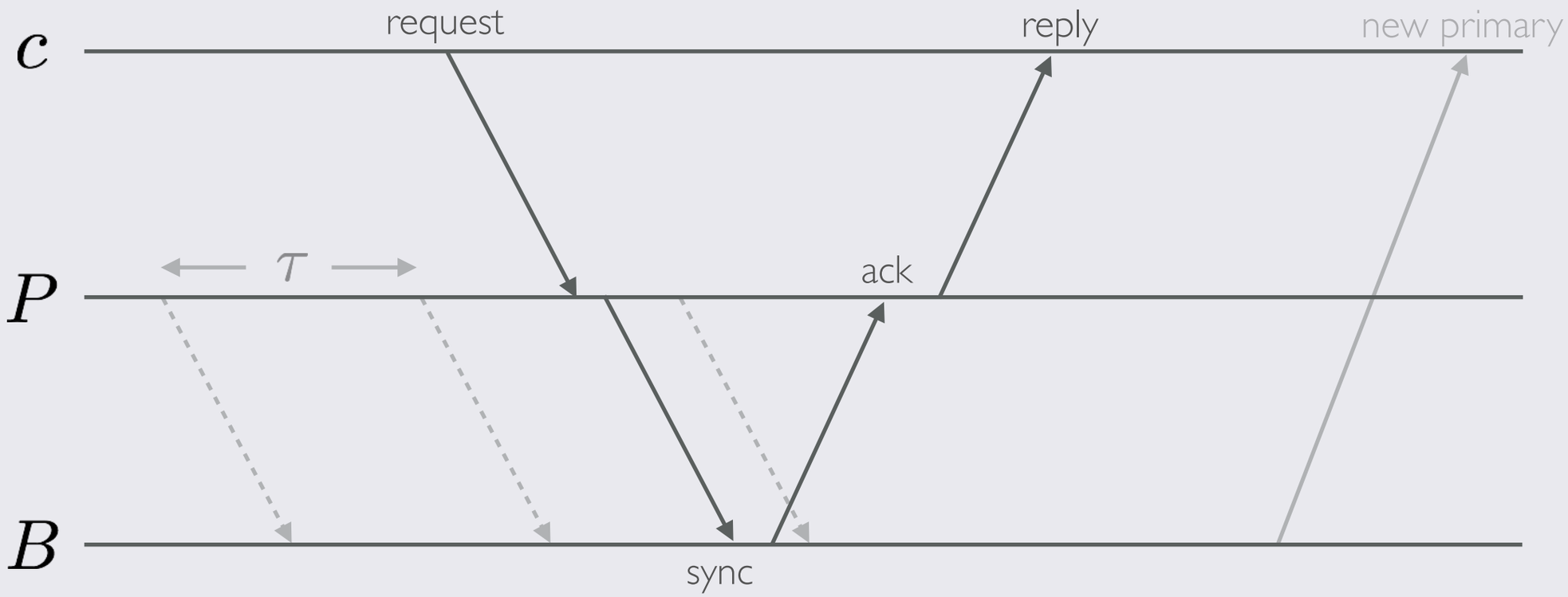
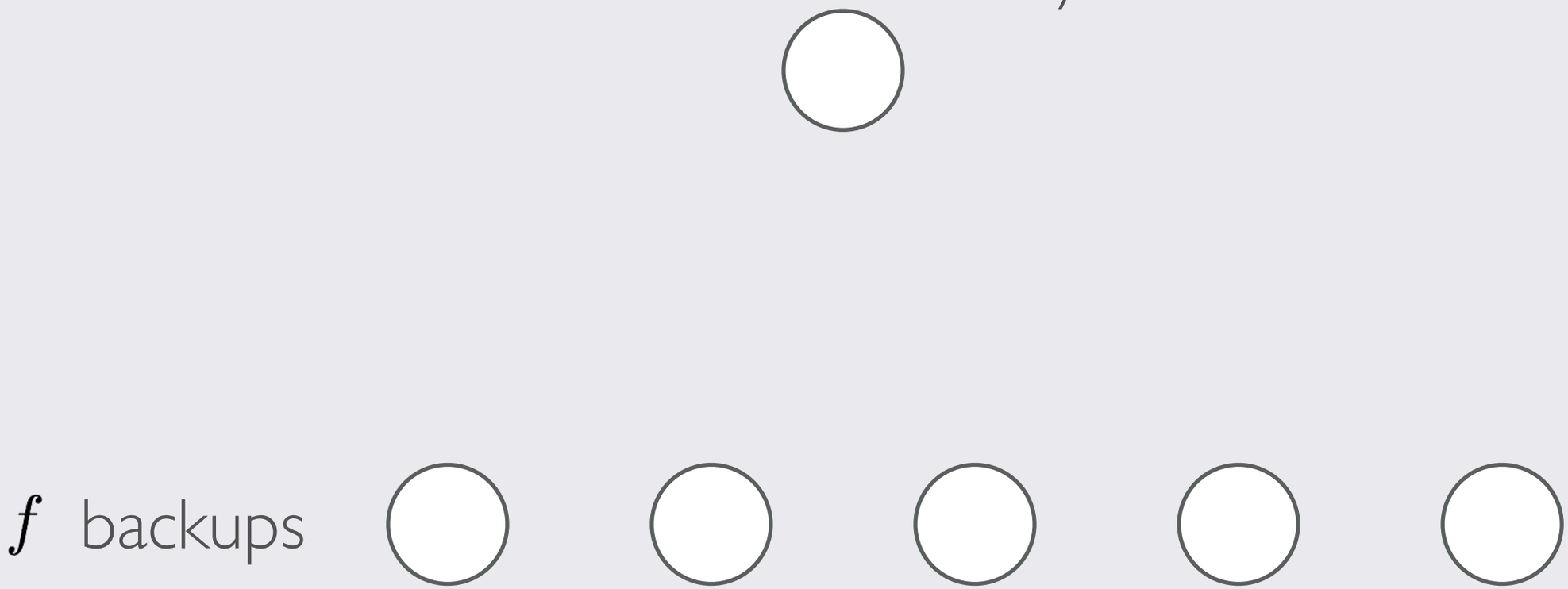
EECS 591
Distributed Systems

Manos Kapritsos
Fall 2021

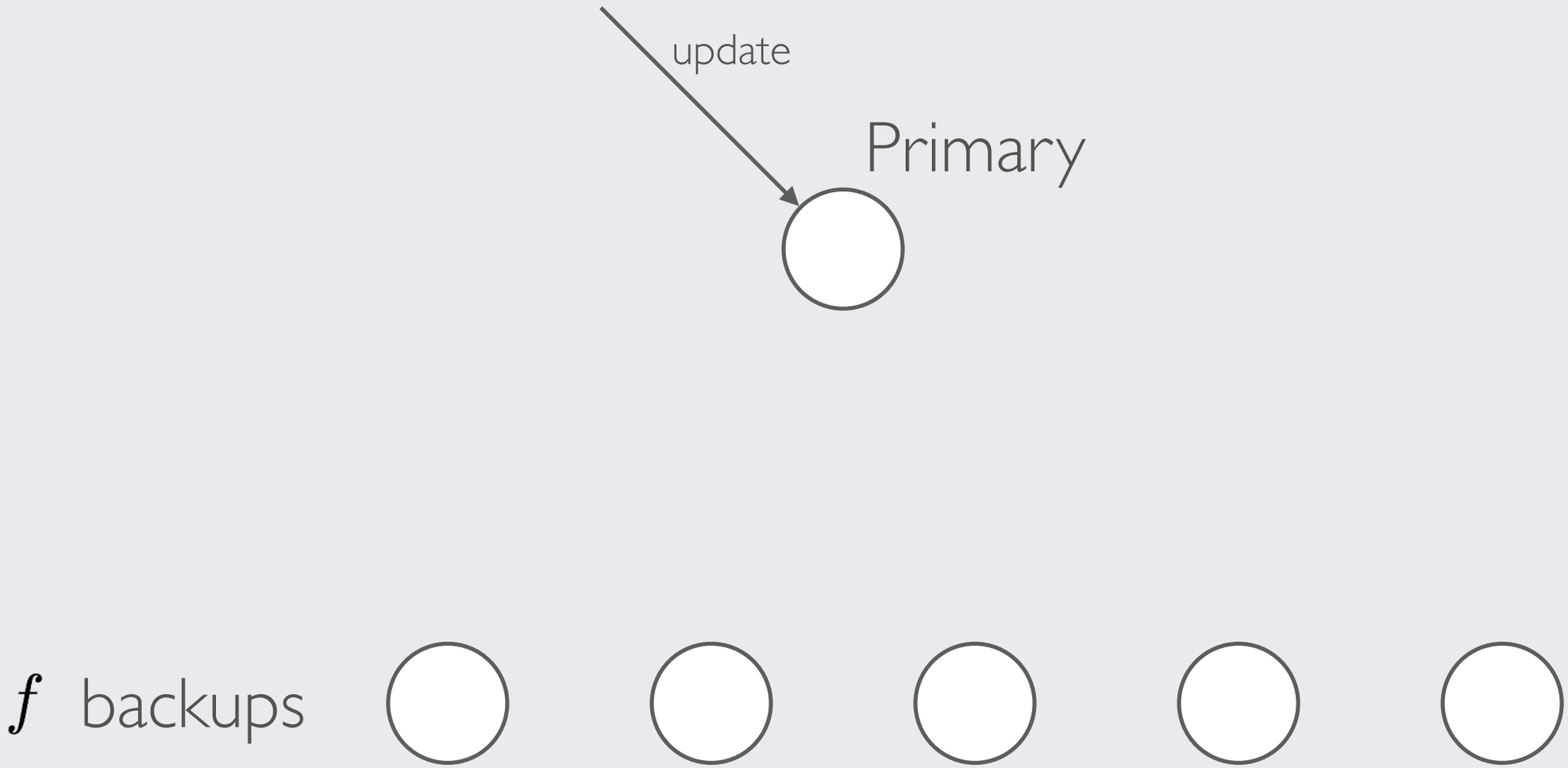
A SLIGHTLY DIFFERENT PRIMARY-BACKUP PROTOCOL ($f = 1$)



Generalizing to more backups



GENERALIZING TO MORE BACKUPS



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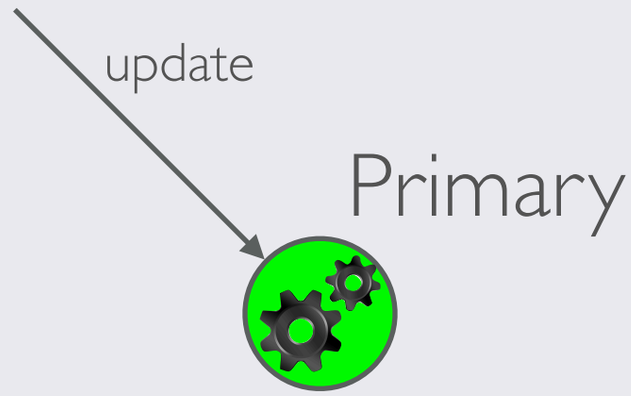
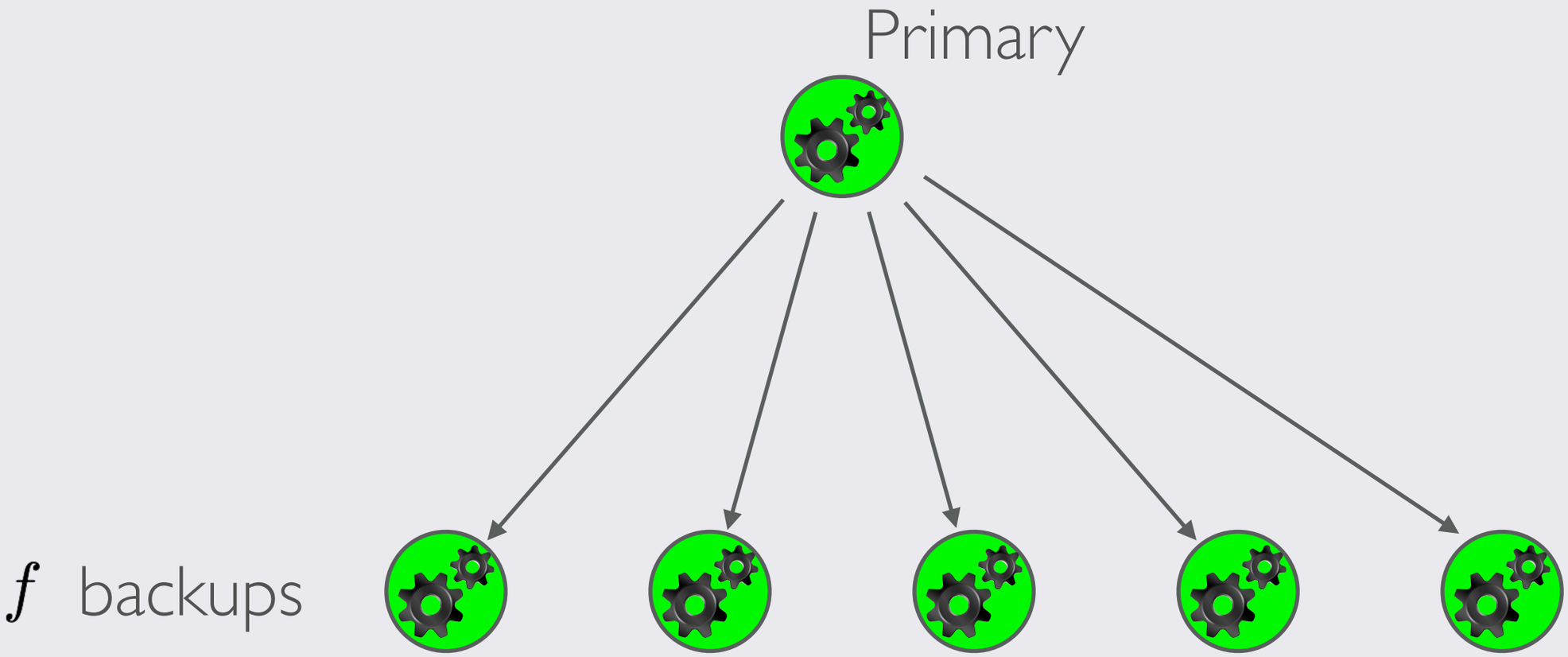


f backups

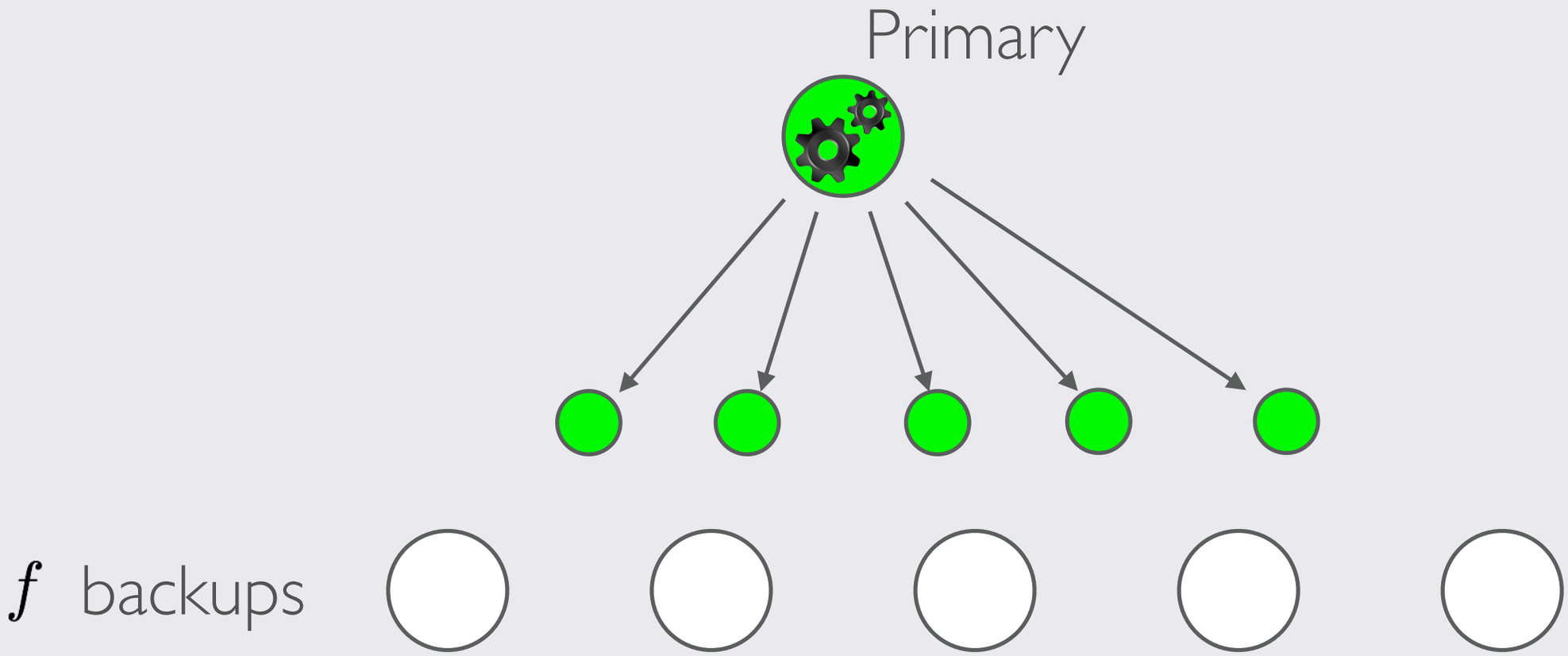
GENERALIZING TO MORE BACKUPS

(active updates)



GENERALIZING TO MORE BACKUPS

(passive updates)



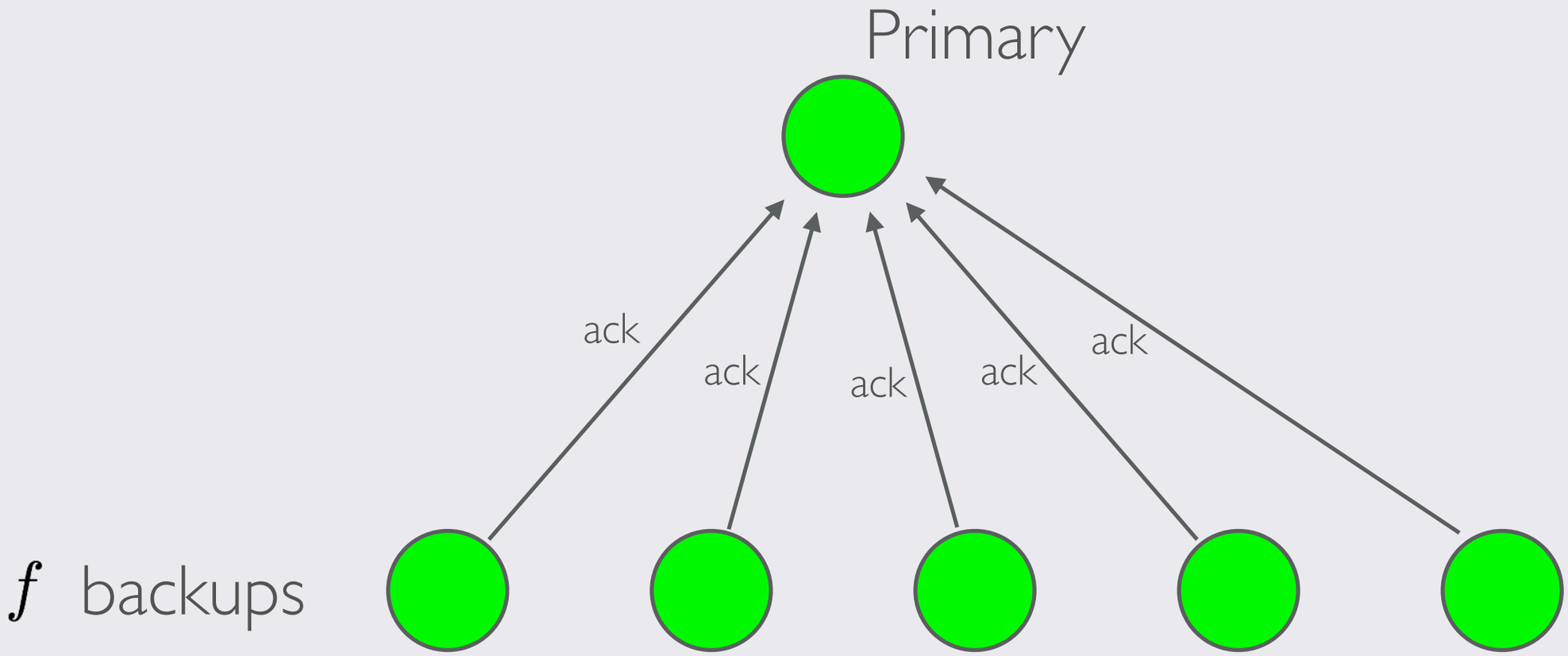
GENERALIZING TO MORE BACKUPS

(passive updates)

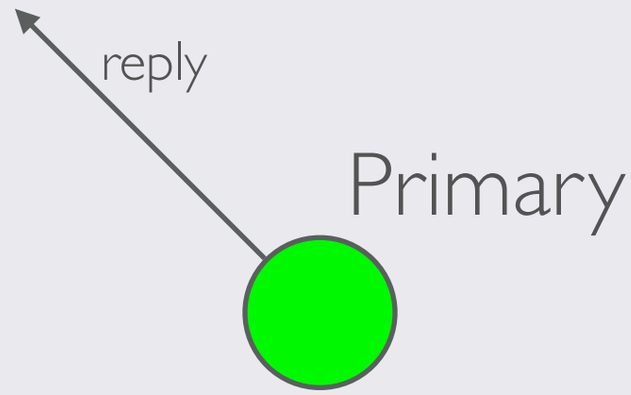
Primary

f backups

GENERALIZING TO MORE BACKUPS

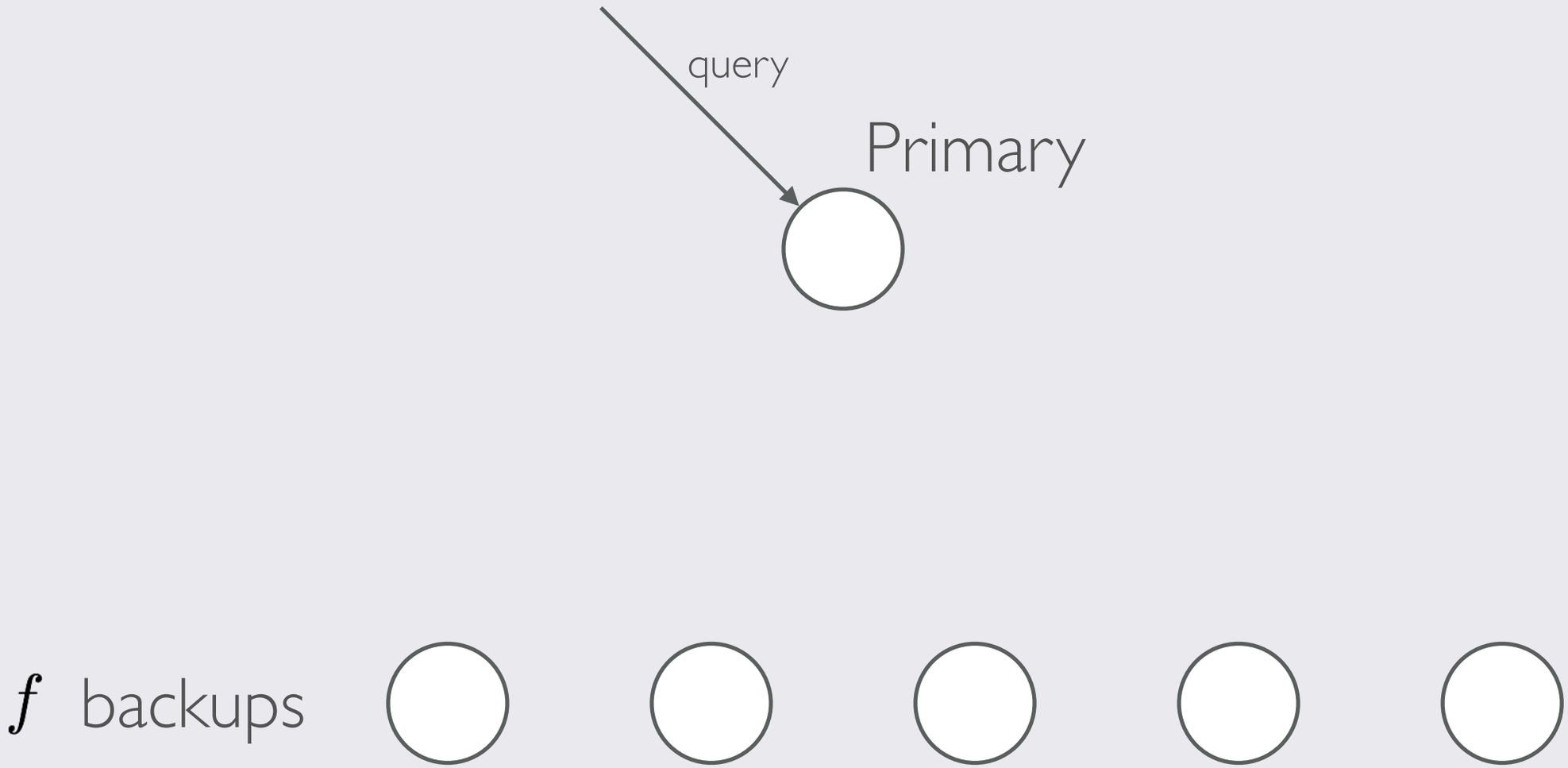


GENERALIZING TO MORE BACKUPS



f backups

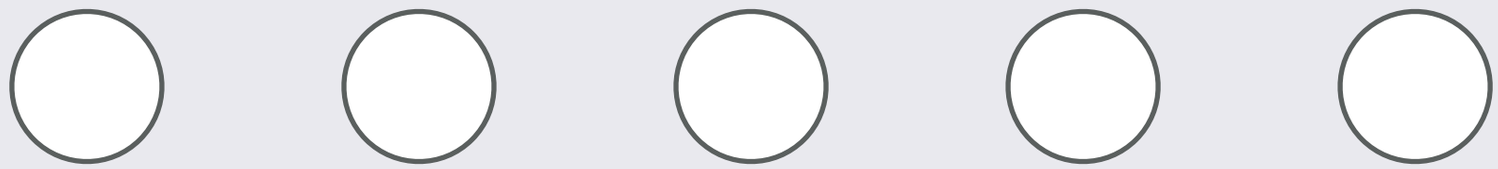
Handling queries



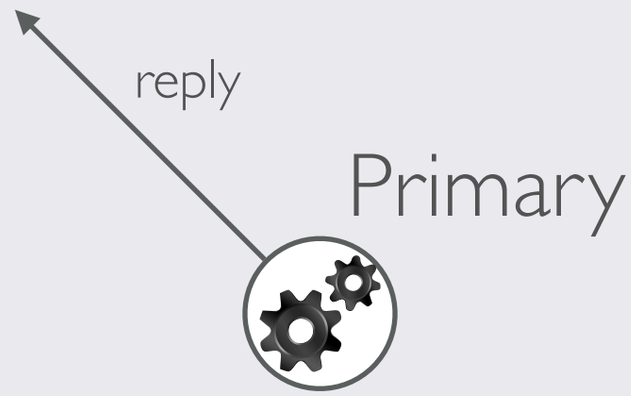
Handling queries

Primary

f backups

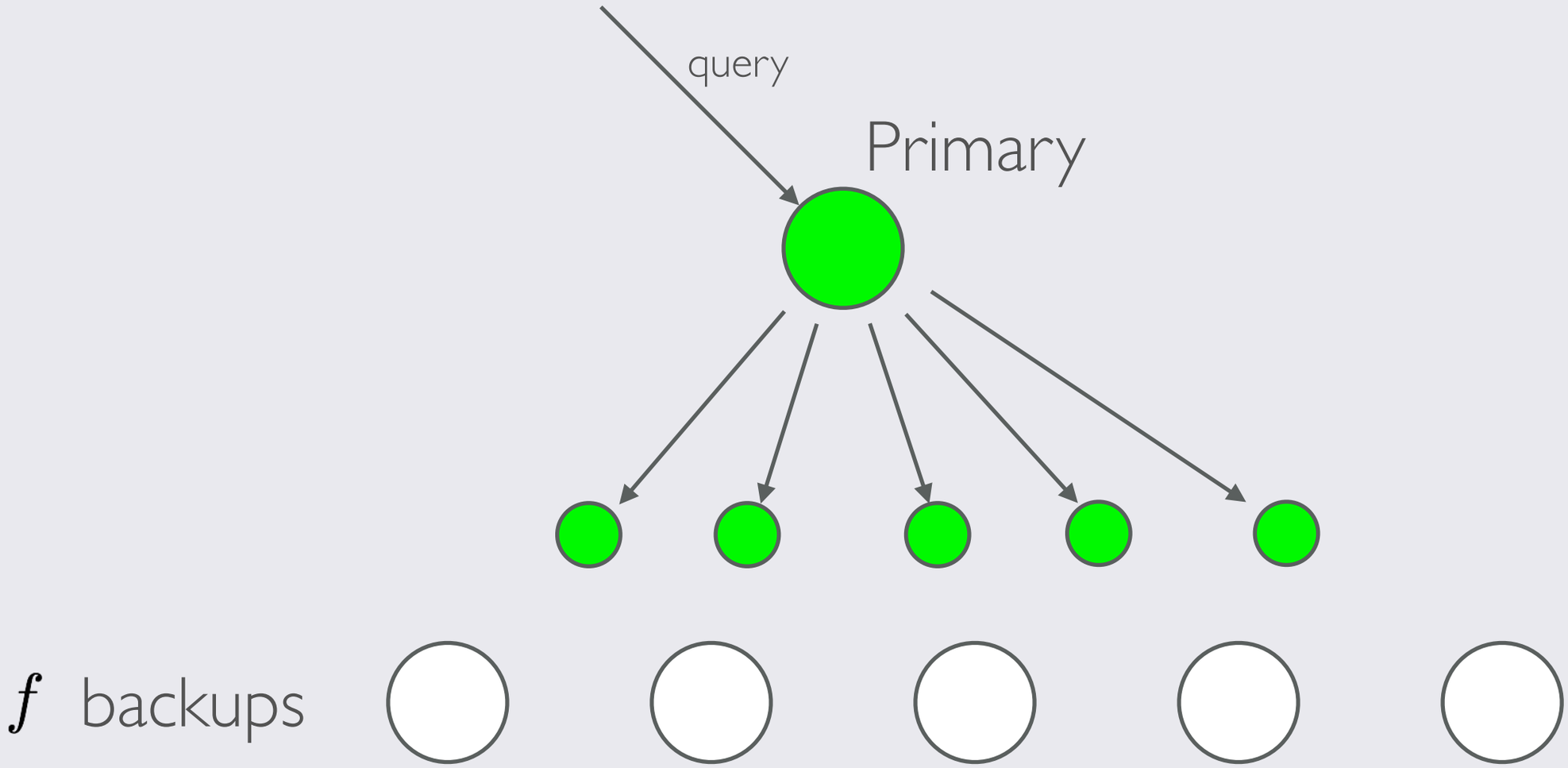


HANDLING QUERIES

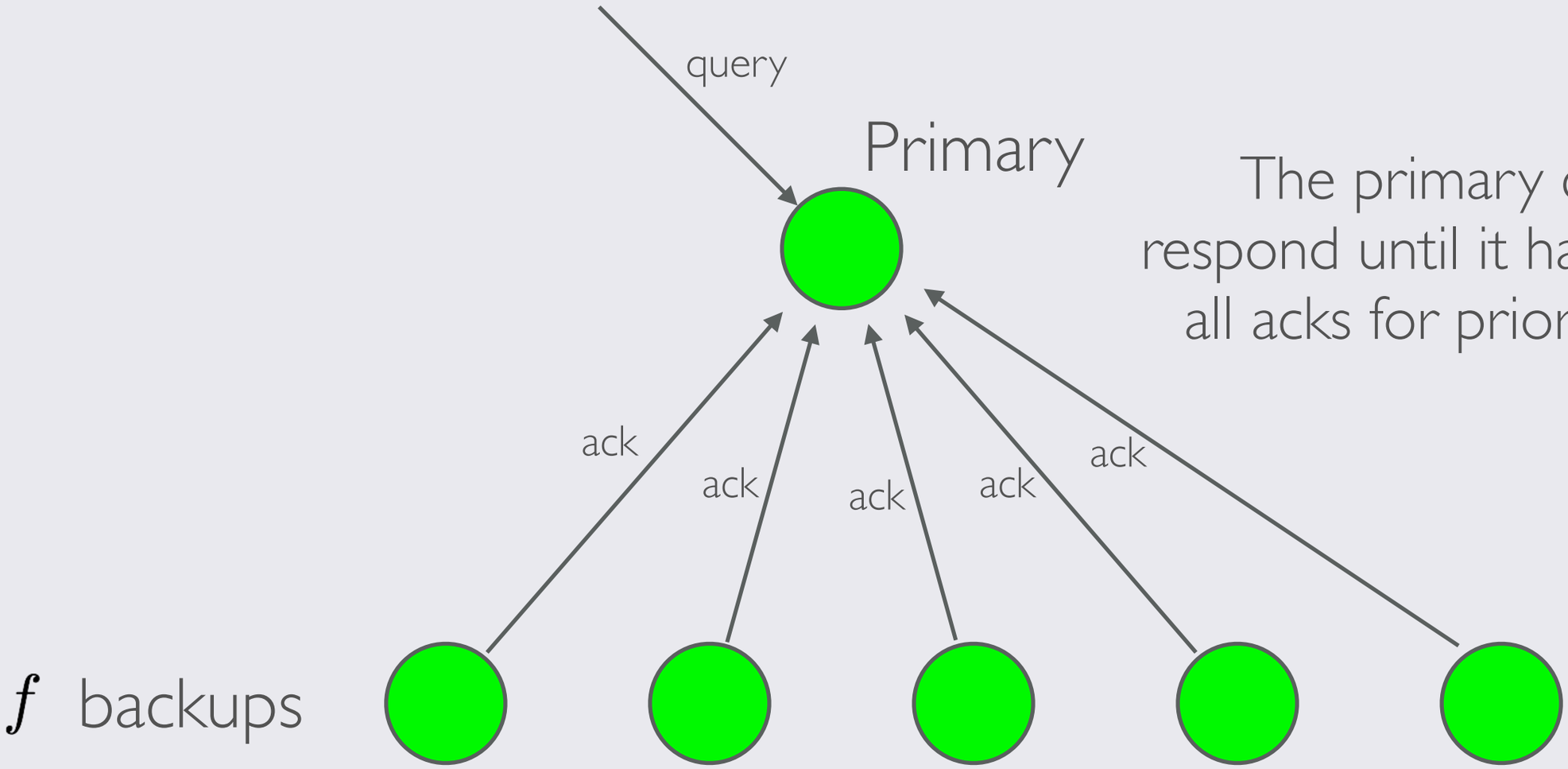


However…

HANDLING QUERIES

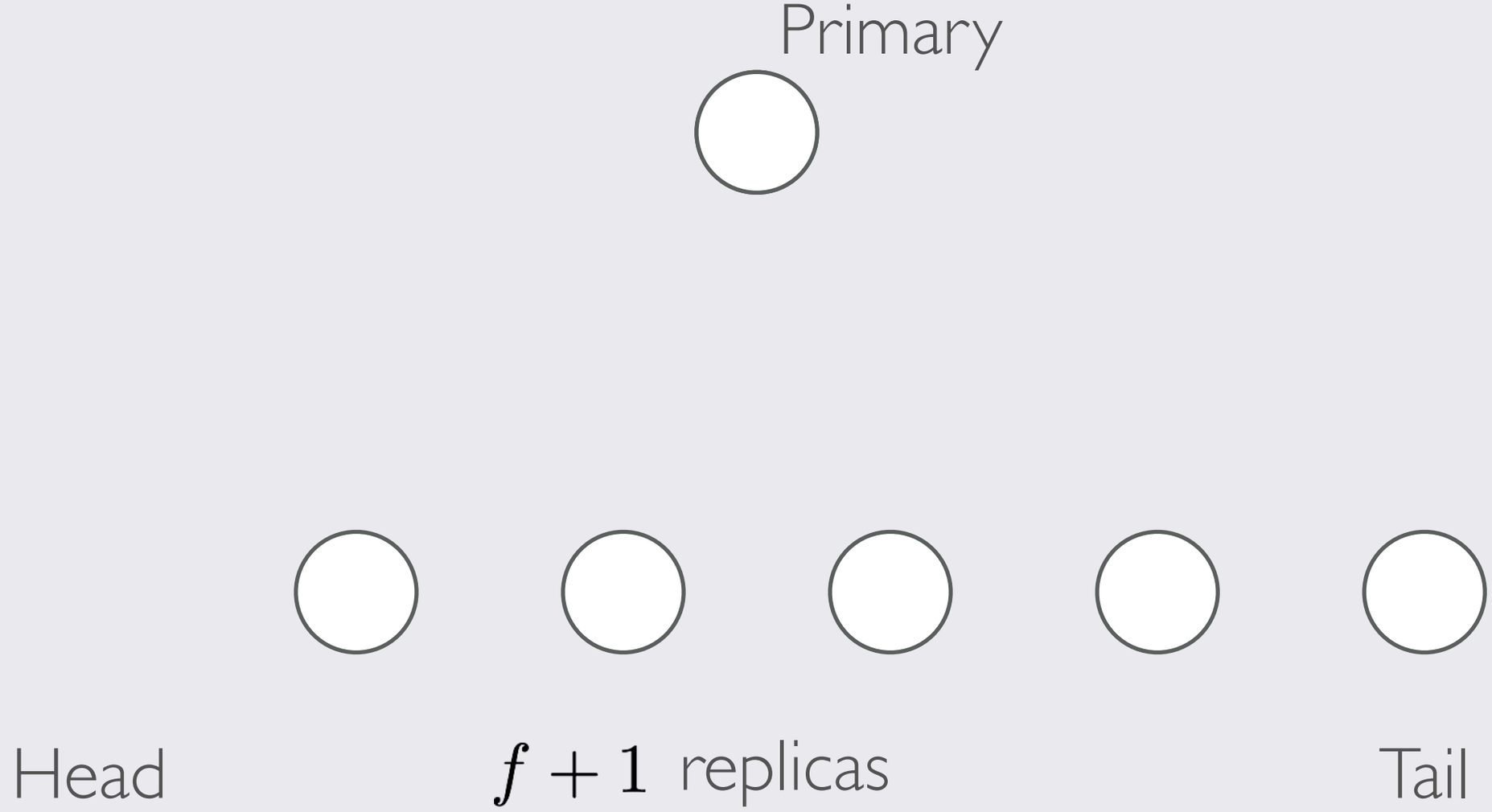


HANDLING QUERIES



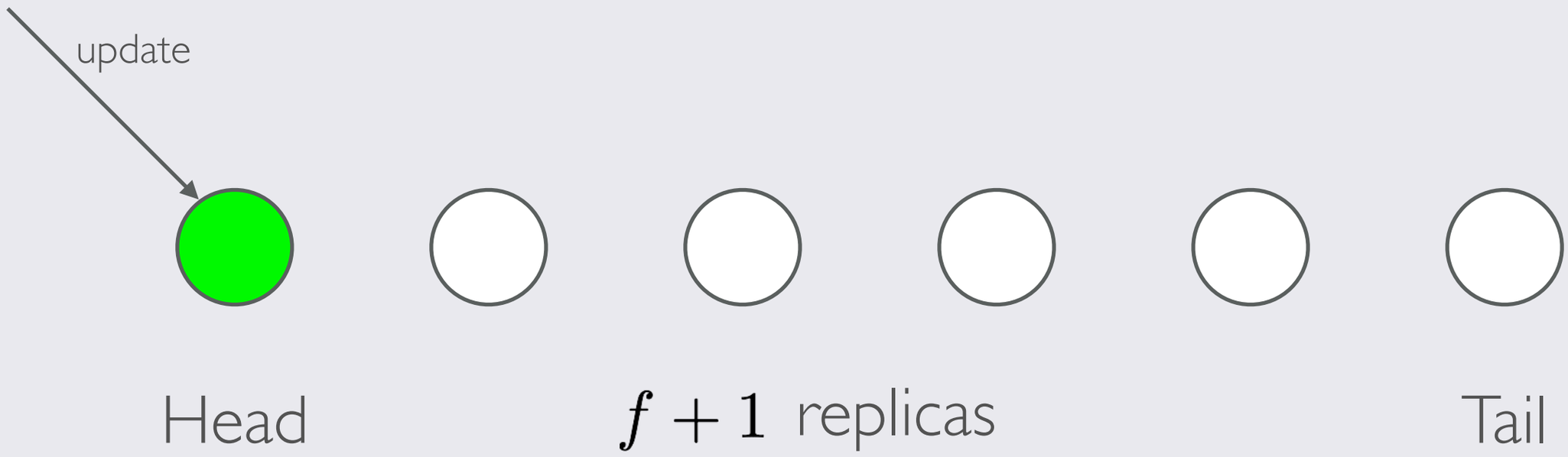
The primary cannot respond until it has received all acks for prior updates

Chain replication

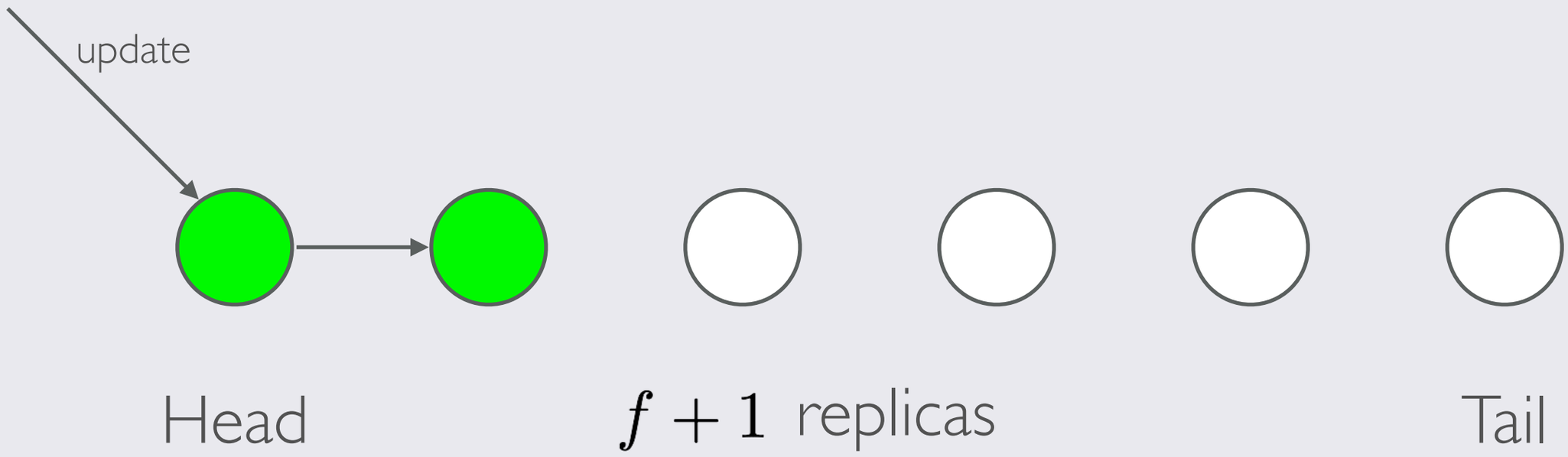


Chain replication

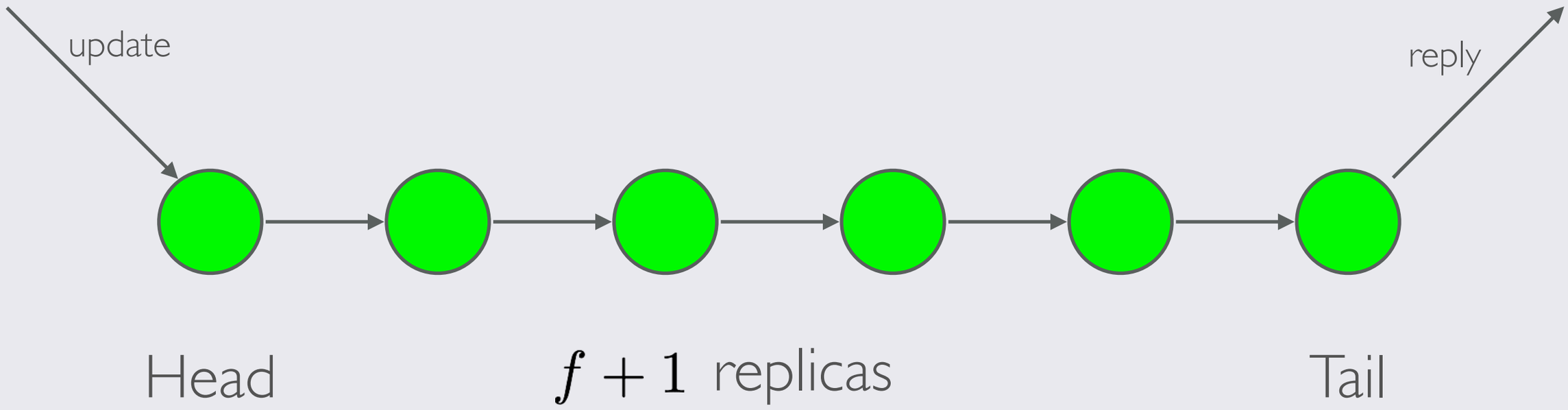
Chain replication



Chain replication

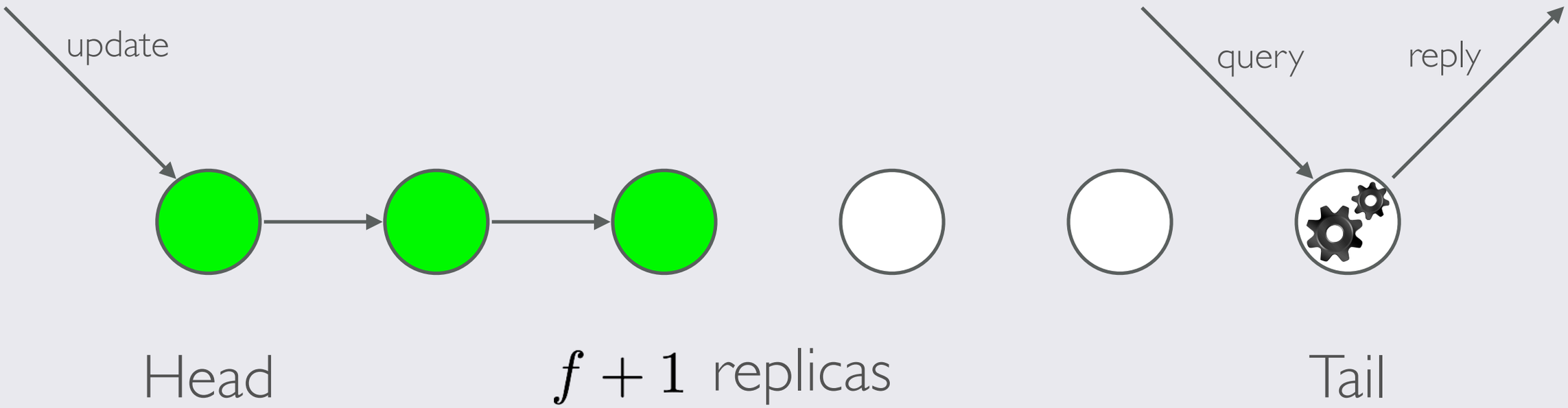


Chain replication



Chain replication

Tail can respond immediately, without waiting for the new update



Administrivia

Problem sets

- PS2 will be sent out today; due on 10/11, before class
  - Individual work only

Presentations

- Presentation assignments coming soon™

Research project

- Group declaration due **on Friday**
- Topic declarations due next Friday, 10/8

Presentations

First, you should always make a script for your presentation, before you start making slides. This helps you organize your thoughts and present them clearly to your audience. The script should be at the high level, a kind of summary of the presentation with about one or two sentences per slide. Also, you should avoid having lots of text on one slide, as this is guaranteed to put your audience to a deep, dreamless slumber. Where most presentations fail is that their authors, convinced they are producing some kind of stand-alone document, put everything they want to say onto their slides, in great big chunky blocks of text. While speaking, your voice should not be a flat monotonic drone, but you should try to change inflection often, so as to avoid putting your audience to sleep. And, of course, you should never try to read aloud the text written in your slides. If you find yourself doing that during your practice talks, it means there's something wrong with the presentation. Unless of course you are trying to make a point, as I am doing right now :)

Presentations (for real this time)

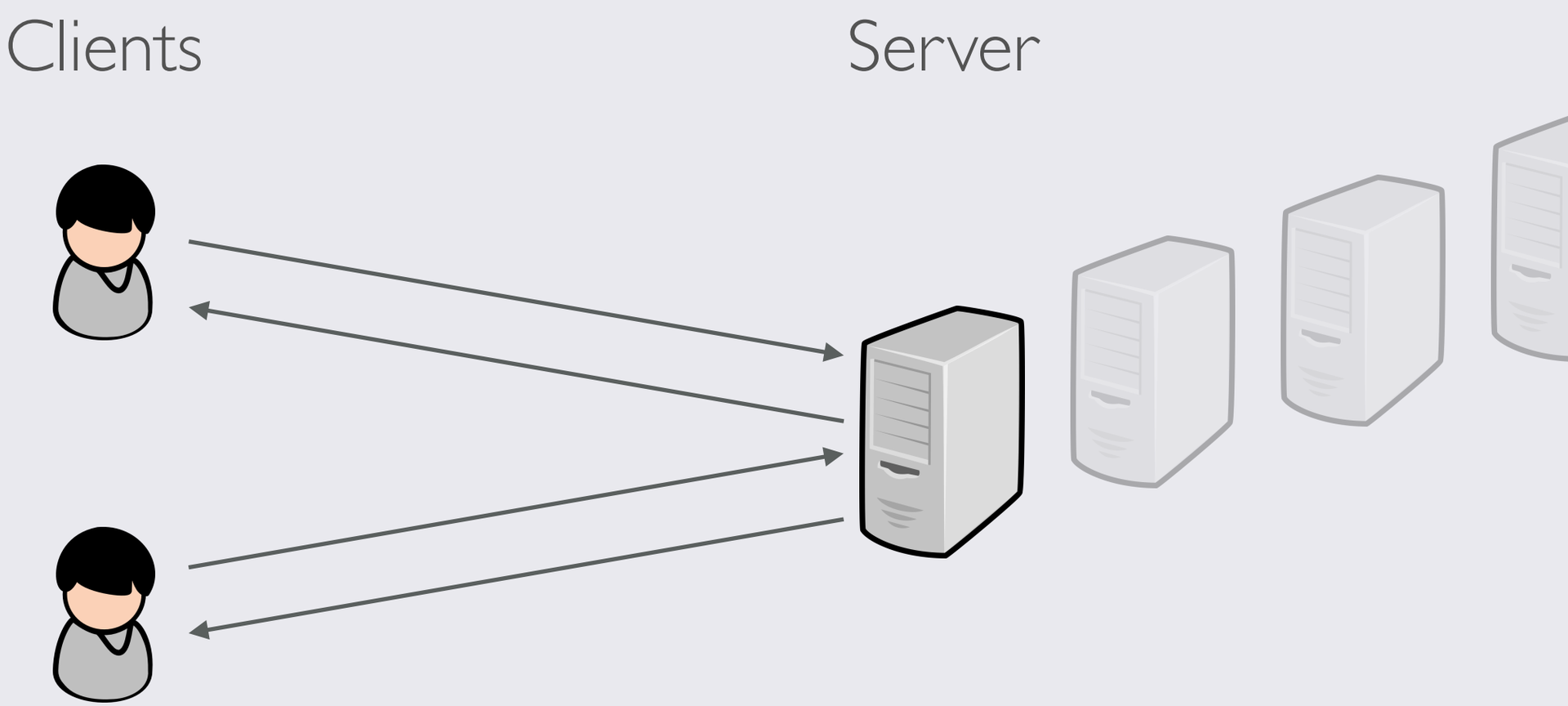
- Motivation, motivation, motivation!
- Keep it simple
  - Give the high-level intuition
- Avoid the "wall of text"
- Speak normally, with changes to your inflection
- Practice, practice, practice!

Consistency

Is the server's response correct?

(are all the server's responses consistent with each other?)

CONSISTENCY



Consistency is a **property** of the execution; a constraint on the values of the reads and writes returned by the server

Monotonic read consistency

*If a client reads the value of a data item **x**, any successive read operation on **x** by that client will always return that same value or a more recent value.*

Are these runs monotonic read consistent?

$W_1(x,3)$ $R_1(x)=4$ $W_2(x,4)$ $R_2(x)=4$

$R_1(x)=1$ $R_1(y)=1$ $W_2(y,4)$ $R_1(x)=4$

.... $R_1(x)=1$ $R_1(y)=1$ $W_2(y,4)$ $R_1(x)=4$