Support Non-voting Member/Learner in Ratis

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Why are learners useful?

The leaner is useful to maintain high availability when new servers join Raft ring (details at thesis 4.2.1, you can find a copy here). For Ozone SCM HA effort, we have also discussed the possibility to utilize leaner as the tool to replace SCM nodes online.

etcd also has an article to explain why learner is useful.

Goals

Support Learner in Ratis, which can be promoted as a normal follower (thus becomes a voting member). Note that the scope of the Learner in this doc is larger than a Listener. Because Learner can replicate state from Leader, and Learner can be promoted to a normal Follower.

When Learner can be added into a Raft Ring?

1. When a Raft Ring starts, the initial RaftGroup could have learners.
2. When a Raft Ring is running, learners can join the ring (need to extend Admin API).

Leader Election

In the RaftConfiguration, there will be two sets of peers: one for normal peers which can vote, the other for learners which cannot vote. So during leader election, candidates only request vote from normal peers, thus learners will not be counted as majority (because learners won't receive RequestVote)

Learners still receive AppendEntries so they can update themselves to the newest leader.

When working like a Listener (not promoted as a normal follower)

Learner should only accept AppendEntries and InstallSnapshot. Learner should reject other requests (e.g. write requests) with an LearningOnlyException. Note that Learner is not supposed to join the DataStream chain either.

Open question: can the learner serve read requests?
- My current thought is no unless there is a use case.

Promote as a normal follower

We can extend the Admin API to allow promoting a learner to a follower. What this operation really does is transite the role of the learner to "FOLLOWER", which will trigger FollowerState demon to start heart beating with the leader.