OpenStack Board Briefing - Condorcet

Context

The OpenStack Board of Directors wishes to consider a resolution to call a special meeting of members to amend the bylaws of the OpenStack Foundation to remove the “cumulative voting” defined process for election of the 8 individual member Directors, and provide for an “order of preference” voting system using either the Condorcet method or the Single Transferable Vote (STV) method of voting.

This briefing paper is intended to brief the Board on the Condorcet voting system, to support the consideration and discussion of the Board resolution when made.

Condorcet Voting

The Condorcet method is an “order of preference” or “ranked” voting system that is used in certain international government, not-for-profit, and other association elections. By definition:

> *“A Condorcet method is a voting system that will always elect the Condorcet winner; this is the candidate whom voters prefer to each other candidate, when compared to them one at a time.”*

Wikipedia has a very good detailed summary of Condorcet here: http://en.wikipedia.org/wiki/Condorcet_method with this overall description:

> “*Each voter ranks the candidates in order of preference (top-to-bottom, or best-to-worst, or 1st, 2nd, 3rd, etc.). The voter may be allowed to rank candidates as equals, to express indifference between them. To save time, candidates omitted by a voter may be treated as if the voter ranked them at the bottom.*
> For each pairing of candidates (as in a round-robin tournament) count how many votes rank each candidate over the other candidate. Thus each pairing will have two totals: the size of its majority and the size of its minority.”

Schulze Method

In most cases, the ranked pairs are sufficient to determine and rank the Condorcet winner. For example, in the last TC election:

http://www.cs.cornell.edu/w8/~andru/cgi-perl/civs/results.pl?num_winners=3&id=E_5af0b5341a01b892&algorithm=beatpath

There were no ties or runoffs needed. The strength of a system is not determined by how well it operates when things are easy though. In the August 2011 OpenStack PPB elections, there was ambiguity between Monty Taylor, Josh Kearny and Soren Hansen:

http://www.cs.cornell.edu/w8/~andru/cgi-perl/civs/results.pl?num_winners=4&id=E_ede443ca3b93b736&algorithm=beatpath

To deal with these, the Schulze method is employed. There is an excellent description here on wikipedia: http://en.wikipedia.org/wiki/Schulze_method which for full correctness requires a discussion of graph theory and some math. For now, let's trust the mathematicians a bit, and summarize as follows.

- Construct the smallest set of candidates such that none in the set are beaten by anyone outside of the set.
- Drop the smallest victory from that set. If there is now an unbeaten candidate, that is the winner. Otherwise, drop again until there is a winner.

Use by other Foundations

The OpenStack Technical Committee, Software in the Public Interest (SPI), The Debian Project, Ubuntu, Gentoo, and The Pirate Party of Sweden all use the Schulze method of Condorcet for their elections.

Legal Considerations

[Mark Radcliffe to populate]

Benefits of Condorcet/Schulze

The general system of ranking candidates from 1 to N is generally well understood in concept. The fact that STV is in use by the OpenStack Technical Committee, as well as Debian and Ubuntu strengthens the

likelihood that the members of the OpenStack Foundation would consider and adopt it as an alternative to cumulative voting. In general, Condorcet is highly regarded by technical communities, as can be seen by its prevalent use amongst Open Source groups. The data and results from a Condorcet election can be published in full to members, enabling verification and analysis by members of where voter preferences were allocated in the end result.

Drawbacks of Condorcet

Like STV, there are choices in implementation of Condorcet - and complex math to calculate results - that can lead to confusion and uncertainty among members. In addition, asking a member to rank in order of preference 20-30 candidates, some of whom the member may not be familiar with, could lead to contention in the voting process and unintended results.

Conclusions

Condorcet is a broadly implemented preference or ranking voting system that is in use by other similar Open Source organizations. The requirement to rank candidates strictly in order of preference, and the counting system in applying those preferences, results in a voting system that provides greater proportional representation than other voting systems. It is also not easily gamed. The voting process is easy to explain to voters, but as with STV, the counting algorithm is more complex to describe (but not insurmountable).

Condorcet is a viable alternative to the current cumulative voting system for individual member Directors, to reduce the perception and reality of block voting by company affiliation.

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