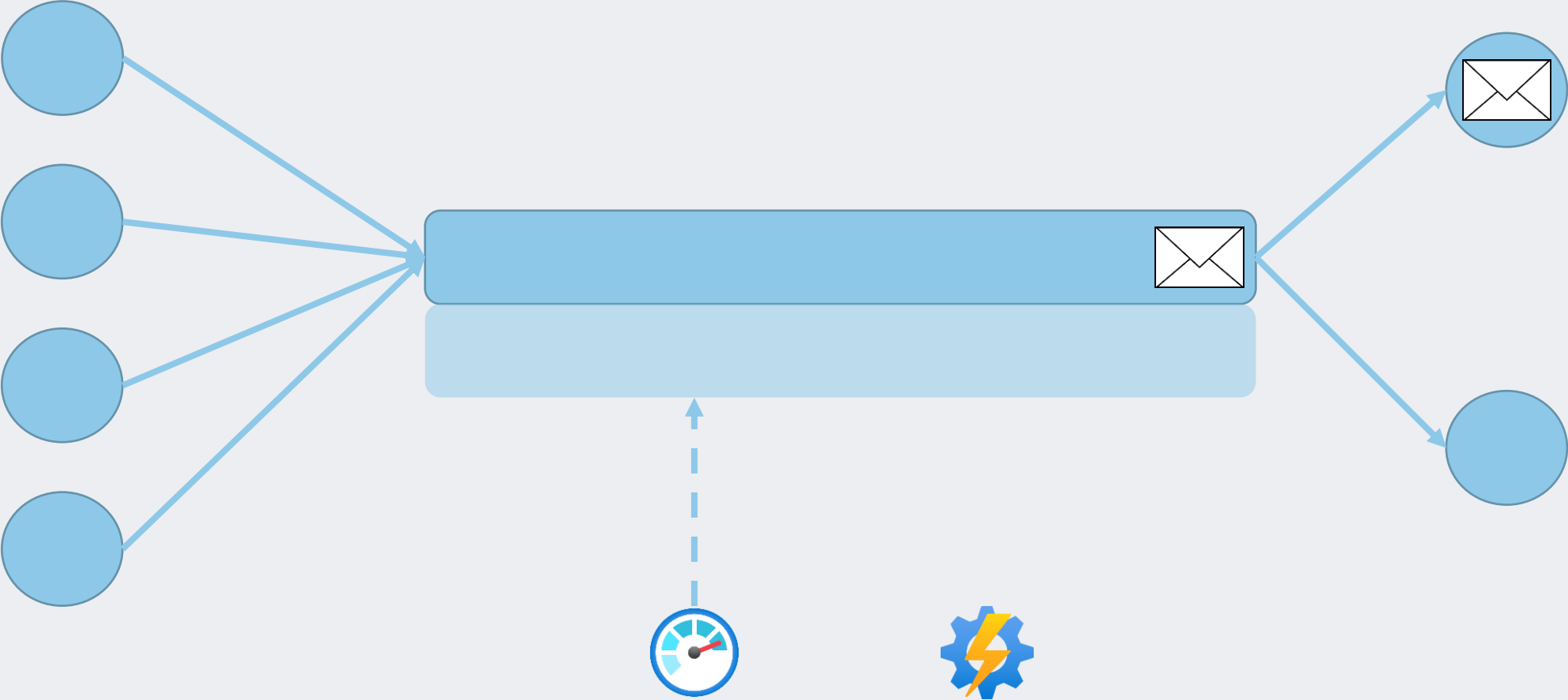
# Circuit Breaker



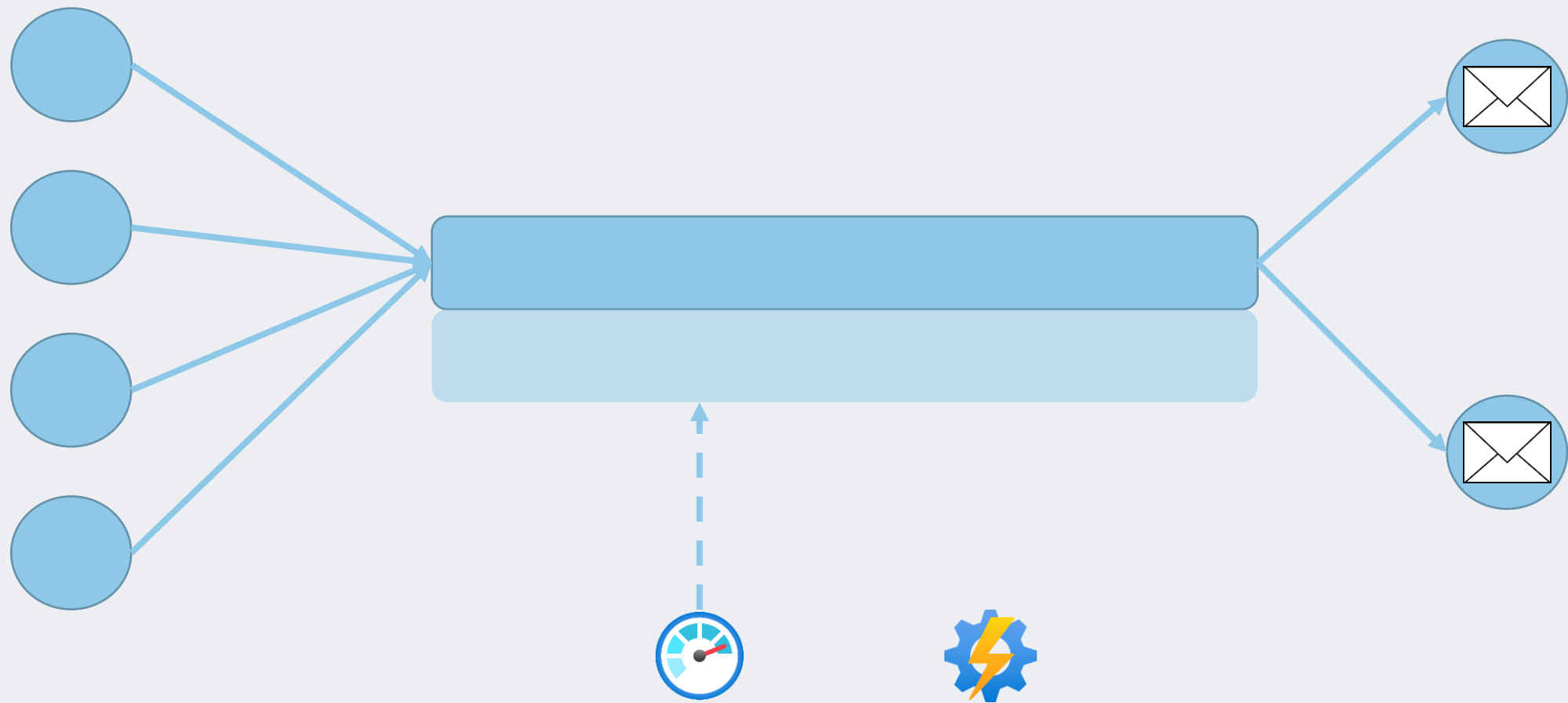
# Circuit Breaker



# Circuit Breaker

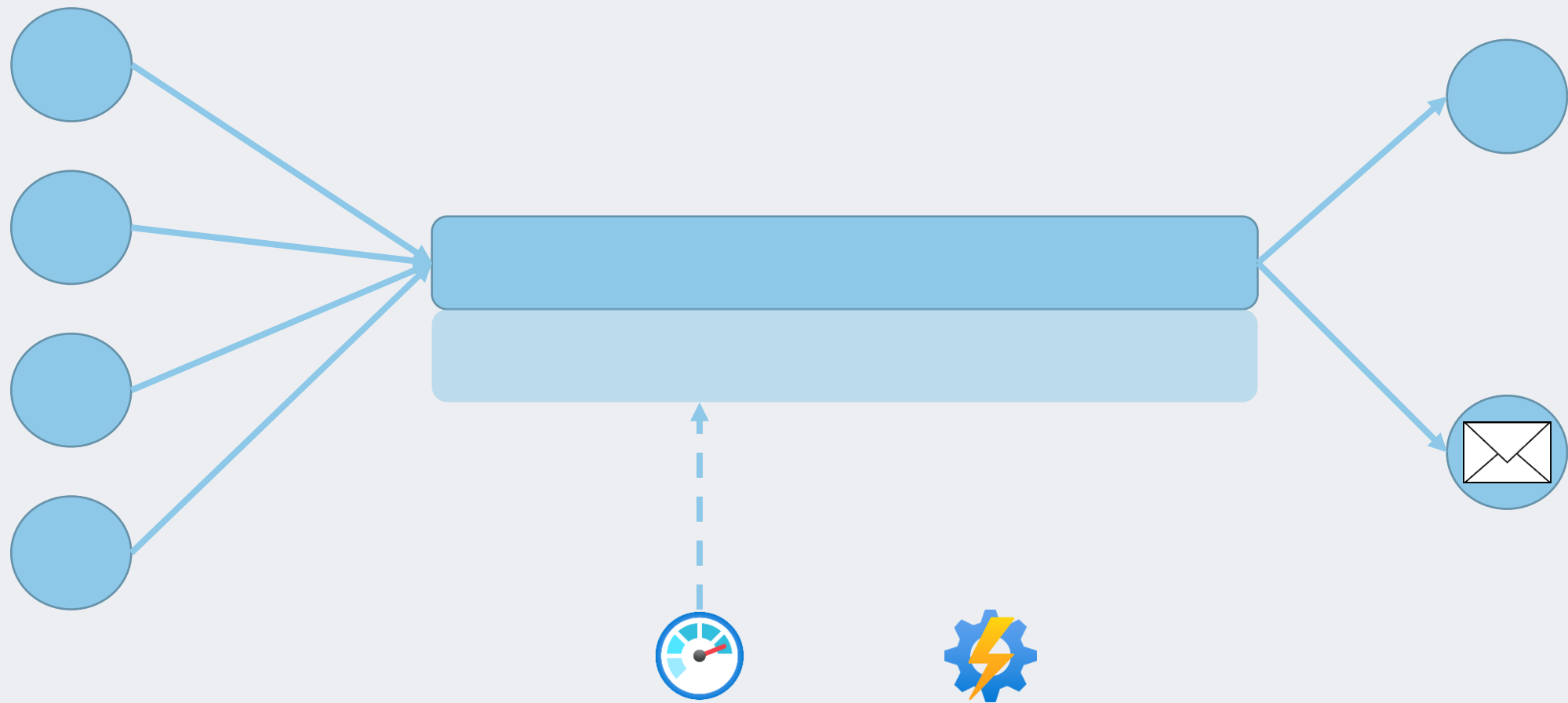


# Circuit Breaker

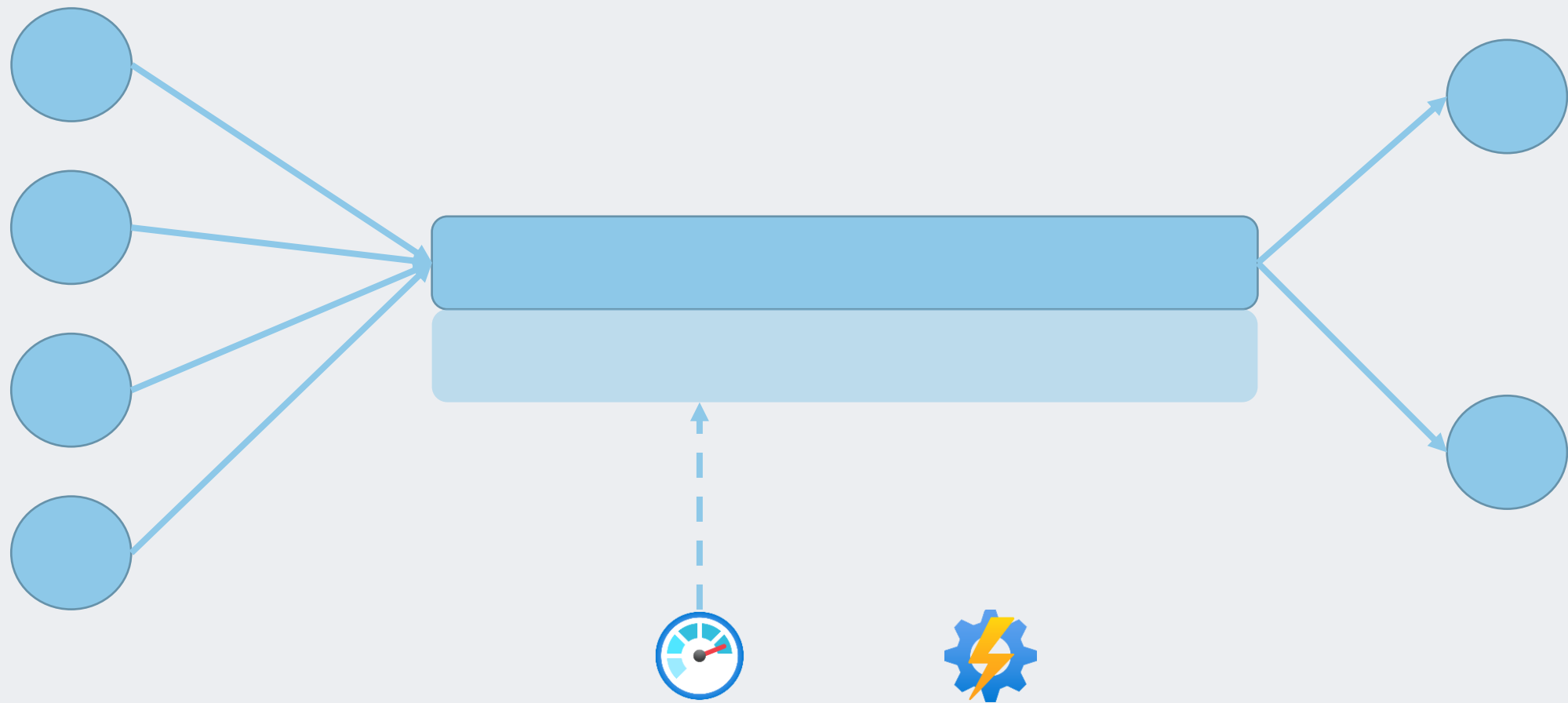




# Circuit Breaker



# Circuit Breaker

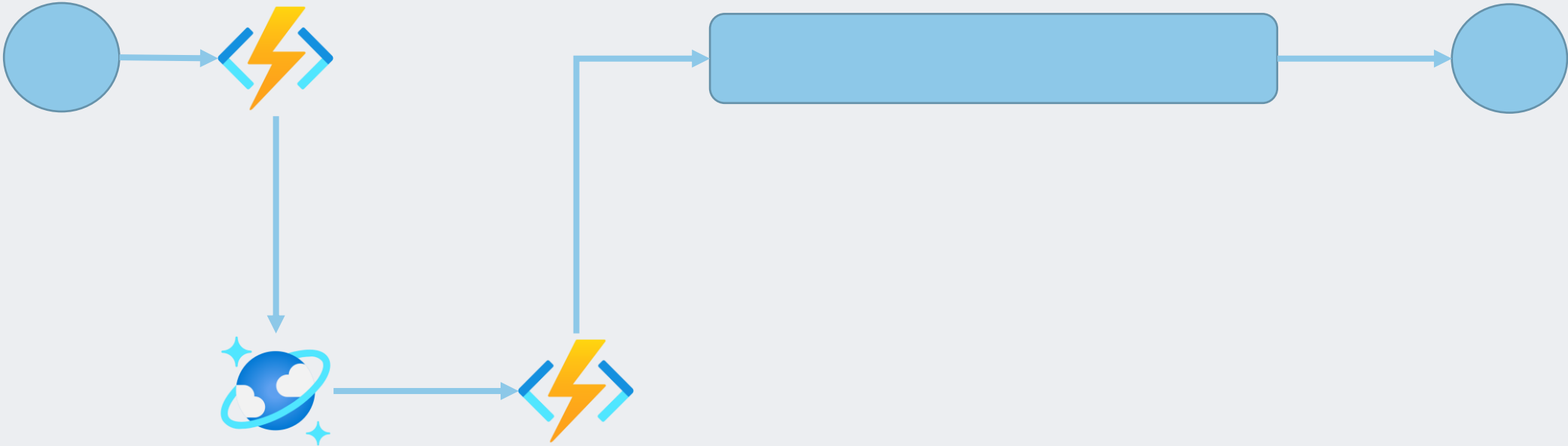




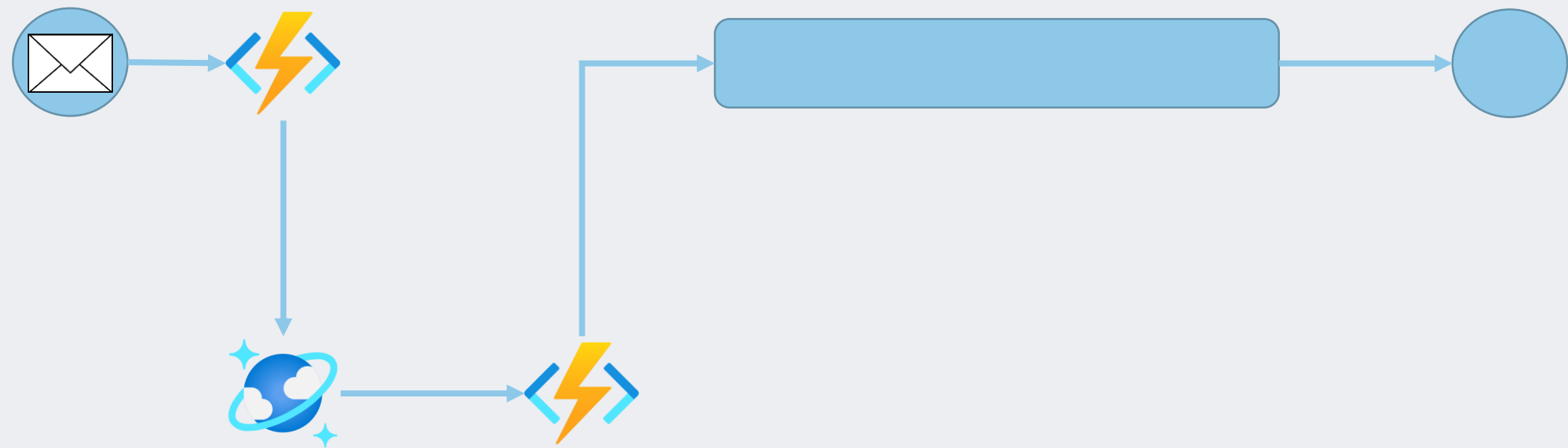
# Transactional Outbox

<https://docs.microsoft.com/en-us/azure/architecture/best-practices/transactional-outbox-cosmos>

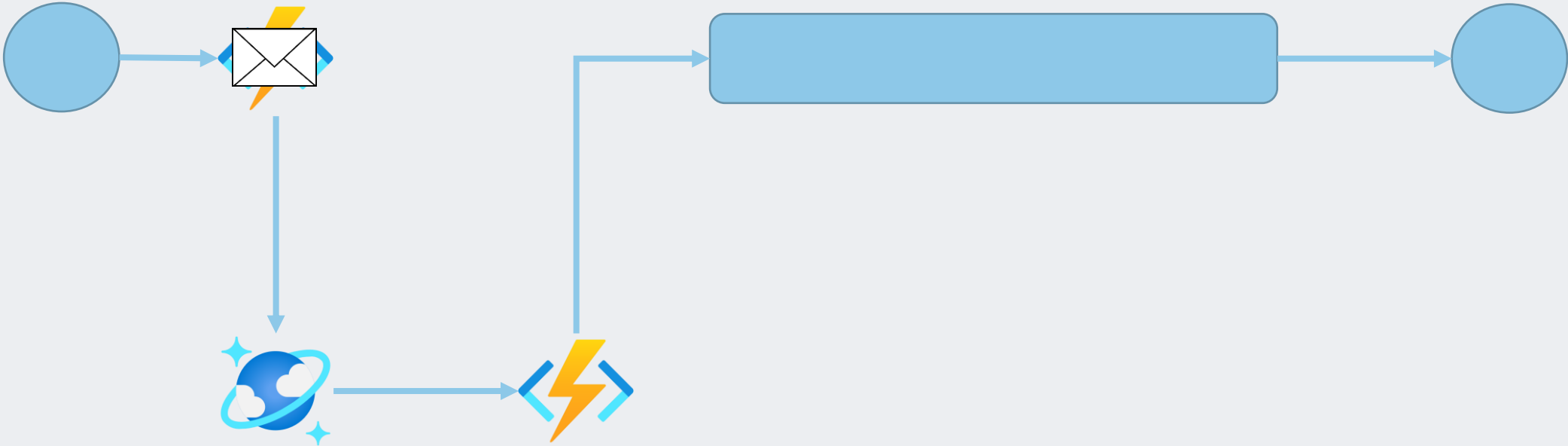
# Transactional Outbox



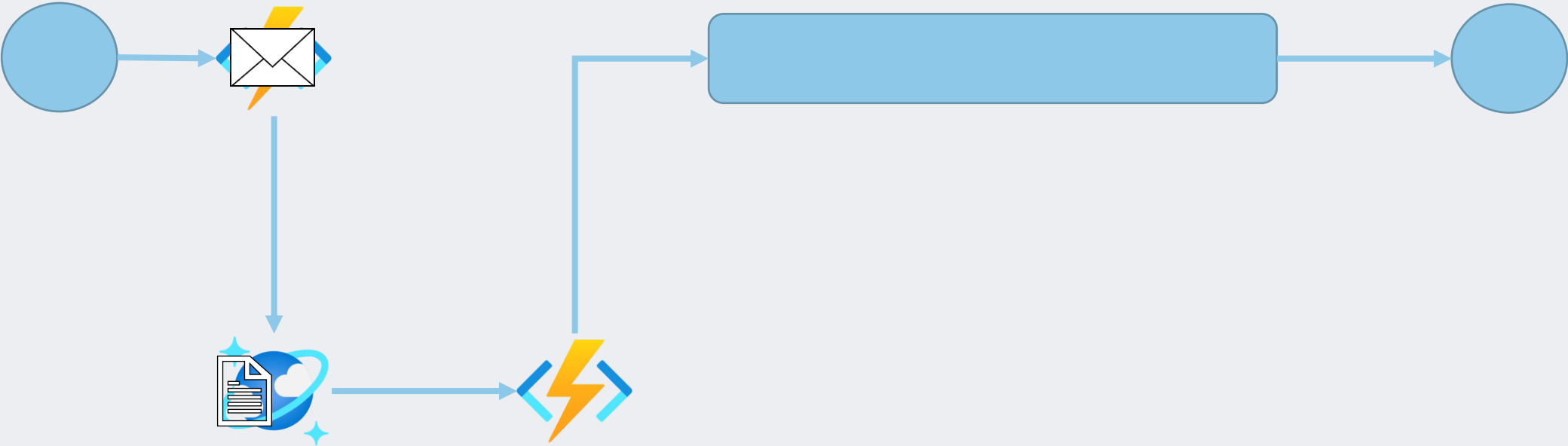
# Transactional Outbox



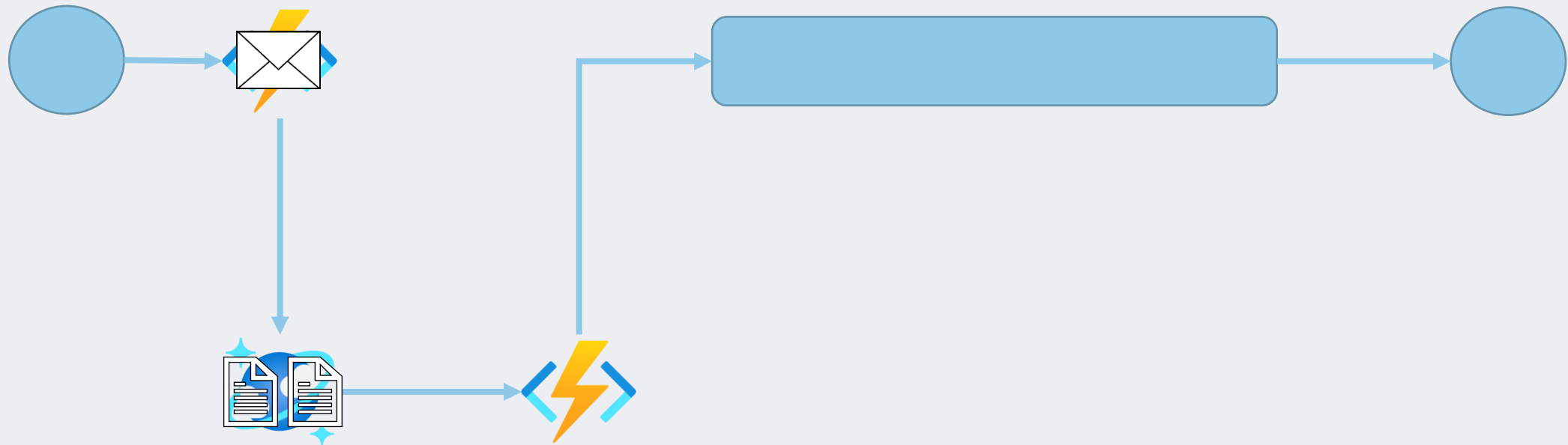
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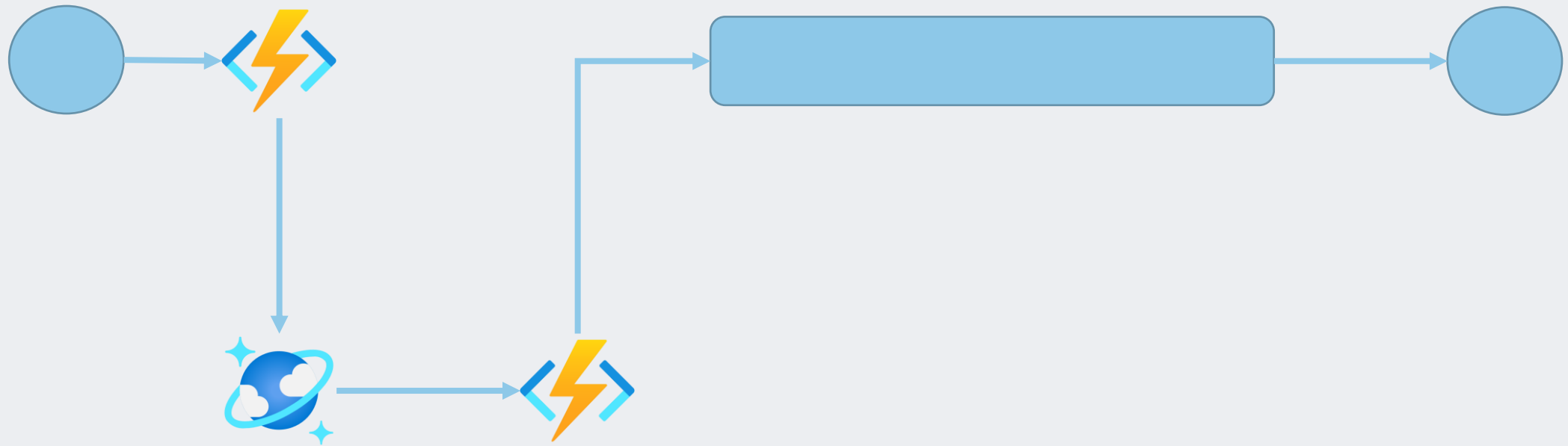


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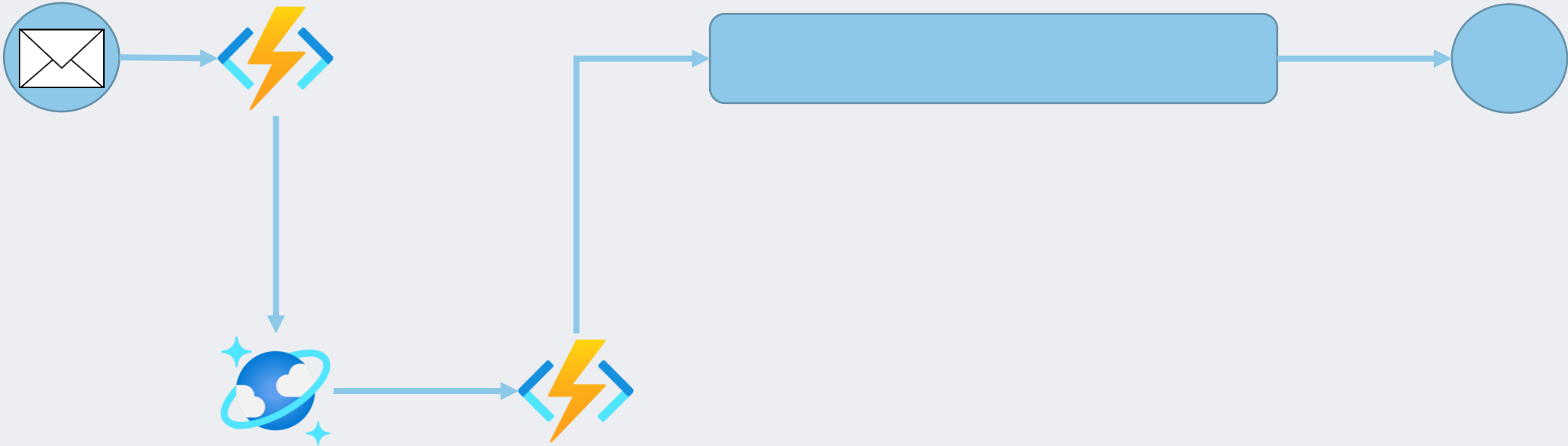




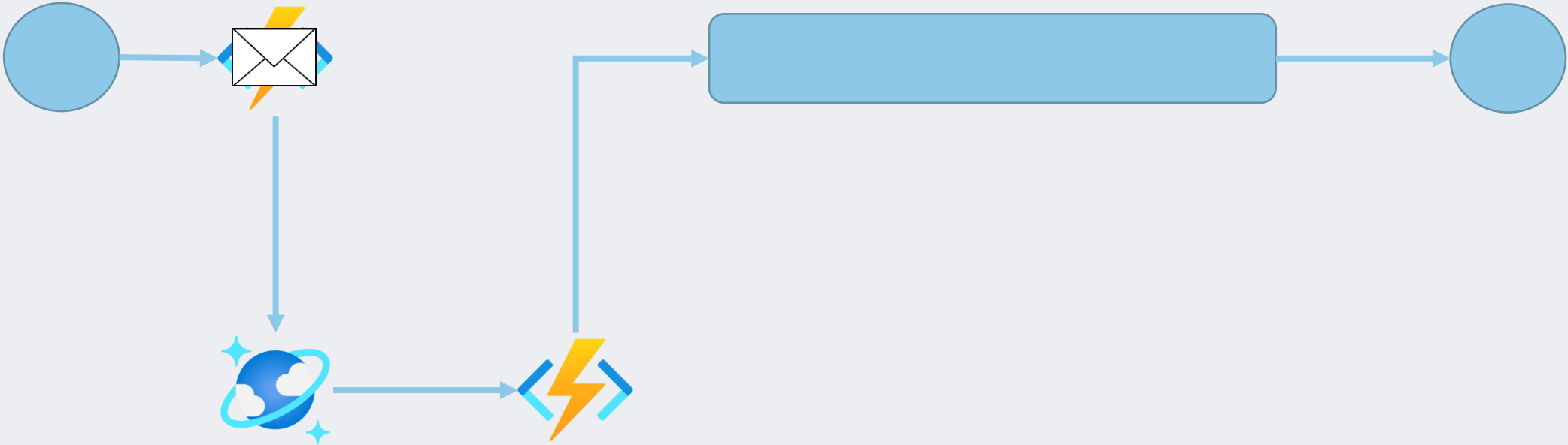
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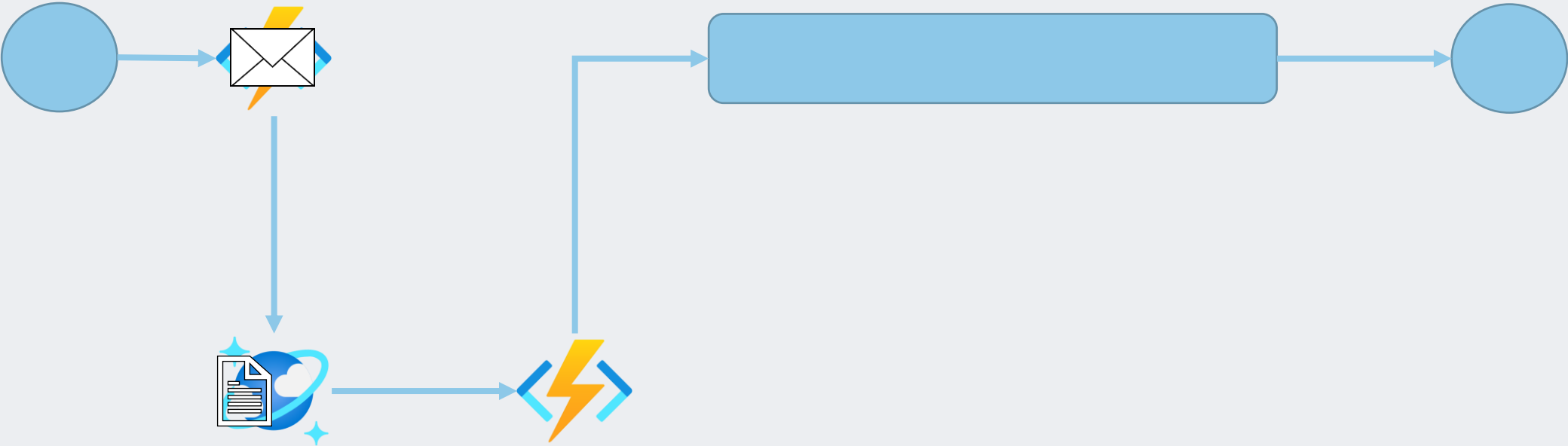
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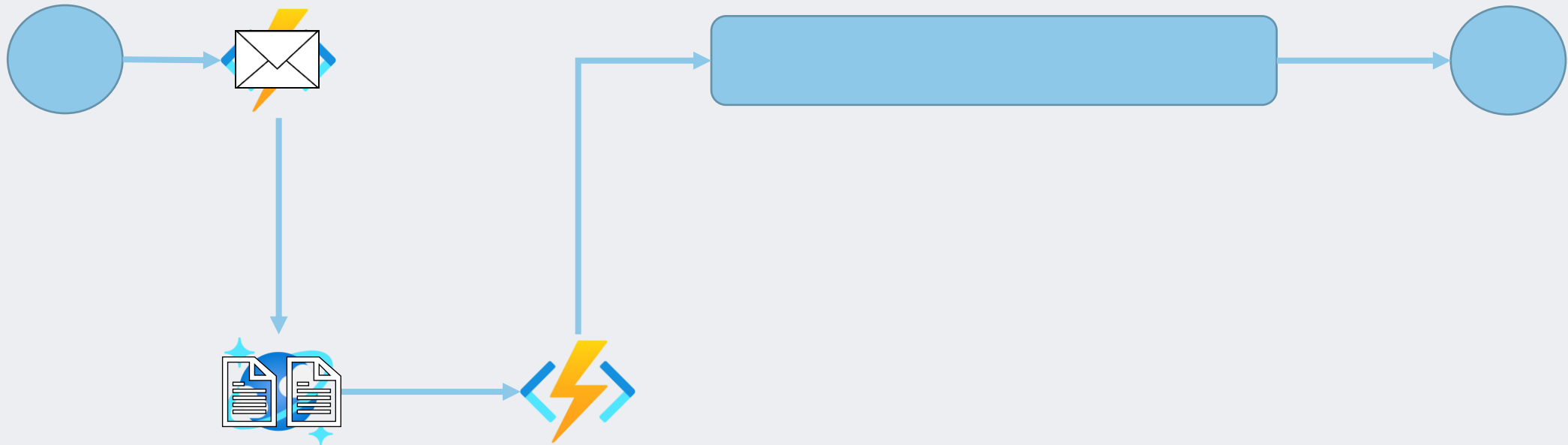
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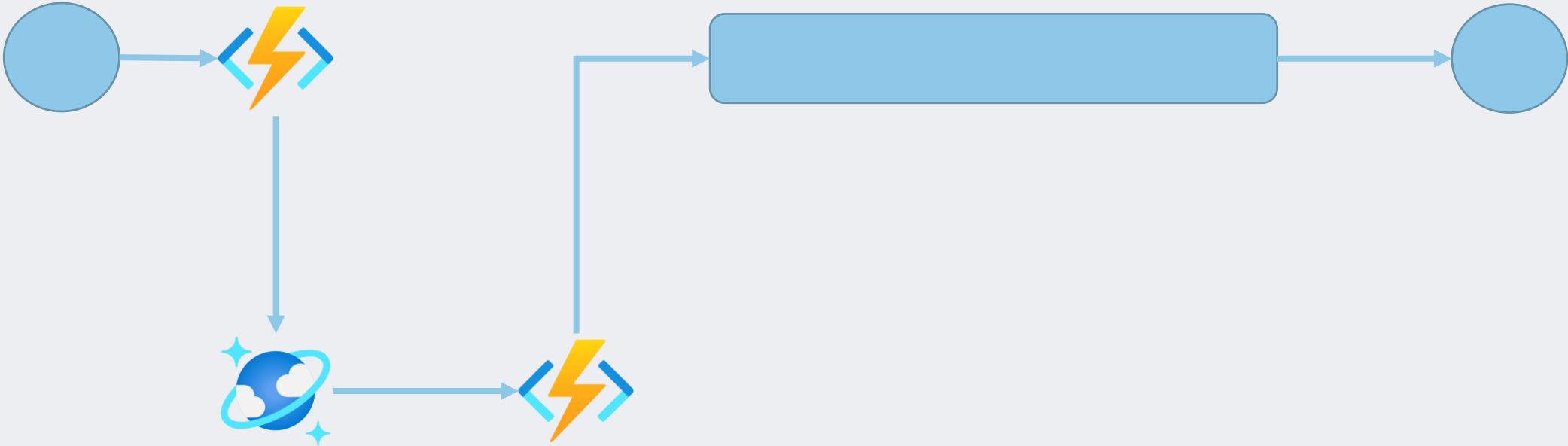
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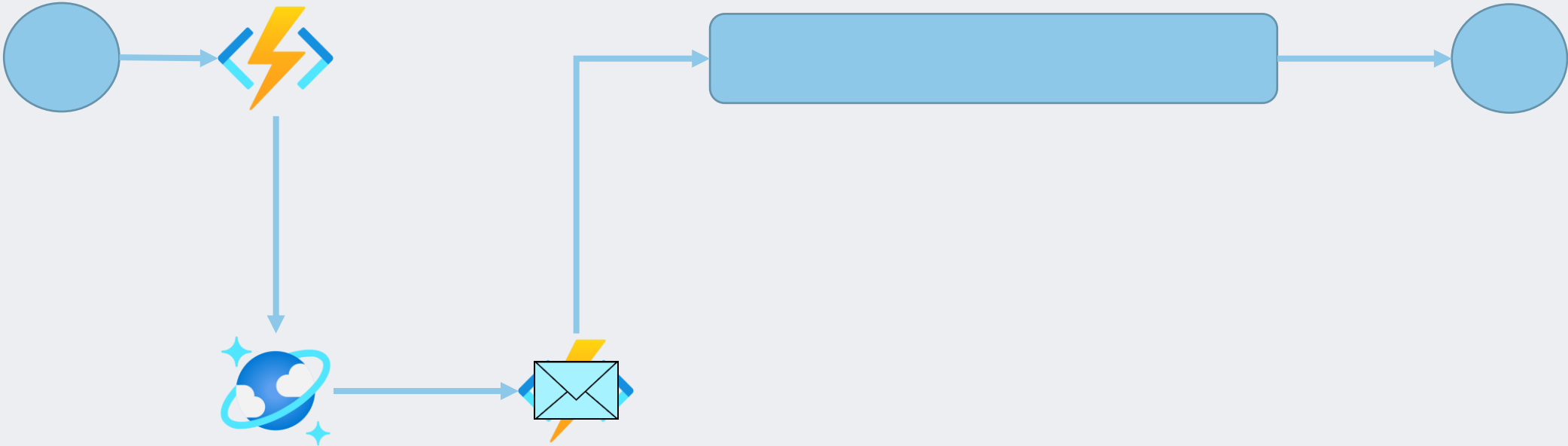
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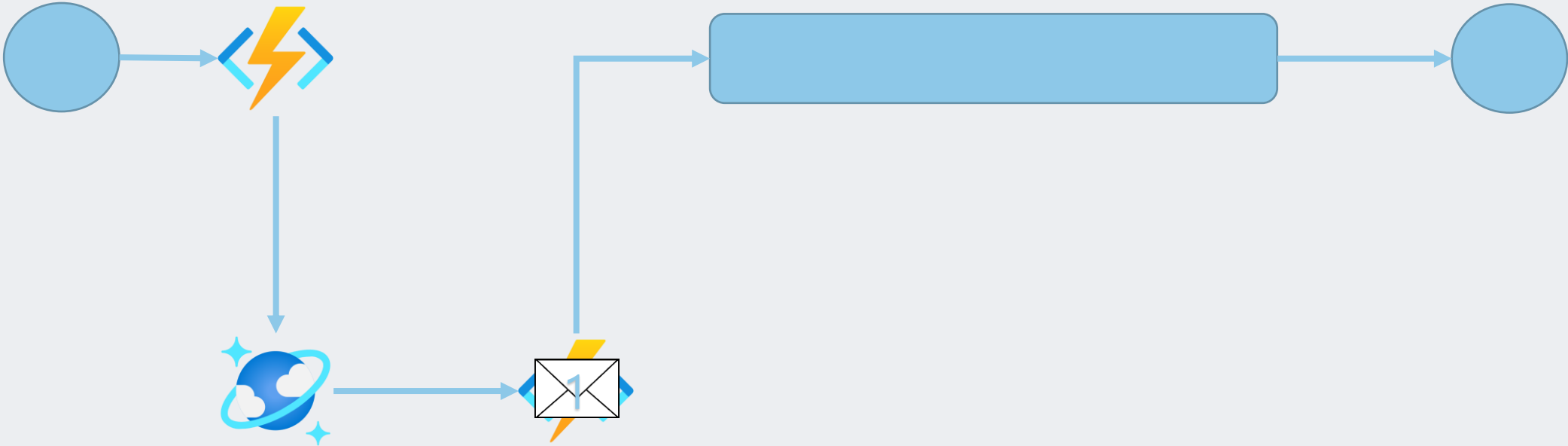
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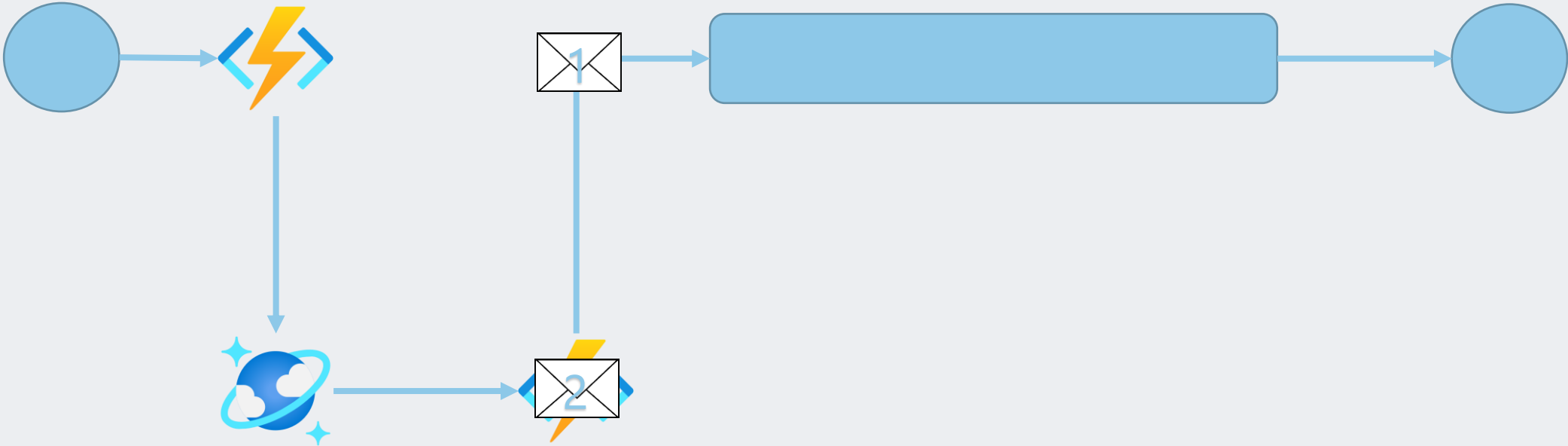


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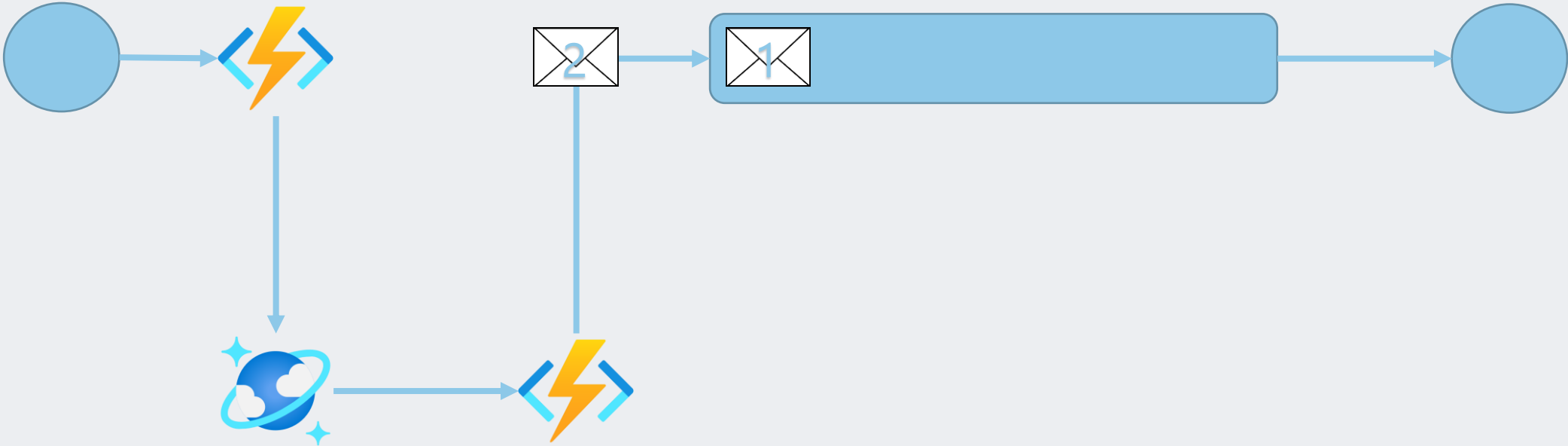




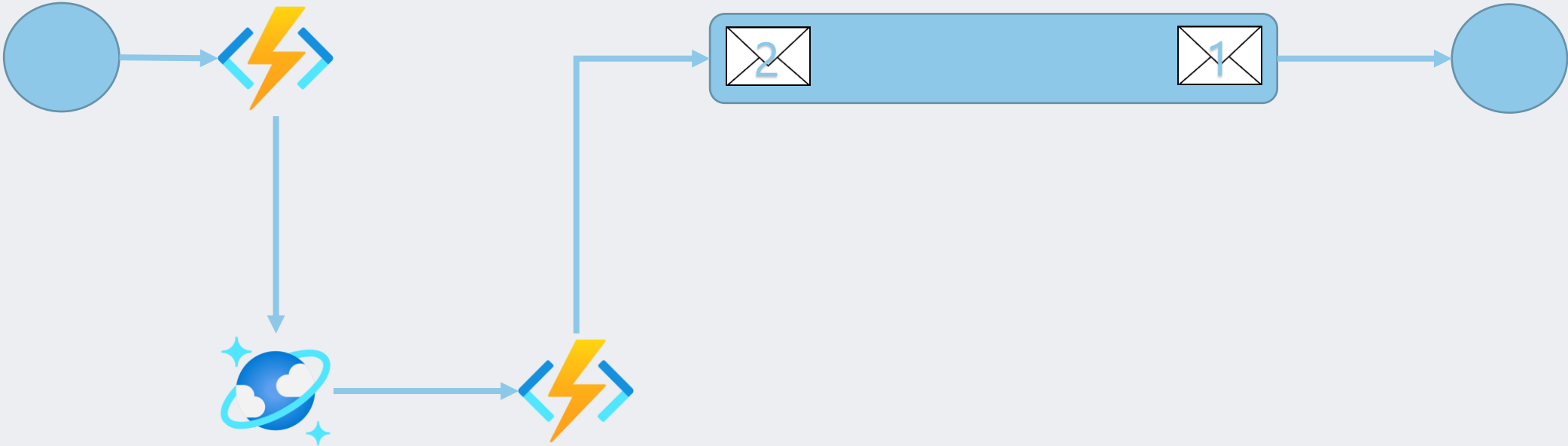
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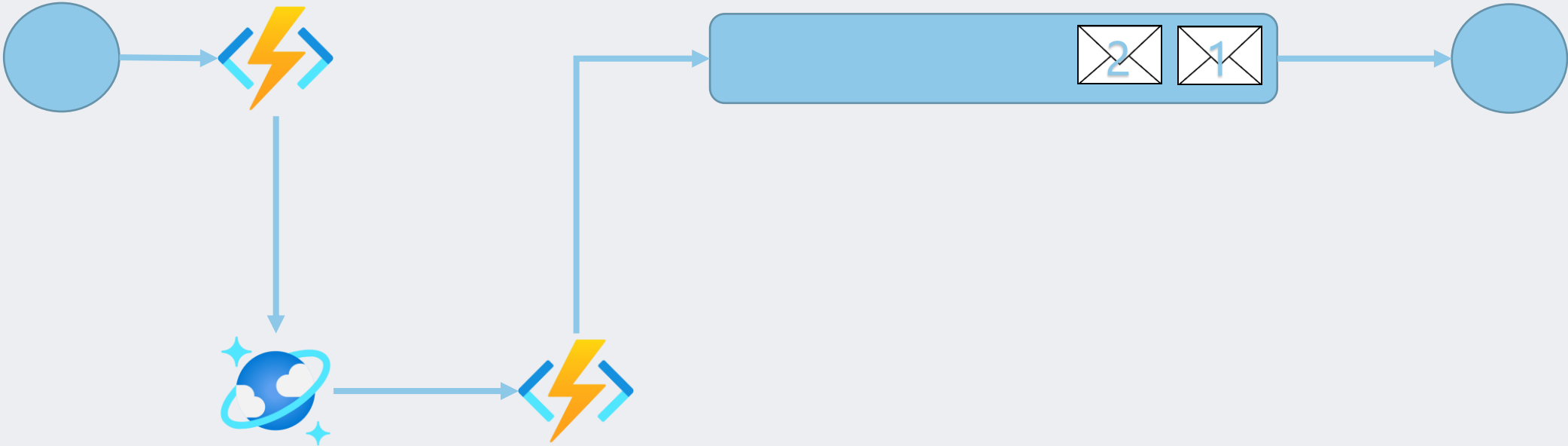
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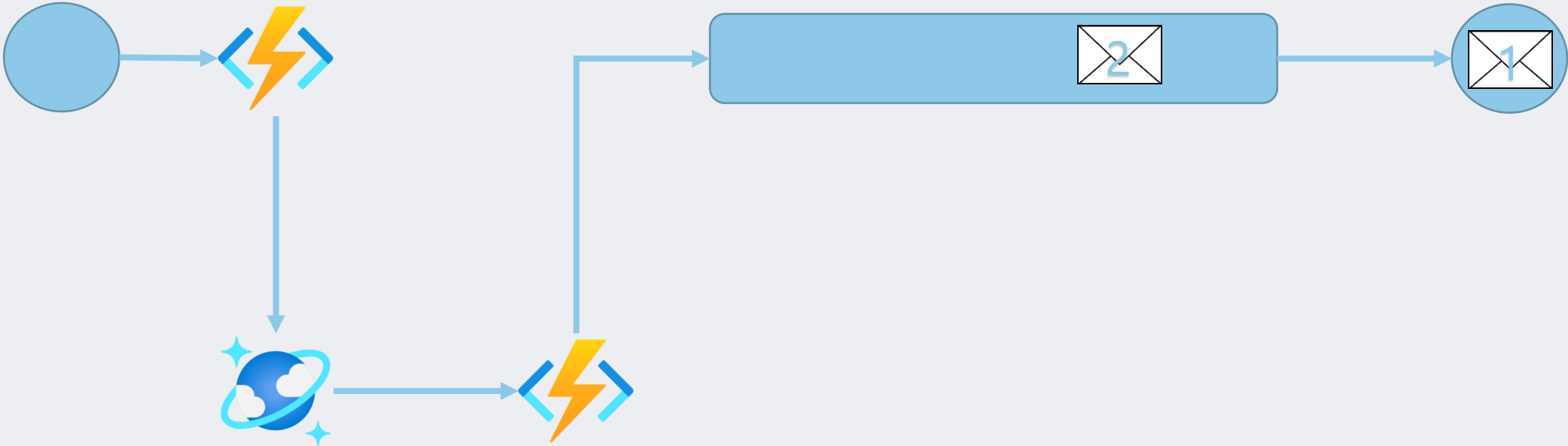
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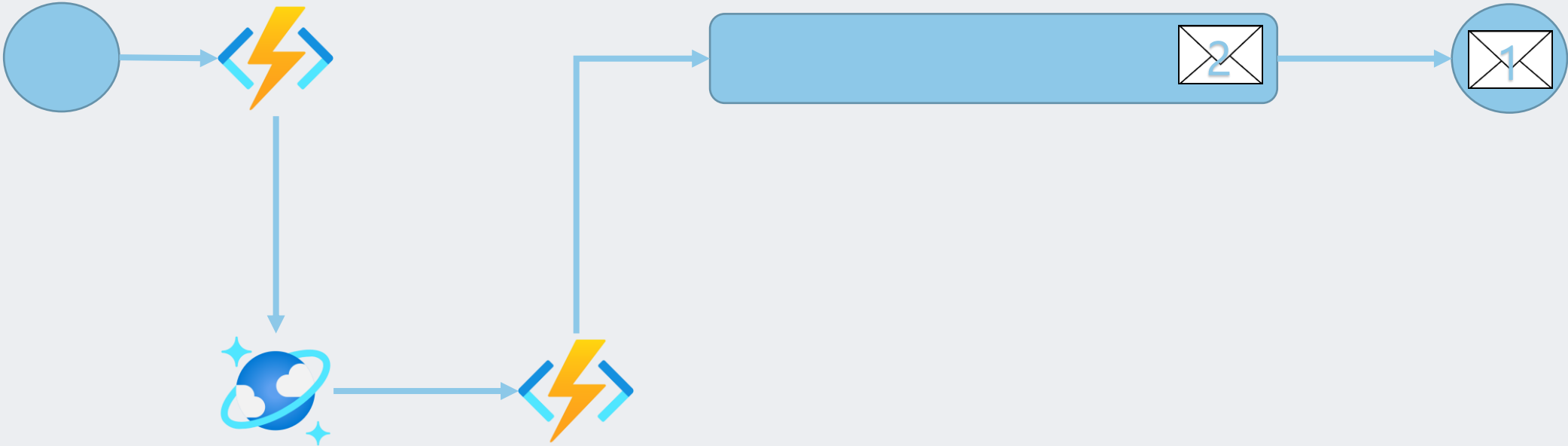
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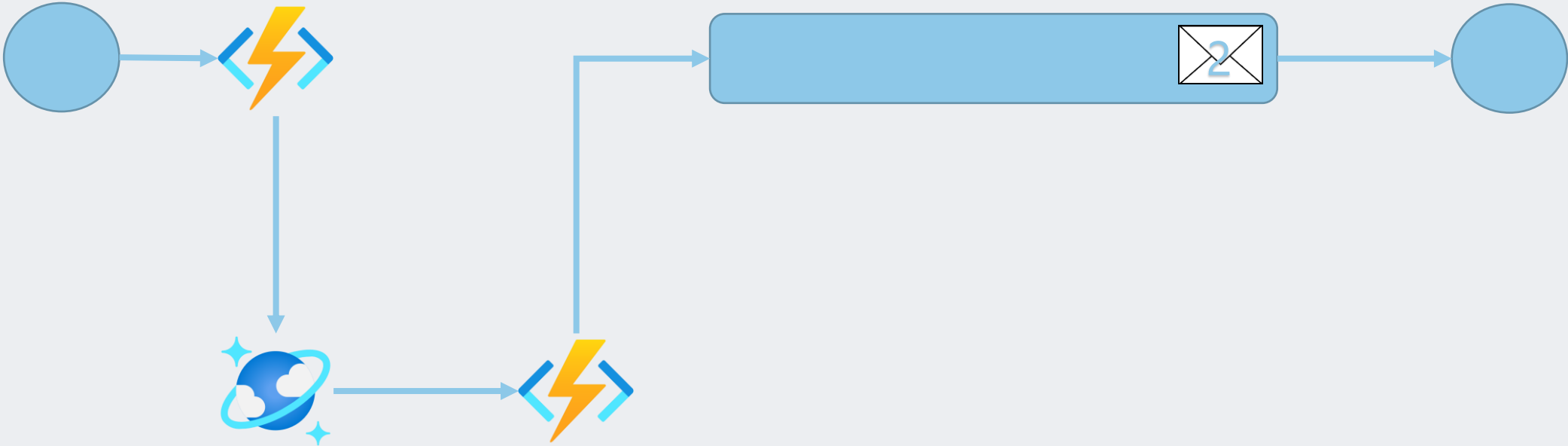
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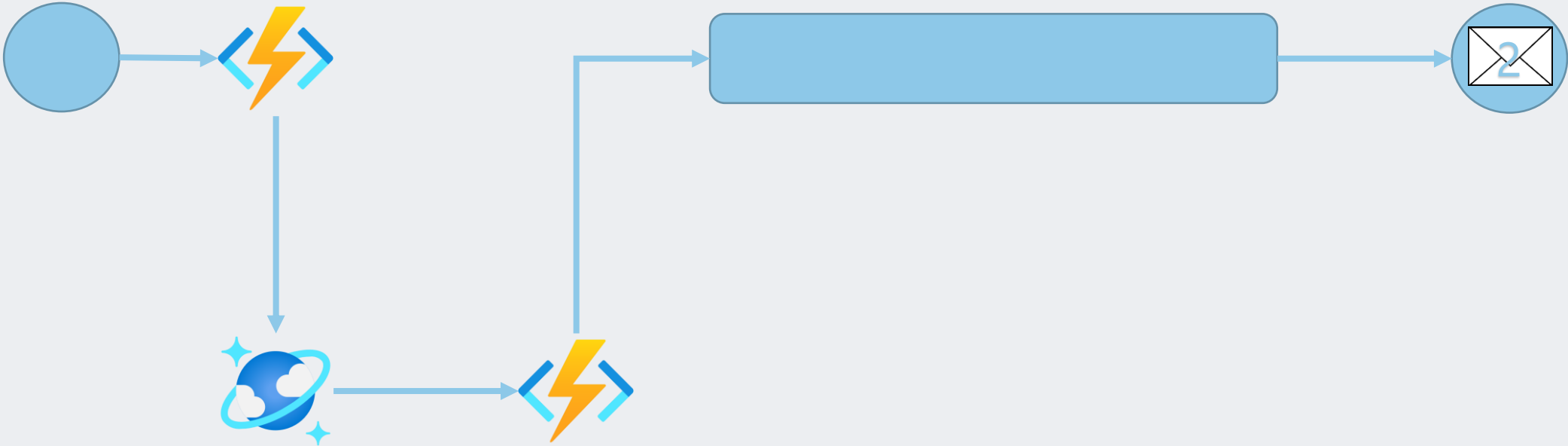
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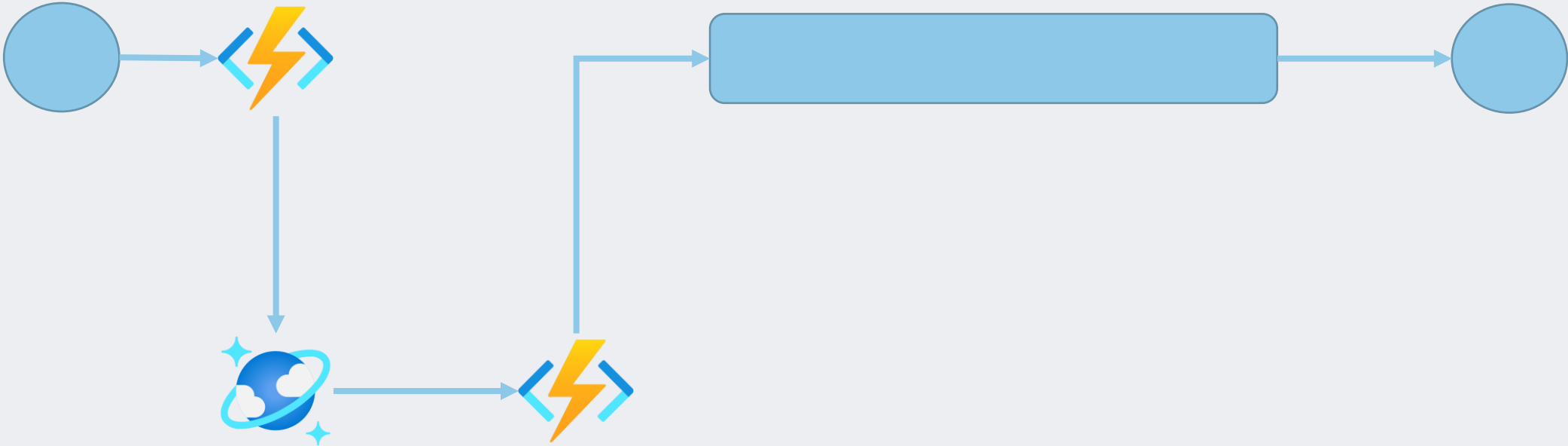


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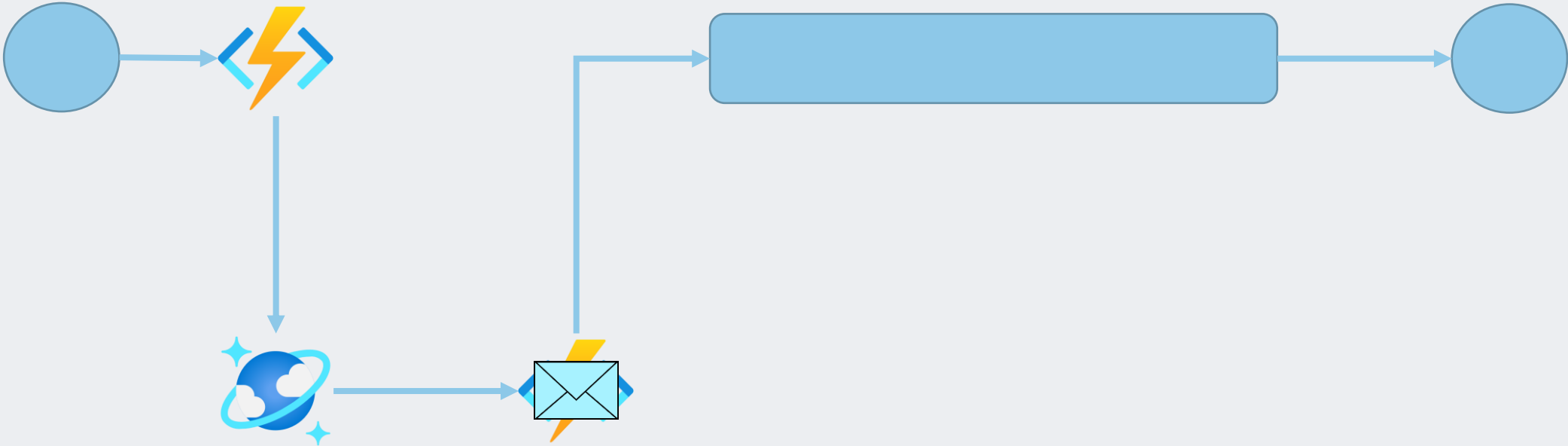




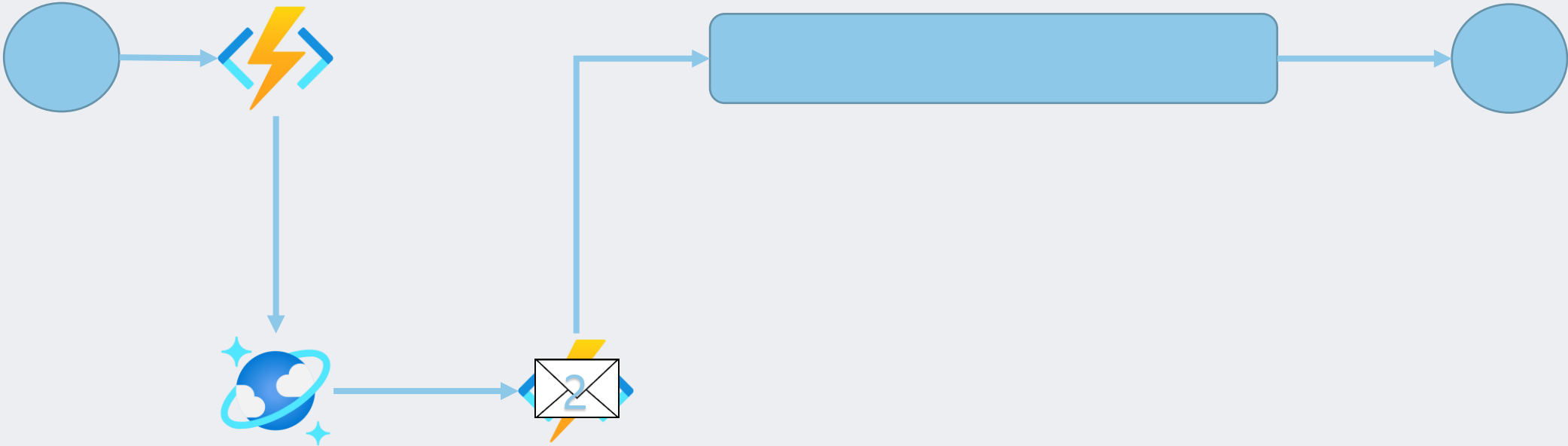
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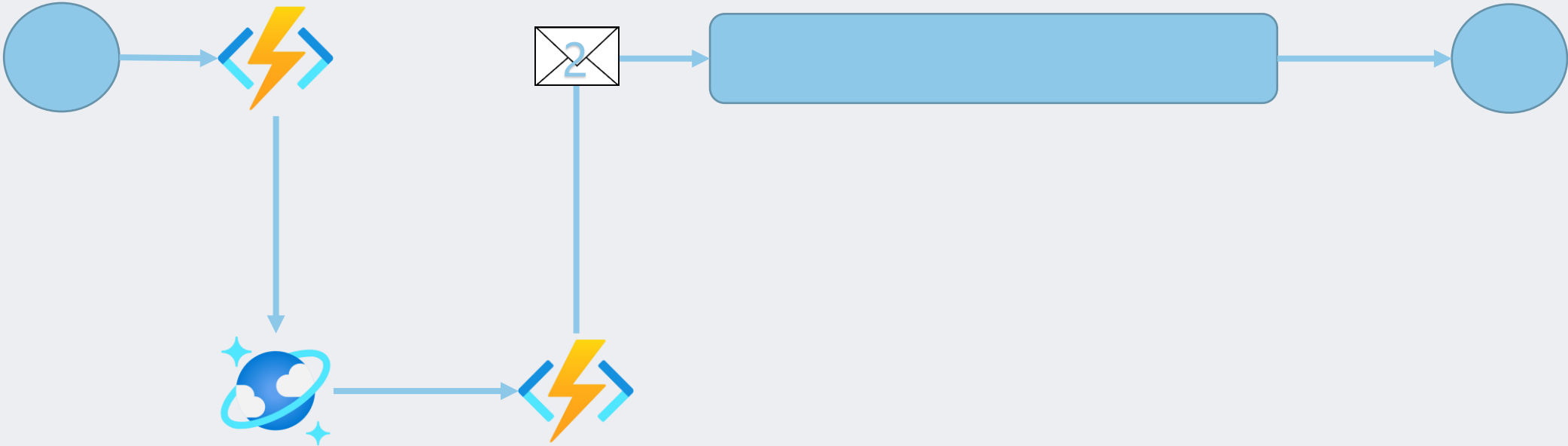
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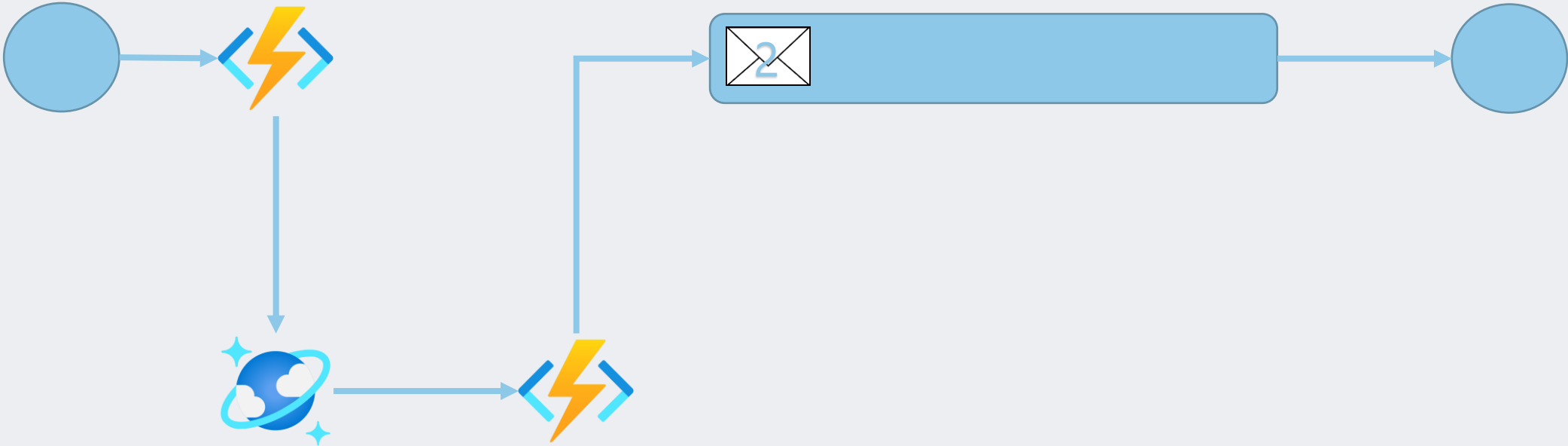
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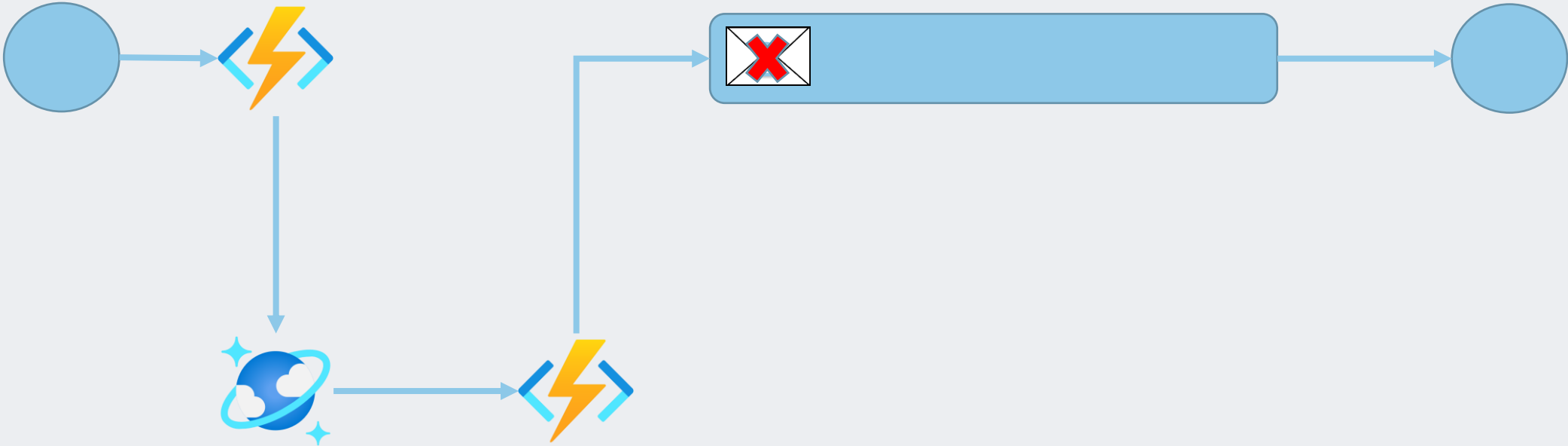
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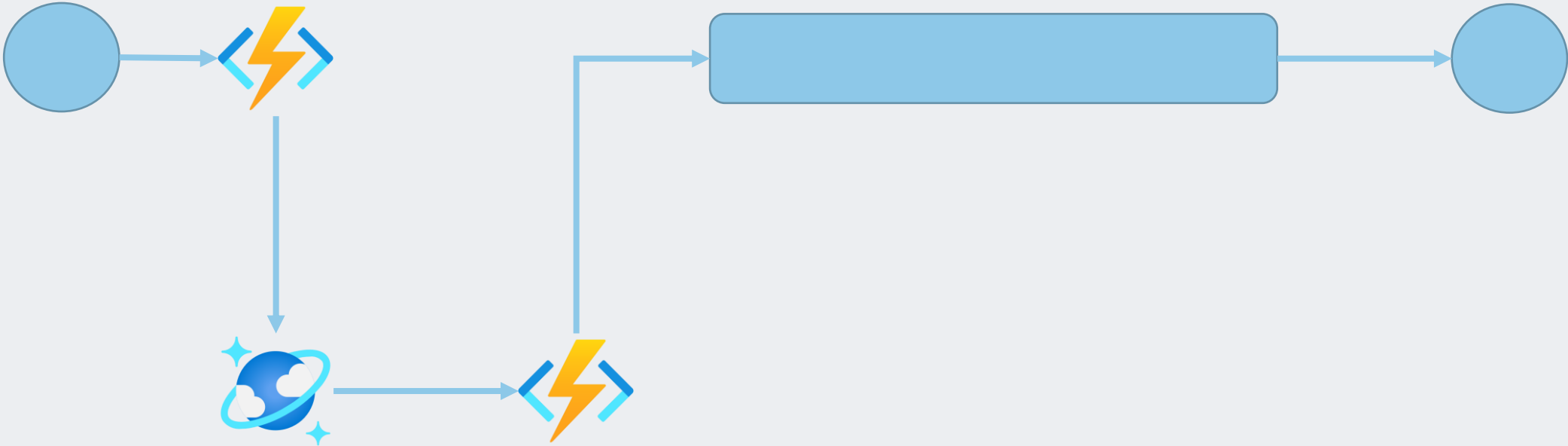
# Transactional Outbox



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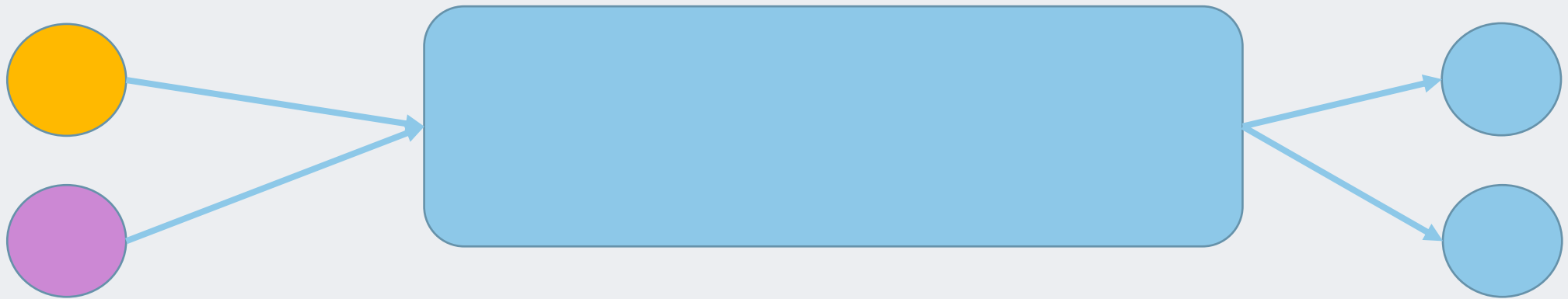
A serene sunset scene over a body of water. The sky is filled with soft, colorful clouds in shades of orange, yellow, and blue. The sun is low on the horizon, casting a warm glow. In the foreground, a wooden pier or walkway extends into the water, with several vertical posts visible. The water reflects the colors of the sky. In the distance, a range of mountains is visible under the twilight sky.

# Saga

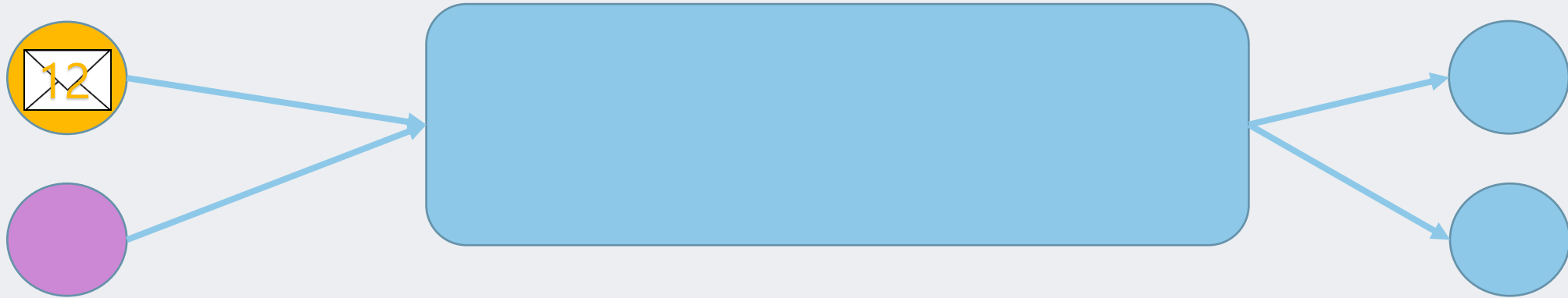
<https://weblogs.asp.net/sfeldman/sagas-with-azure-service-bus>



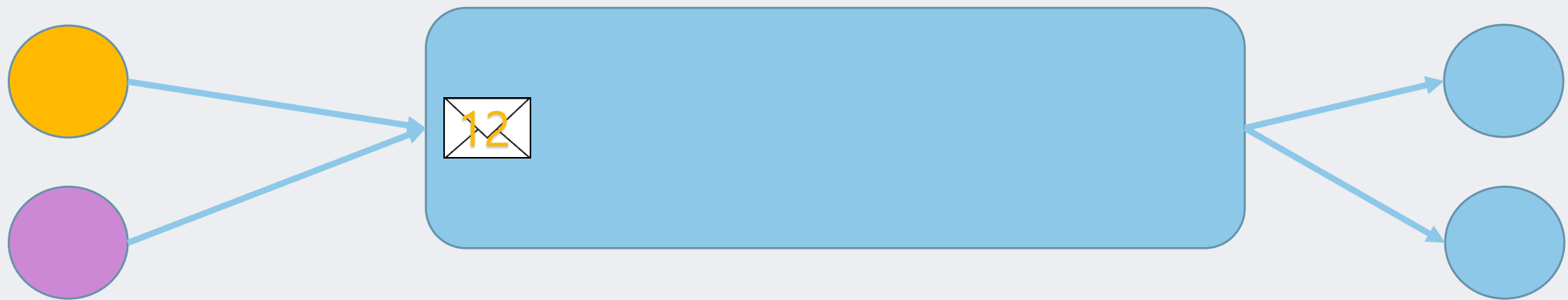
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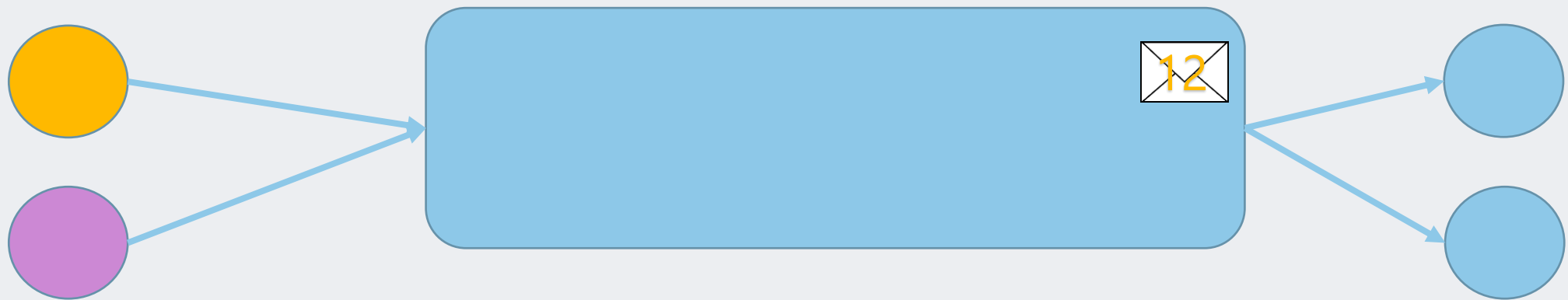
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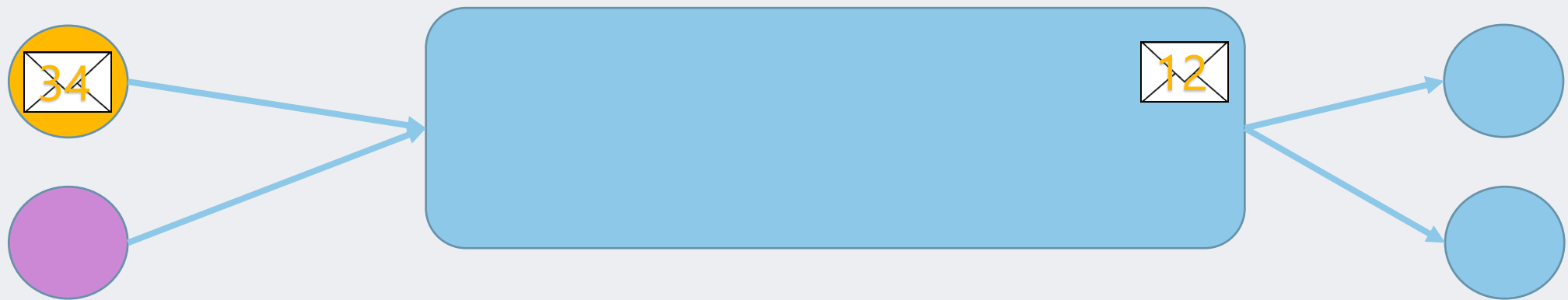
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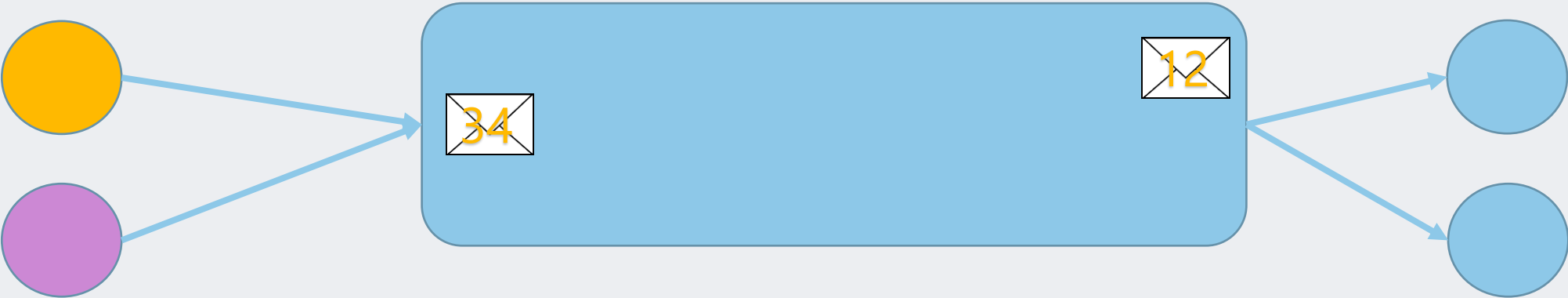
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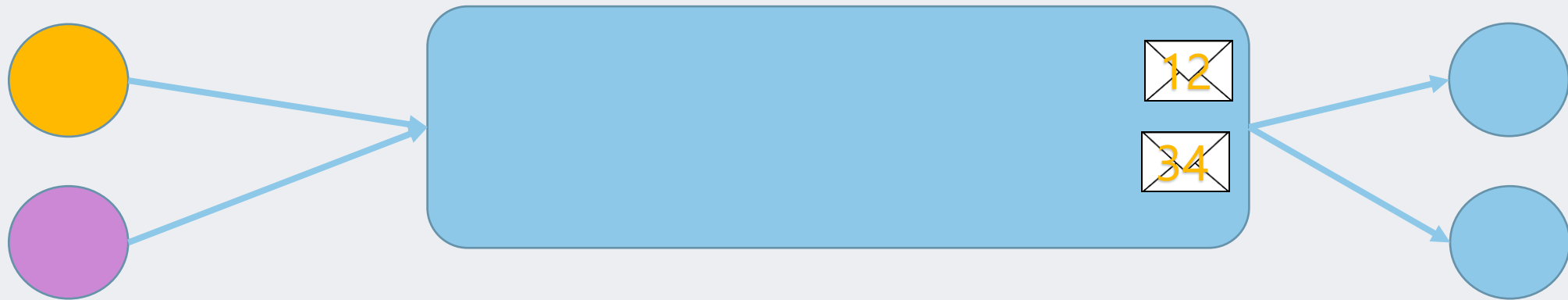
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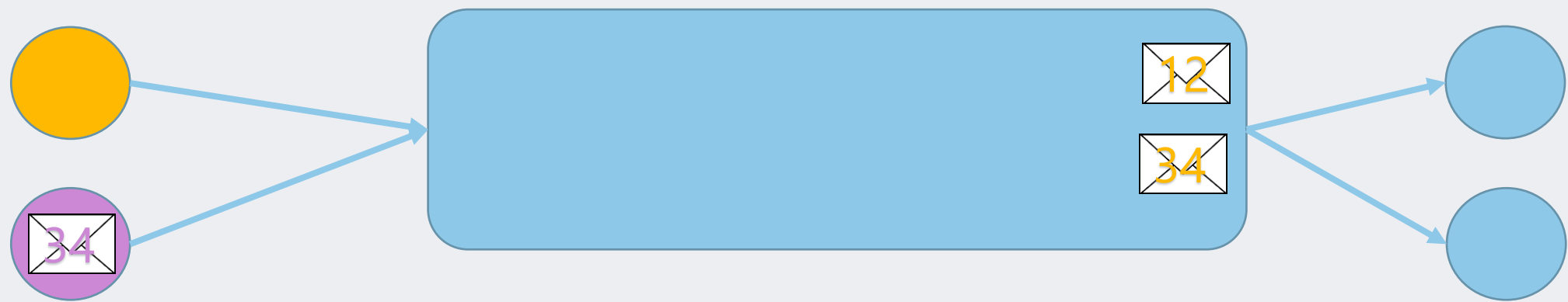
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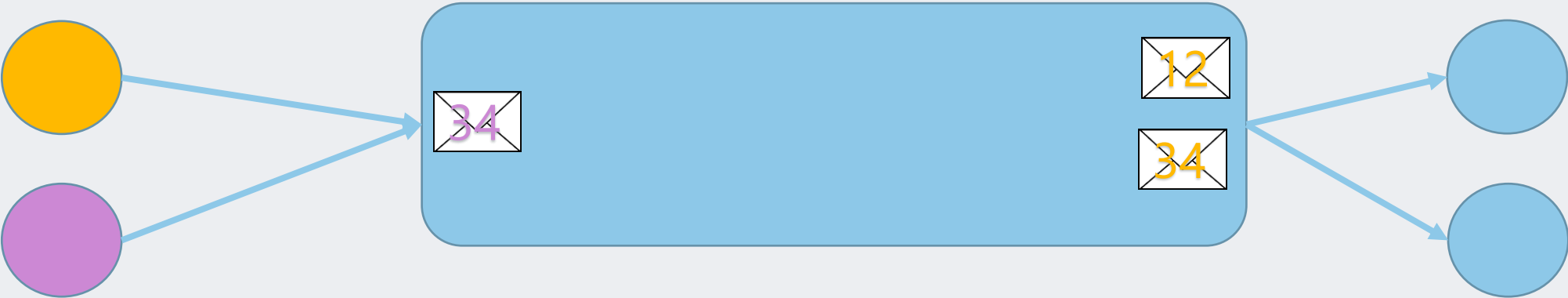


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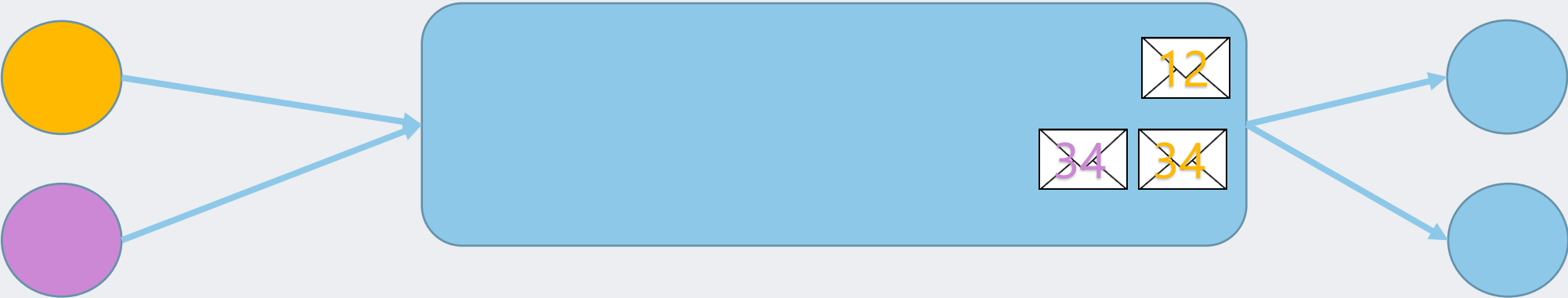




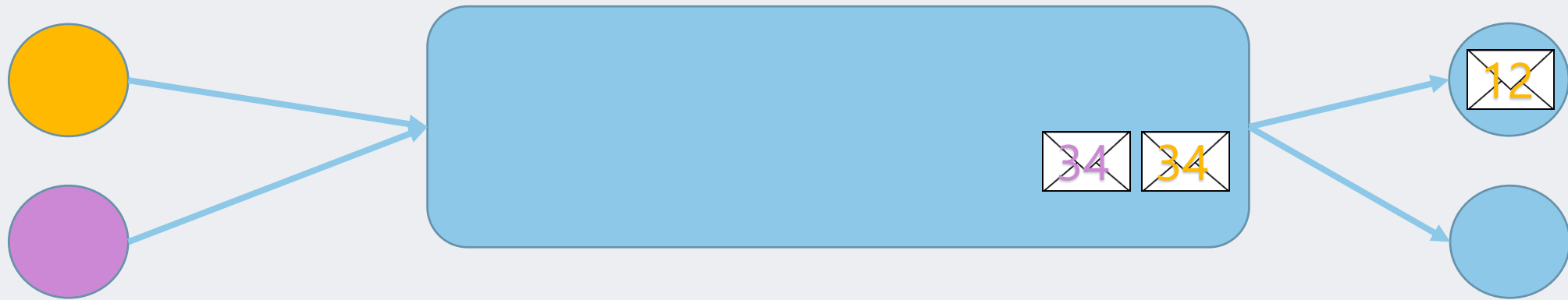
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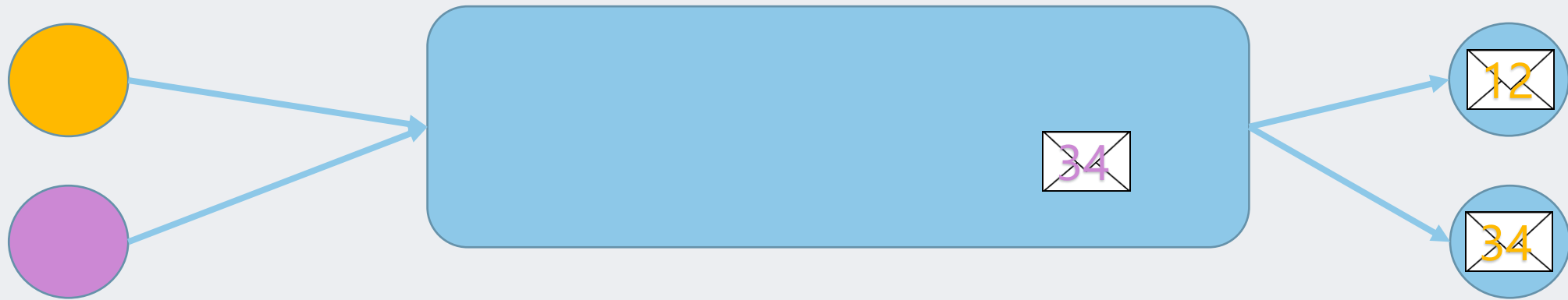
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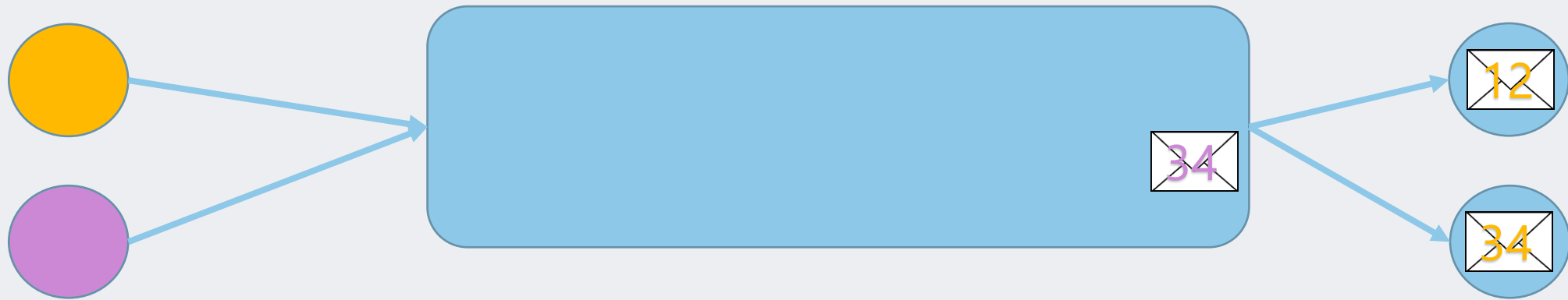
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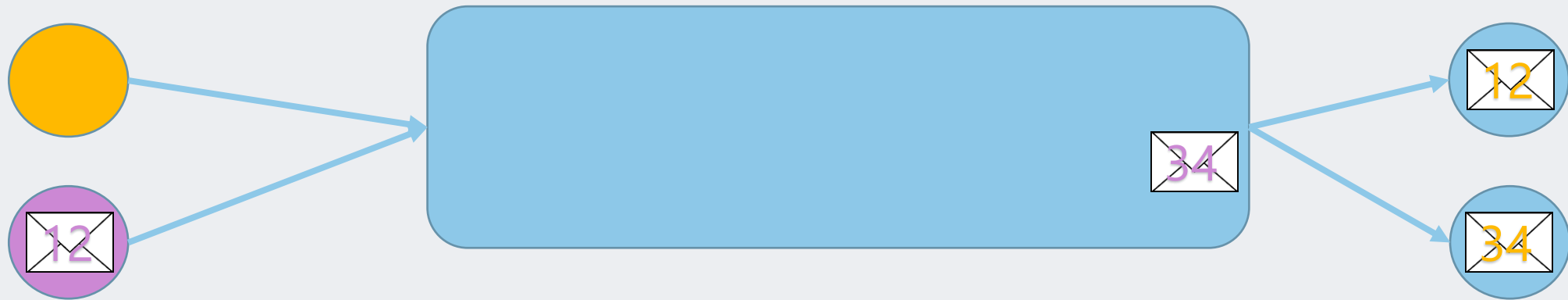
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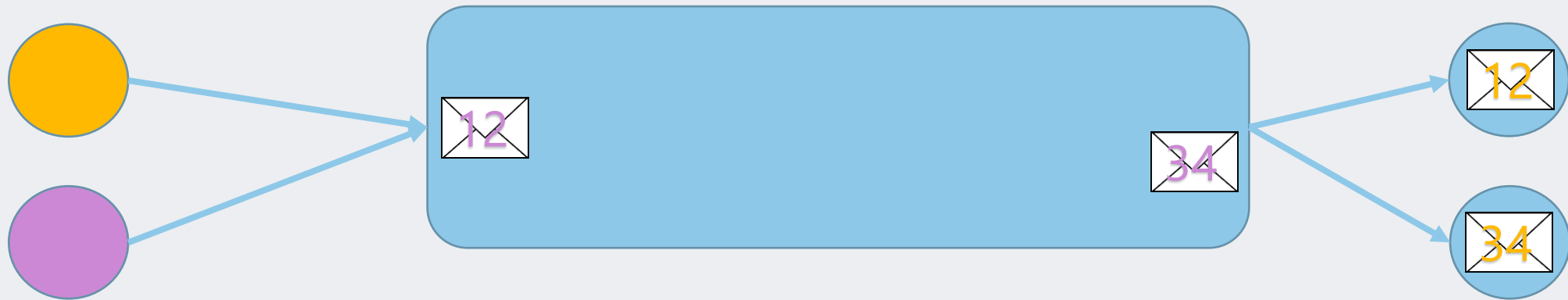
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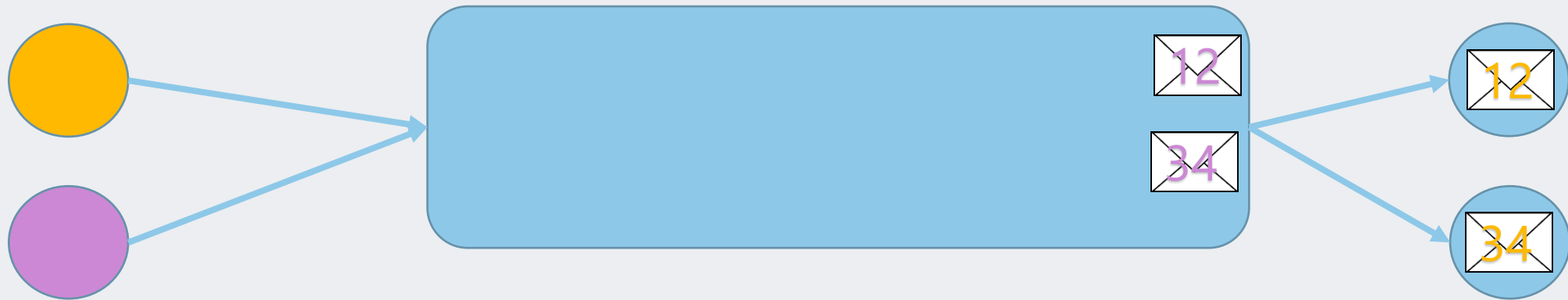
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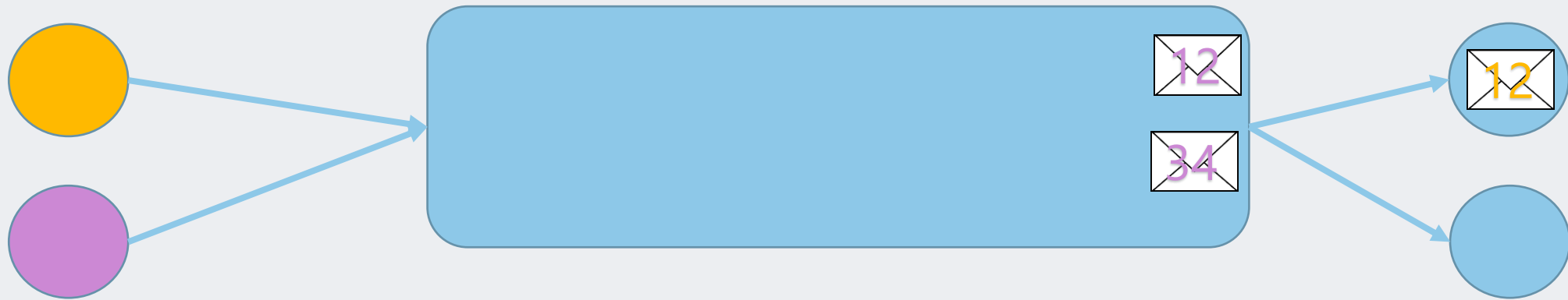


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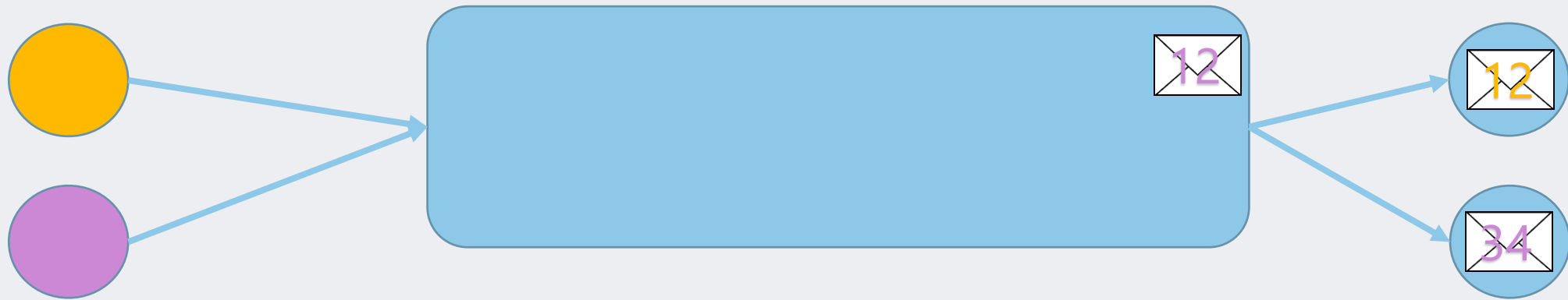




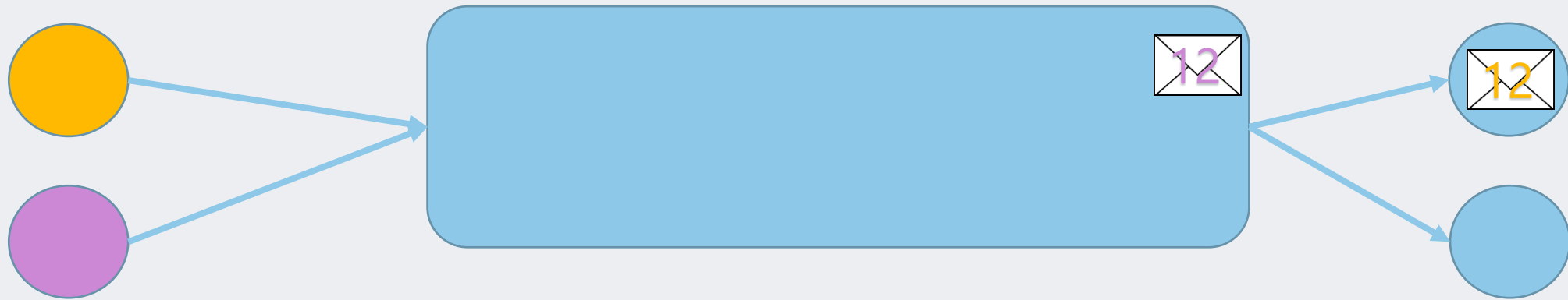
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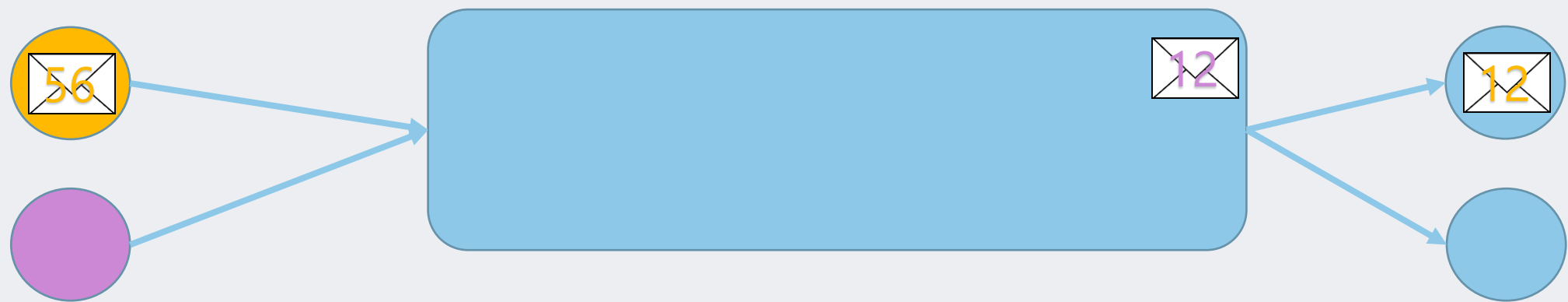
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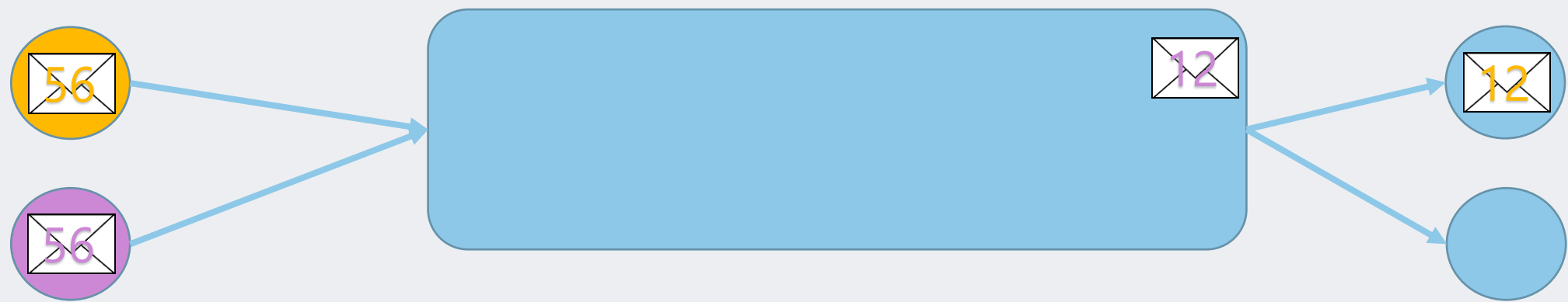
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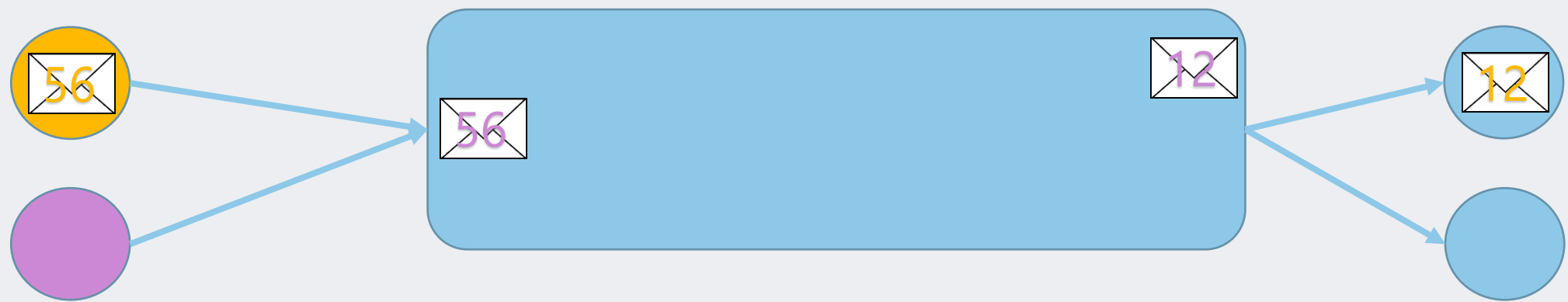
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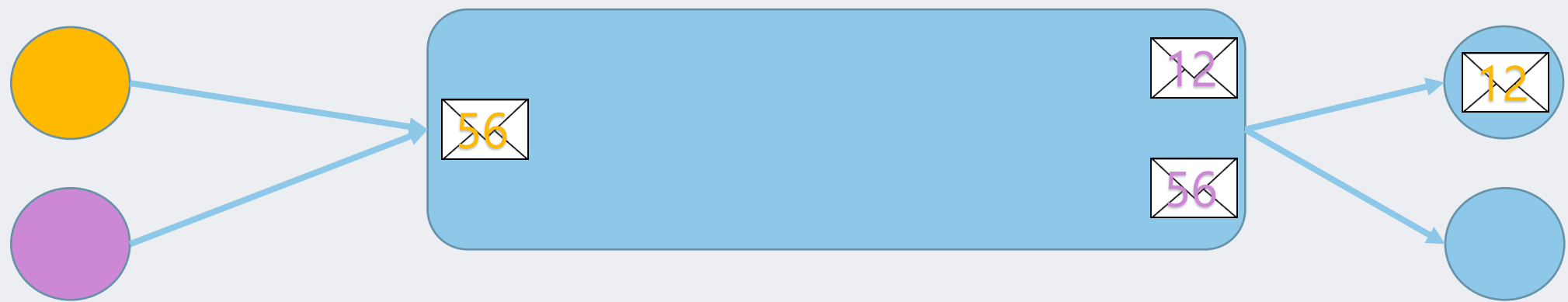
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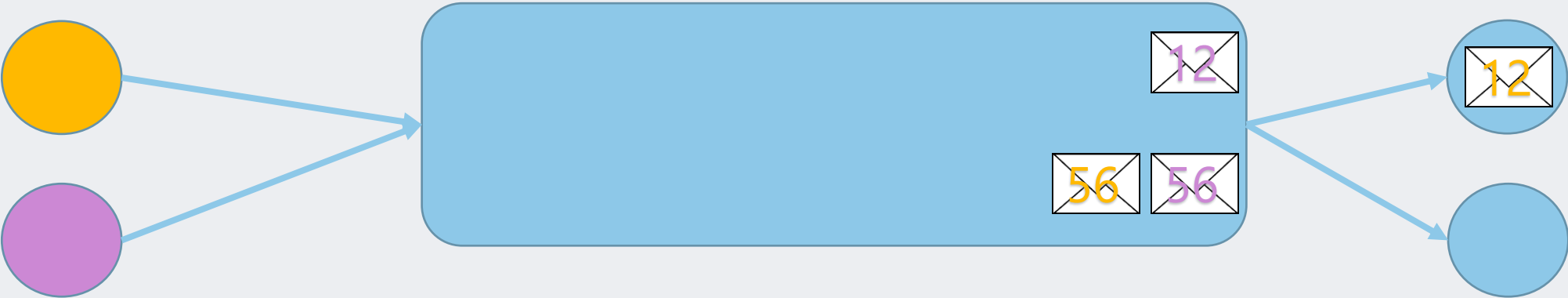
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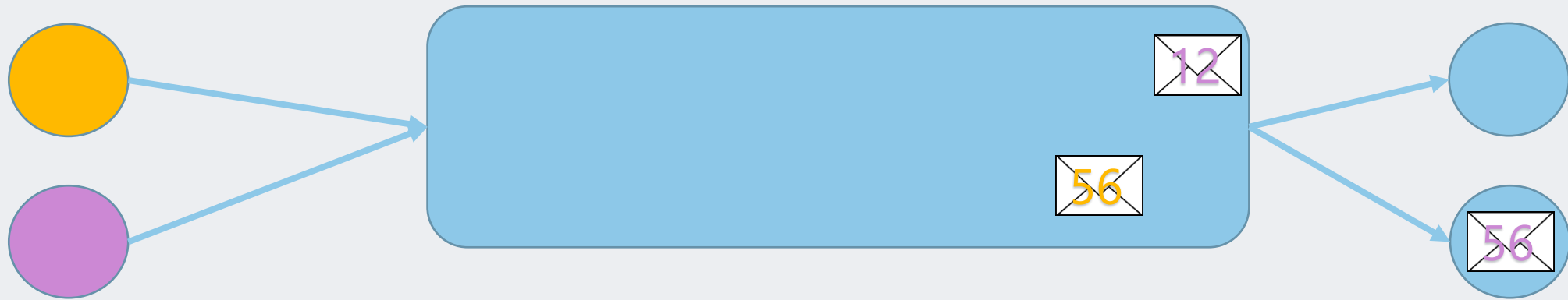


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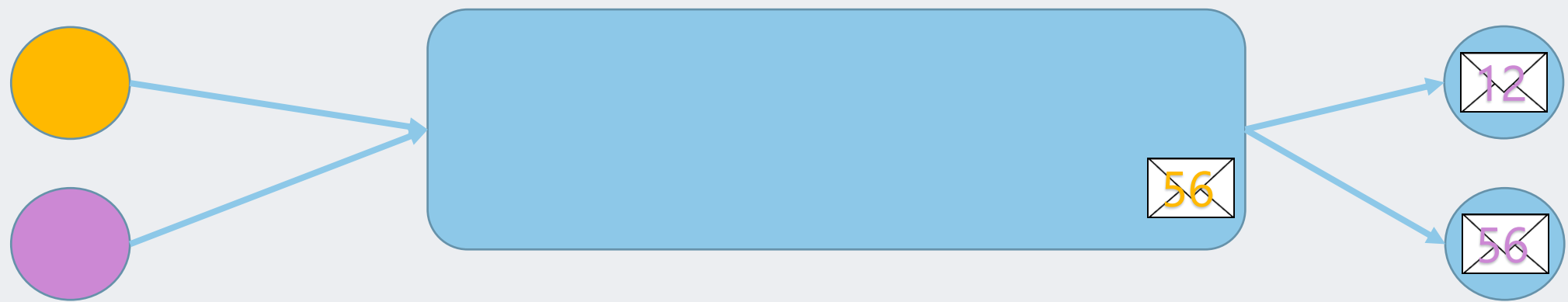




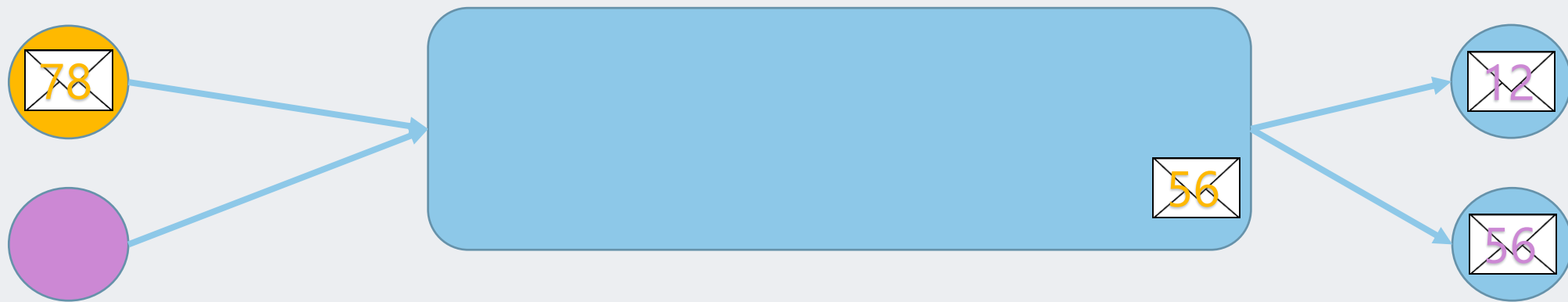
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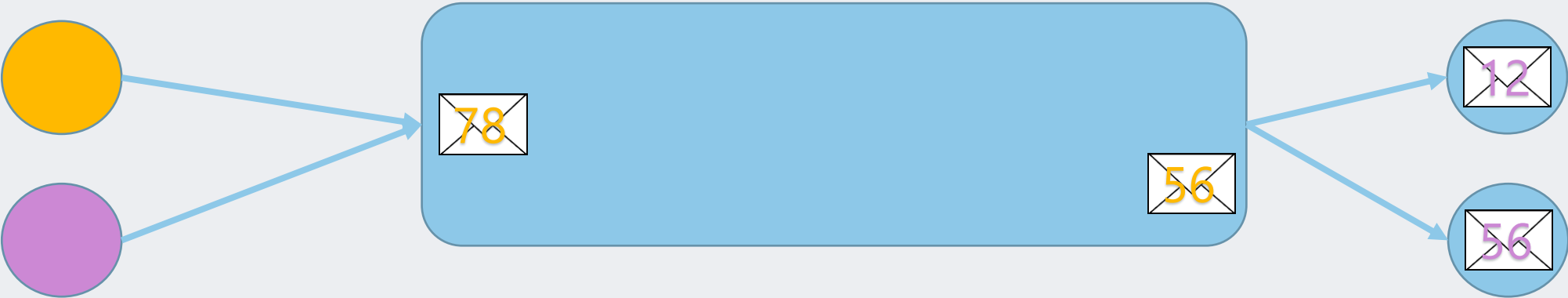
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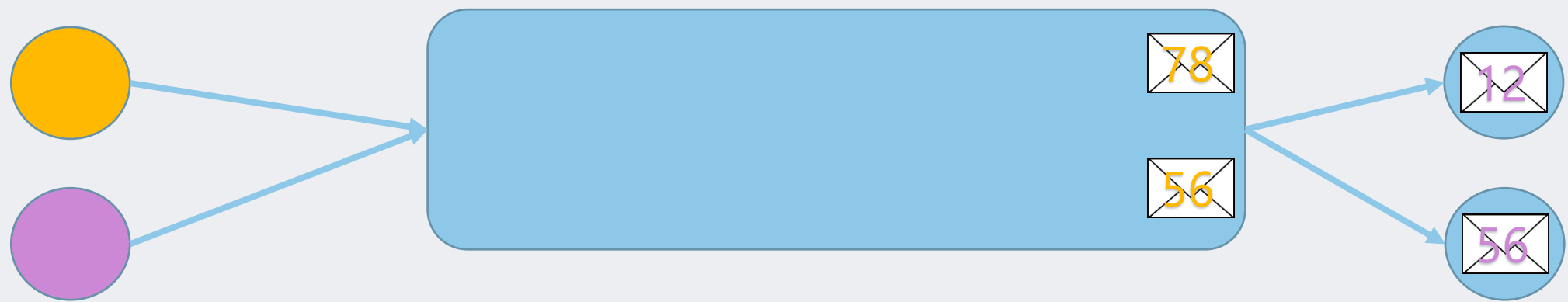
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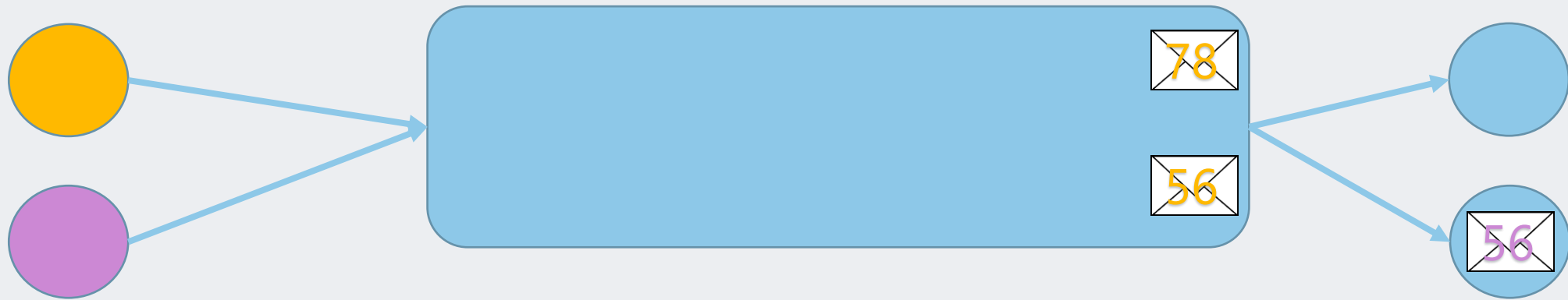
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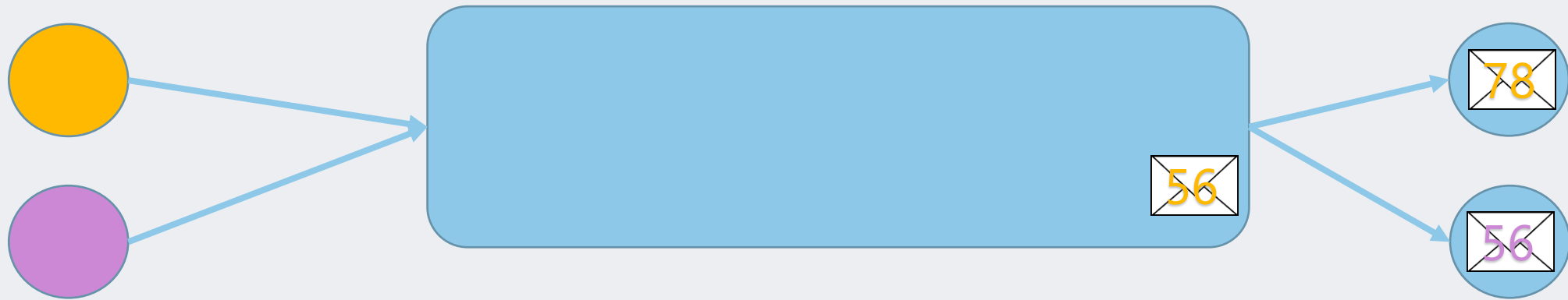
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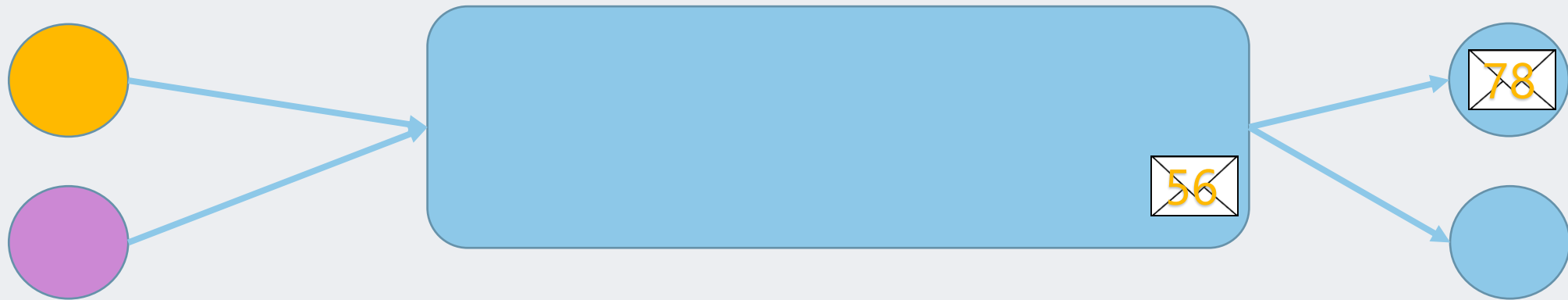
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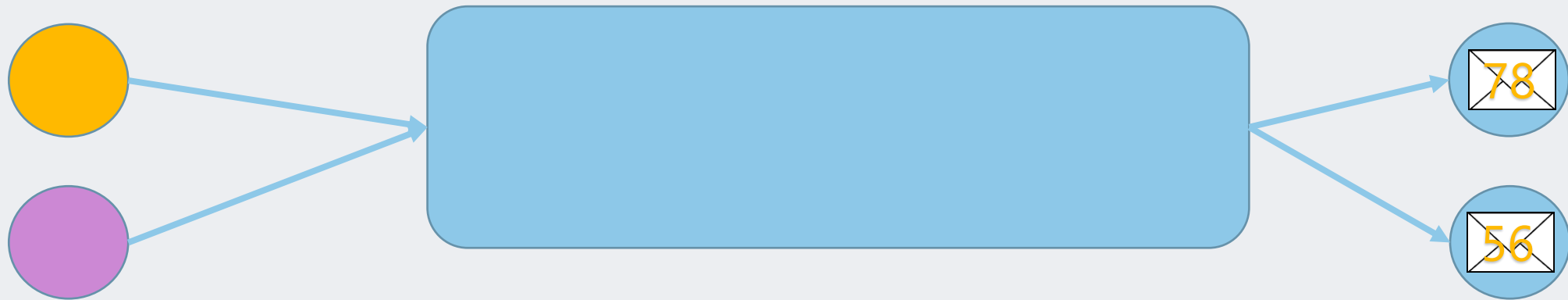


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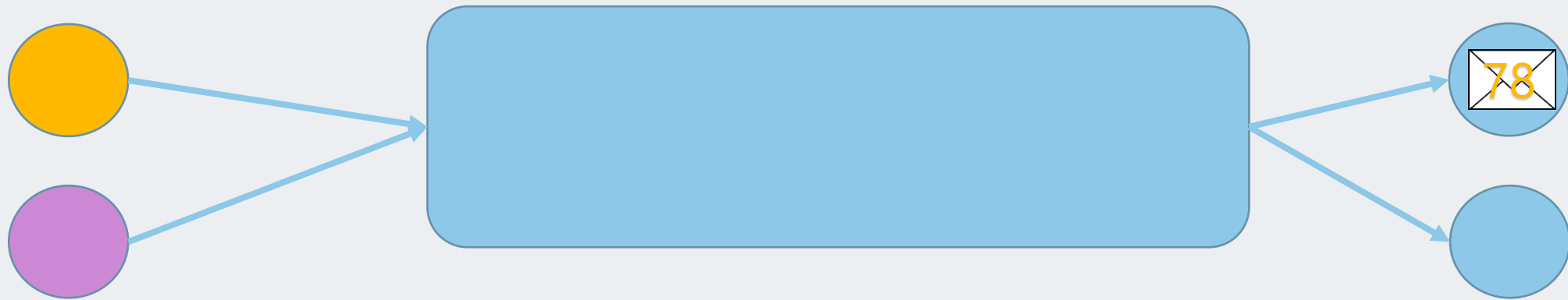




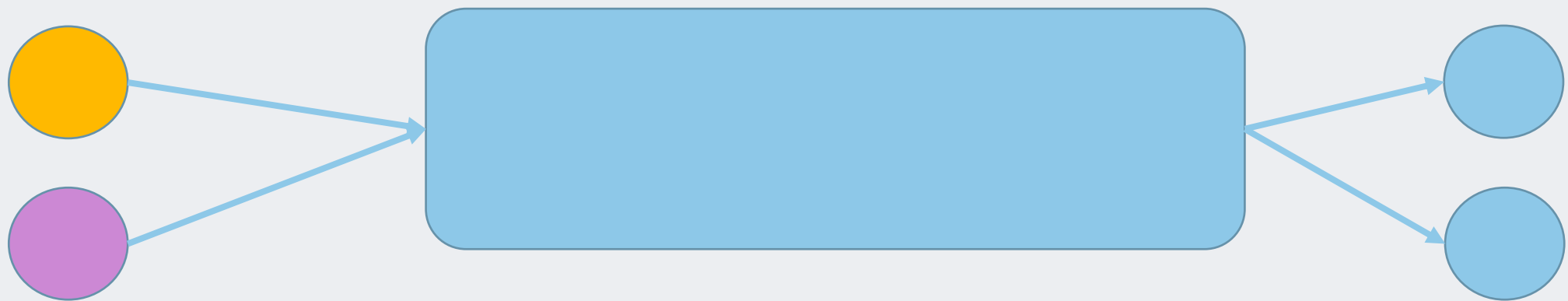
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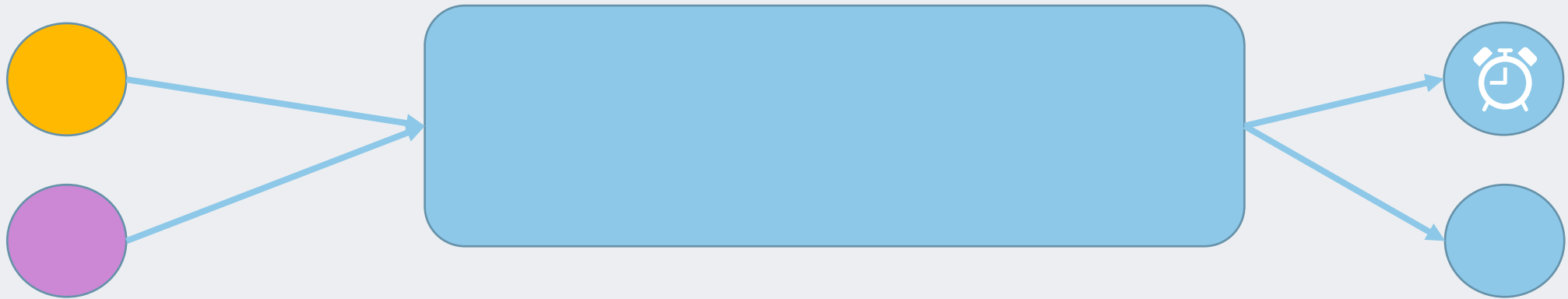
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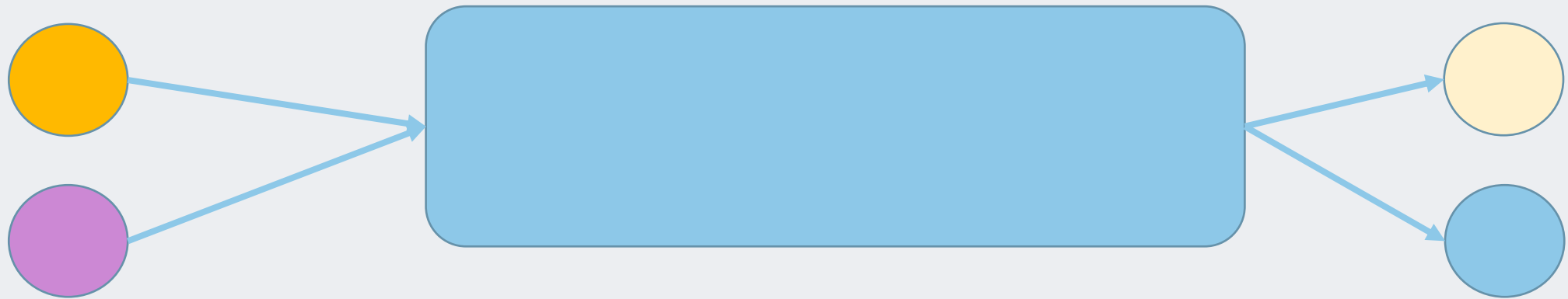
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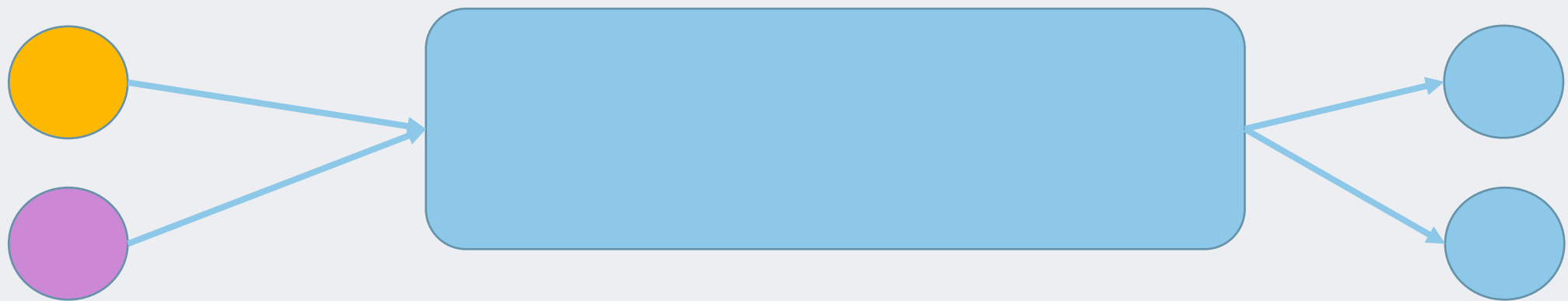
# Saga



# Saga



# Saga



**Almost done...**

## Key take-aways

Messaging patterns allow to solve recurring challenges

Azure Service Bus offers a variety of features to implement these patterns

Complement with other Azure services



# Thank You

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 <https://aka.ms/MessagingFeedbackDWX>