

vr-revisited

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Viewstamped Replication

- handles **crash** failures
- works in an **asynchronous network**
- maintains a **state**, and makes that state accessible to a set of client machines
- provides state machine replication, is suitable for implementing replicated services such as lock manager or a file system

A threshold: $f / 2f + 1$

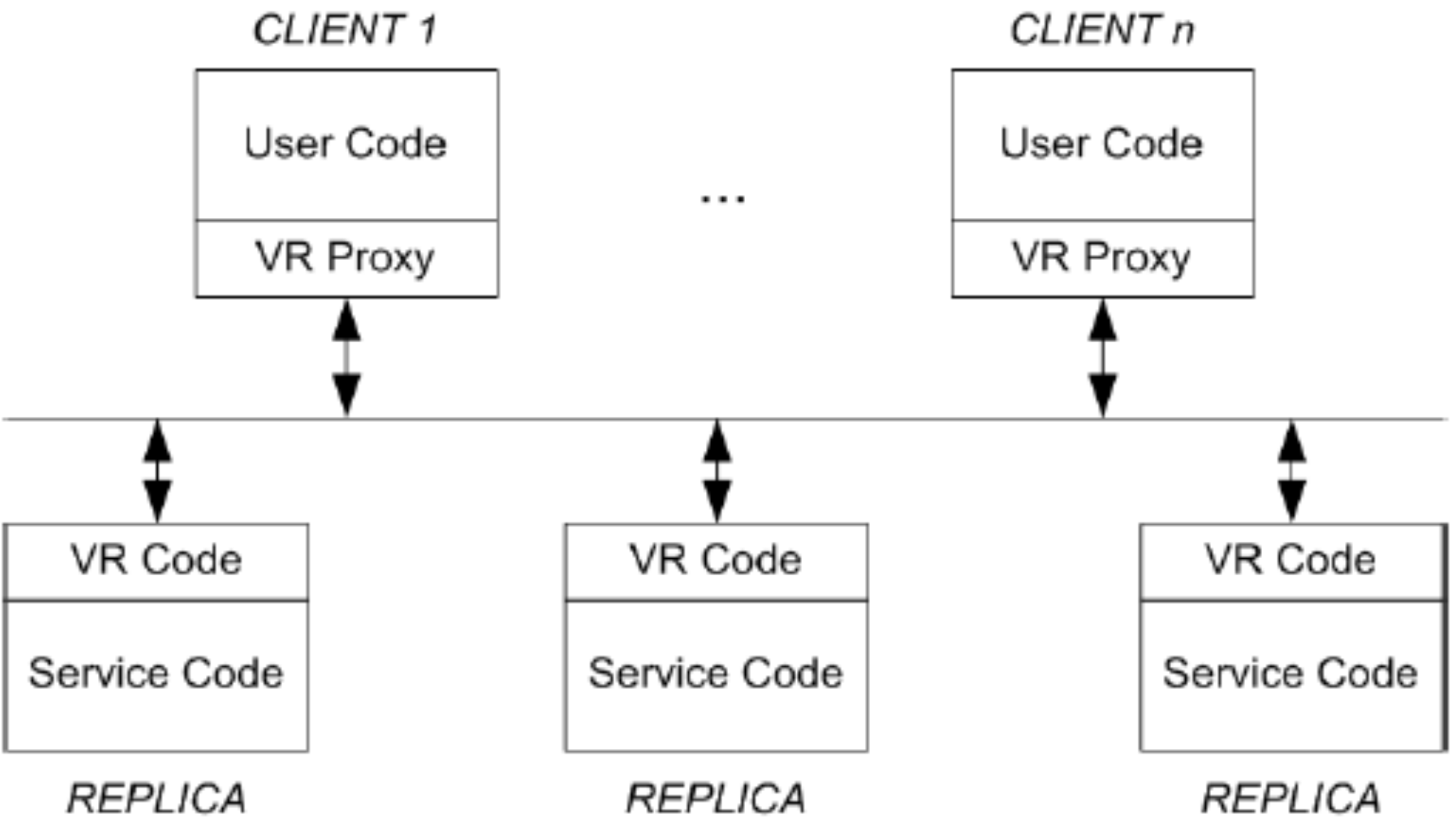
目标：当 f 台机器不参与协议时保留所有信息

$$f + \underbrace{f + 1}$$

不参与协议的机器，有 f 台
表现为：crash或仅仅 unable to reply

参与协议的机器，其中最多可能有 f 台 fail

Architecture



Client	User Code
	VR Proxy
	(Network)
Replica	VR Code
	Service Code

Overview

主要挑战：同步

Primary + Backup(s) { Normal case processing
View change
Recovery
(Reconfiguration)

Replica State

- The *configuration*. This is a sorted array containing the IP addresses of each of the $2f + 1$ replicas.
- The *replica number*. This is the index into the configuration where this replica's IP address is stored.
- The current *view-number*, initially 0.
- The current *status*, either *normal*, *view-change*, or *recovering*.
- The *op-number* assigned to the most recently received request, initially 0.
- The *log*. This is an array containing *op-number* entries. The entries contain the requests that have been received so far in their assigned order.
- The *commit-number* is the *op-number* of the most recently committed operation.
- The *client-table*. This records for each client the number of its most recent request, plus, if the request has been executed, the result sent for that request.

Figure 2: VR state at a replica.

Normal case processing

前置条件

- `status = normal`
- `view_number = current_view`

Normal case processing

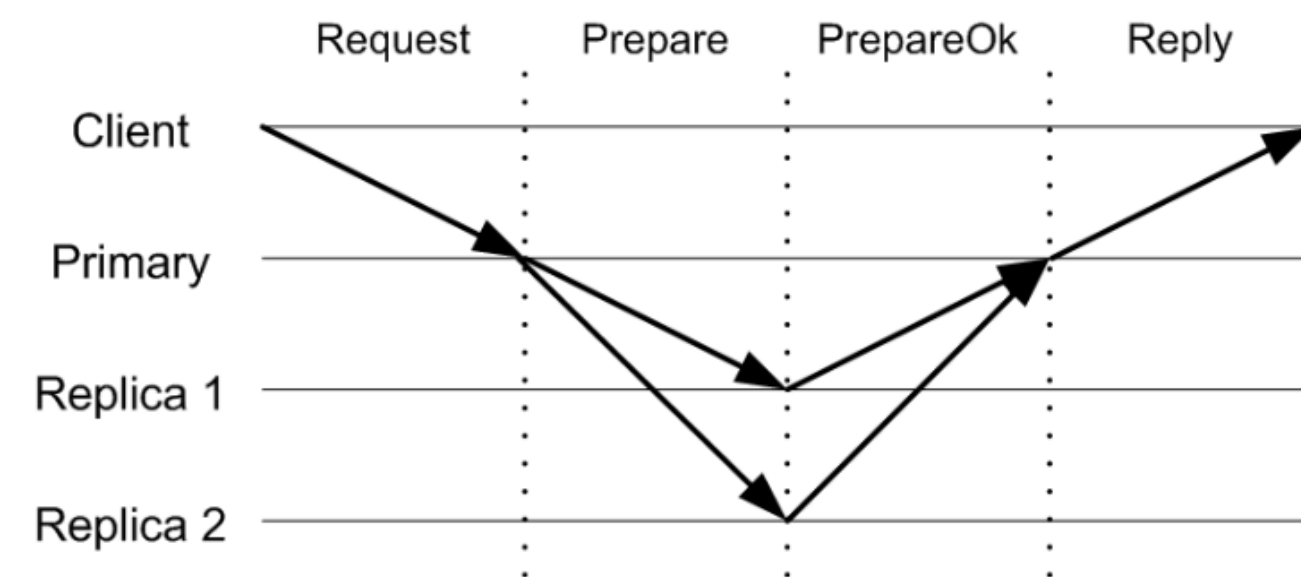
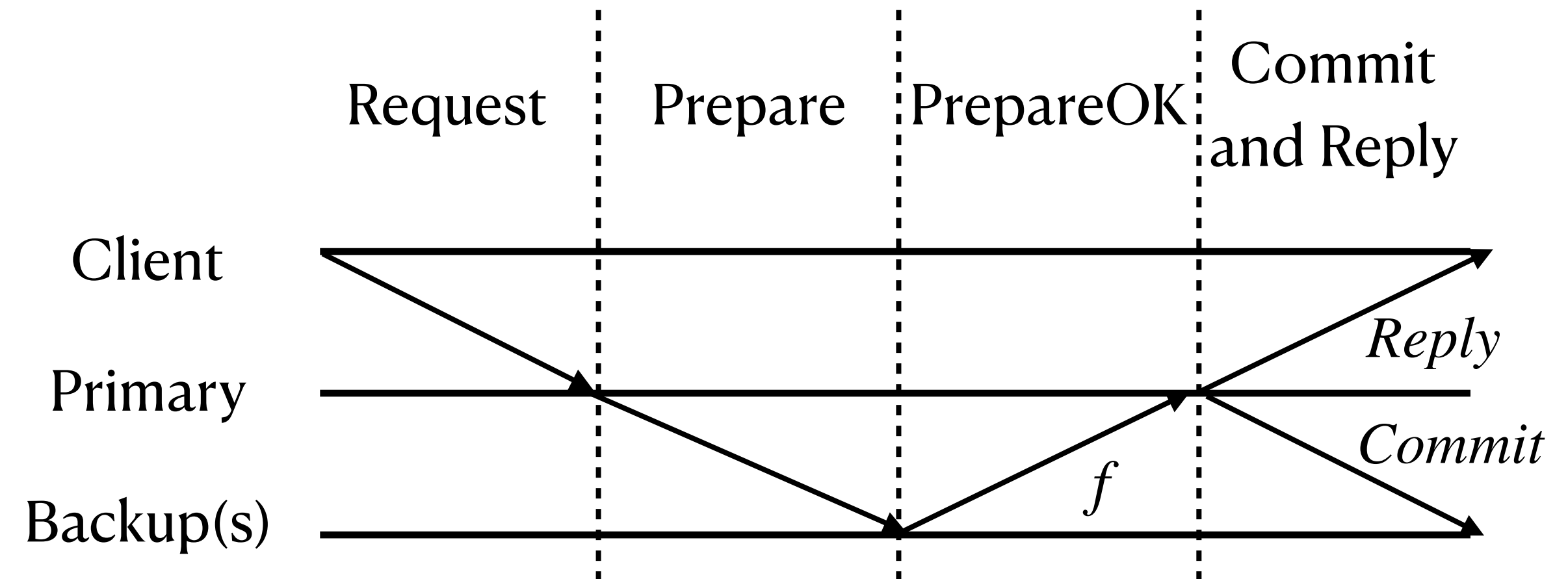


Figure 3: Normal case processing in VR for a configuration with $f = 1$.



	Request	Prepare	PrepareOK	Commit and Reply
Client	request-number			
Primary		op-number		commit-number
Backup(s)				

Normal case processing

