

To: San Francisco Elections Commission
Cc: Director John Arntz
From: David Cary
Date: October 14, 2015

Subject: Scorecard of RFI Responses

Attached is a scorecard for the eleven RFI responses that proposed voting systems for San Francisco. This scorecard can be helpful in providing a summary overview how well the responses met the RFI requirements and for better understanding opportunities to better meet San Francisco's needs with a future voting system.

Some high-level observations about the results of this scorecard include:

1. **None of the voting systems are currently well prepared to meet San Francisco's voting system requirements.** The highest scoring voting system (Dominion's) only meets 26 of the 40 requirements (65%).
2. **There is not currently strong competition to meet all of San Francisco's voting system requirements.** Only one other voting system (Hart's) meets more than half of the requirements. Hart met 21 (52.5%) of the requirements.
3. **None of the five highest scoring, existing voting systems are primarily open source voting systems.**
4. **Voting systems could satisfy more of San Francisco' requirements if they are given more time to respond to the requirements.** The most dramatic example of this was the open source voting system from Galois, which could jump from only meeting two requirements now to meeting 35 requirements if given a greater lead time than the RFI acquisition schedule indicated.

Two consequences related to future action include:

1. **An open source voting system could also help close the requirements gap.** Besides the direct benefits of being open source, there are opportunities to satisfy more of San Francisco's other requirements than any existing voting system.
2. **There is value to pursuing a two-prong approach to San Francisco's next voting systems:** one prong that focuses on shorter term needs to replace the existing system and another prong that allows more time for both open source developers and the larger market to respond to San Francisco's needs.

None of San Francisco's voting system requirements, as expressed in the RFI, were particularly novel. Many of the requirements help lay a foundation for further improving the transparency and trustworthiness of San Francisco elections. So it was disappointing that the newer offerings of well-established

providers did not meet more of San Francisco's requirements.

As long as development and certification cycles for new voting systems can be three years or longer, there will be value for San Francisco to at least engage more proactively and with a longer planning horizon with voting system providers. Such longer-term perspectives and schedules are likely to be a part of any initiative to acquire or develop an open source voting system in the current state of the market.

A description of the evaluation methodology and some caveats for interpreting the results are also attached. This evaluation of the RFI responses to some extent stretches the RFI process beyond its primary purpose and design. The scorecard is not necessarily an accurate predictor of the conclusions that a full evaluation of these voting systems might reach. However this scorecard can still be useful for understanding generally where such evaluations might lead, given the limited information that is currently available from the RFI responses.

Attachments:

1. Scorecard of RFI proposals (3 pages)
2. Scorecard notes (2 pages)
3. Scorecard methodology and caveats (3 pages)

	# yes	# yes or later	Dominion Voting	Hart	Everyone Counts	ES&S	Clear Ballot	OSET	Alan Dechert	CAVO #1	Prime III #2	Galois	IVM
# yes (out of 40)			26	20	16	13	12	11	5	5	4	2	0
# yes or later (out of 40)			26	21	18	14	15	19	6	6	4	35	1
Two references	5	5	yes	yes	yes	yes	yes#4	no	no	no	no	no	no
1 Functionality													
a SoS approved	1	10	yes#5	later#6	later#7	later#8	later#9	later	later	later	no	later	later
b paper ballots	9	10	yes	yes	yes	yes	yes	yes	yes	yes	yes	later	no
c open source	10	10	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no#10
c1 primarily open source	5	5	no	no	no	no	no	yes	yes	yes	yes	yes	no
d third party use	4	5	no	no	no	no	no	yes	yes	yes	yes	later	no
e RCV	0	2	no	no	no	no	no	later	no	no	no	later	no
e1 generally supported	3	9	yes#11	later#12	yes	no#13	later	later	later	later	no	later	yes
e2 rank all candidates	0	2	no	no	no	no	no	later	no	no	no	later	no
f multi-language ballots	5	7	yes#14	yes#14	yes#14	yes#14	yes#14	later	no	no	no	later	no
g one equipment per precinct	1	2	yes	no	no	no	no	no	no	no	no	later	no
h high-speed scanners	7	9	yes	yes	yes	yes	yes	later	yes	yes	no	later	no
i ballot photo image	2	4	no	no	yes	no#15	yes	later	no	no	no	later	no
i1 stores ballot image	4	6	yes	yes	yes	no#15	yes	later	no	no	no	later	no
i2 post on website	3	5	no	yes	yes	no#15	yes	later	no	no	no	later	no
i3 quick xref to paper ballot	2	3	no	no	yes	no	yes	no	no	no	no	later	no
j security reqs, EAC and SoS	1	4	yes	no	no	no	later	later	no	no	no	later	no
k auto format ballot	2	3	no	yes	no	no	no	yes	no	no	no	later	no
l 2 hr aux power	5	7	yes	yes	no#16	no#17	yes	later	yes	yes	no	later	no
m min moving parts	1	2	no	no	no#18	yes	no#19	no	no	no	no	later	no
n clear documentation	0	1	no	no	no	no	no#20	no	no	no	no	later	no
o operational ballot audits	0	1	no	no	no	no	no	later	no	no	no	no	no
p easy custom reports	3	4	yes	yes	yes	no	no	no#21	no	no	no	later	no
q event logging	1	2	no	yes	no	no	no#22	no	no	no	no	later	no
r seamless risk-limiting audits	0	0	no	no#23	no#23	no#23	no#23	no	no	no	no	no#24	no

	# yes	# yes or later	Dominion Voting	Hart	Everyone Counts	ES&S	Clear Ballot	OSET	Alan Dechert	CAVO #1	Prime III #2	Galois	IVM
s digital ballot adjudication	2	3	no	yes	no	no	yes	no	no	no	no	later	no
s1 digital ballot adjudication	4	4	yes	yes	yes	no	yes	no	no	no	no	no	no
s2 adj. actions on website	2	2	no	yes	no	no	yes	no	no	no	no	no	no
t near real-time reporting	2	3	yes	no	no	no	yes#25	no	no	no	no	later	no
u easy transport	2	3	yes	yes	no	no	no	no	no	no	no	later	no
v manually set L&A patterns	3	4	yes	no	no	yes	yes	no	no	no	no	later	no
w compatible with DFM EMS	3	4	yes	yes	no#26	no	no	yes	no	no	no	later	no
x automated SoS testing	1	3	yes	no	later#27	no	no	no	no	no	no	later	no
2 Usability/Transparency													
a accessible for all voters	5	6	yes	yes	no#28	yes	no#28	yes	no	no	yes	later	no#29
b all assistive devices	2	3	no	no	yes	no	yes	no	no	no	no	later	no
c easy equipment setup	1	2	yes	no	no	no	no	no	no	no	no	later	no
d per-ballot tally record	2	3	no	no	no	no	yes	yes	no	no	no	later	no
e log ballot review, to website	2	3	no	yes	yes	no	no#30	no	no	no	no	later	no
f open and human readable report formats	2	3	yes	yes	no	no	no#31	no	no	no	no	later	no
g ballot images on website	4	6	yes	yes	yes	no	later#32	yes	no	no	no	later	no
h flexible external reporting	2	3	yes	no	no#33	no	no	yes	no	no	no	later	no
3 Results Reports													
a election night reporting:	2	3	yes	no	yes	no	no	no	no	no	no	later	no
a1 rapid	2	3	yes	no	yes	no	no	no	no	no	no	later	no
a2 real-time	1	2	yes#34	no#34	no#34	no#34	no#34	no#34	no#34	no#34	no#34	later#34	no#34
a3 versatile	5	6	yes	yes	yes	no	yes	yes	no	no	no	later	no
a4 customizable	5	6	yes	yes	yes	yes	no	yes	no	no	no	later	no
b post-poll-closing contexts	5	6	yes	yes	yes	yes	no	yes	no	no	no	later	no
c variety of formats	1	2	yes#35	no	no	no	no	no	no	no	no	later	no
4 Adaptability													
a changes in law	3	4	no	yes	yes	yes	no	no	no	no	no	later	no

	# yes	# yes or later	Dominion Voting	Hart	Everyone Counts	ES&S	Clear Ballot	OSET	Alan Dechert	CAVO #1	Prime III #2	Galois	IVM
a1 generally	5	6	yes	yes	yes	yes	yes	no	no	no	no	later	no
a2 SB 450 voting centers	4	5	no	yes	yes	yes	no	yes	no	no	no	later	no
b mode of acquisition	5	5	yes	yes	yes	yes	no	no	no	no	no	yes	no
c upgrade	3	3	yes	no	yes	yes	no	no	no	no	no	no	no
d services flexibility	5	5	yes	yes	yes	yes	no	yes	no	no	no	no	no

ScoreCard Notes

- 1 CAVO recommends open source, particularly GPL, COTS hardware, and sponsored development.
- 2 Prime III appears to be only a system for marking ballots, rather than a complete voting system.
- 3 Offers design services, rather than a specific voting system
- 4 It is not immediately clear whether either reference has implemented the proposed system.
- 5 Not all features needed for the requirements marked as fulfilled have been approved.
- 6 Hart expects to have CA approval of its Verity voting system "prior to the City's plan to acquire a new system".
- 7 Everyone Counts is in the process of getting EAC certification and later get California certification.
- 8 ES&S system is currently in the California certification process and is expected to be certified in early 2016.
- 9 California certification planned to start in early 2016. No federal testing has been started.
- 10 Publicly disclosed source might be negotiable.
- 11 No version of the Dominion Democracy Suite has federally or California certified RCV functionality
- 12 Hart supports RCV ballots but requires additional custom designed RCV tabulation logic.
- 13 ES&S provides some support for RCV but does not include RCV tabulation logic, and instead supports data interfaces to any external RCV tabulation program.
- 14 Supports multiple languages, but some ambiguity as to whether a multi-language ballots is supported.
- 15 It is unclear to what extent ES&S DS850 central scanners store photographic images of ballots or make them available for export to a web server.
- 16 Aux power for about 2 hours, but only for precinct ballot box scanner and while plugged in, not necessarily while being used.
- 17 ES&S DS200 precinct scanner has 2 hour battery, but no claim is made about its accessible ExpressVote device.
- 18 Uses COTS hardware to minimize maintenance
- 19 Moving parts in precinct scan system are protected, in tabulation systems limited but not necessarily minimal; ballot printing not addressed.
- 20 Has documentation, but not necessarily clear.
- 21 May need separate reporting engine.
- 22 Does not necessarily log abnormal events other than failed attempts to log into server.
- 23 Does not handle statistics for risk-limiting audits.
- 24 Not aware of how to do risk-limiting audits for RCV.
- 25 Near real-time reporting might not be planned for RCV contests if a single contest can take up to 3 minutes for a preliminary tabulation.
- 26 compatibility with existing DFM Associates EMS is to be determined

- 27 not currently; indefinite plans to support this in the future
- 28 Ballot marking device is accessible to all, but ballot verification and casting ballot is not.
- 29 System is not accessible for visually impaired voters.
- 30 Supports logging of adjudication actions, but not necessarily facilitates posting to website.
- 31 Machine readable formats are supported, but not necessarily in open data formats.
- 32 Posting ballot images to a website is currently a special project that would need to be tailored or standardized for San Francisco.
- 33 Reporting in a common data format is not necessarily flexible.
- 34 Real-time results reporting to the public is likely not practical or in California even possible. Excluded from the assessment for this requirement.
- 35 Provides reports formatted in XML, but not in EML.

Scorecard Methodology

This scorecard evaluated eleven RFI responses from providers that discussed existing or proposed voting systems. Each response and its voting system were evaluated against 40 RFI requirements: the request for two references (II. A. 10) and the 39 enumerated requirements in section II. B., "Specific Criteria for New Voting System". The responses from Civic Design and Digital Foundry are not included in this scorecard because those responses were of a different nature and did not propose a system or address how it would or would not satisfy the evaluated requirements.

The evaluation whether response satisfied a requirement produced one of three results:

- "yes" (shown in green), the existing system fully satisfies the requirement
- "later" (shown in blue), the responder states a commitment to fully satisfying the requirement in the future
- "no" (shown in red), neither the existing system nor a stated commitment for the future will fully satisfy the requirement

Some results have a note that provides additional information about the evaluation.

This evaluation methodology tends to favor simplicity and objectivity over completeness and full precision.

No partial credit was given. If the requirement was for A, B, and C, but the response only demonstrated provision of A and B, the requirement was scored as not met, unless C could reasonably be expected to necessarily be a result of A, B, and other elements of the voting system. Requirements were evaluated against the entire response, not just a part of the response that specifically targeted the requirement. Except as noted below, each full RFI requirement was considered, not just the shortened label shown on the scorecard.

In order to clarify how some multi-part requirements were or were not met, the different parts and their evaluations are shown in the scorecard using a light-gray background and a bold italic font. When this is done, the entire requirement is still scored as a single, no-partial-credit requirement.

Detailed claims in the responses were generally accepted at face value but critically evaluated as to what exactly was and was not being claimed. No attempt was made to independently verify or clarify a claim. The evaluation of detailed claims were given priority, and not uncommonly contradicted a summary claim that a requirement was met.

In two cases, the evaluation or presentation in the scorecard deviates from the RFI requirements:

- Requirement 1.c could be satisfied by a voting system that contained ***any*** open

source software. So for notational purposes, a somewhat stronger requirement, 1.c1, was also evaluated: did the voting system consist primarily of open source software. This is still a fairly weak requirement, but comes closer to what most advocates have in mind when calling for an open source voting system. In evaluation of this requirement, particular weight was given to the status of election-specific software. There were no close calls. However only the evaluation of the original RFI requirement 1.c was tallied in the overall scores.

- Requirement 3.a required real-time results reporting, not just near real-time reporting. I consider real-time results reporting to be an impractical if not impossible requirement to meet in California, particularly since tabulation systems can not be networked with Internet-facing web servers. Since another requirement called for near real time reporting, I ignored the requirement for realtime reporting when evaluating and tallying requirement 3.a.

Scorecard Caveats

This scorecard can produce different results than a full evaluation of each voting system would likely produce. For example:

- The primary purpose of the RFI was to discover generally what was available and to gather input for producing a well-informed RFP. This scorecard stretches beyond that core purpose and design. Responses might have been different in some cases if they had anticipated this kind of detailed and critical evaluation.
- This scorecard is not intended to duplicate, replace, or second guess any evaluation the Department of Elections may perform on the RFI responses.
- An RFP is likely to have different and more detailed requirements. As a result, in some cases the RFP requirements might easier to satisfy, in other cases they might be more difficult to satisfy.
- A full evaluation of a voting system would not be so reliant on unverified claims of the voting system providers.
- Claims about future development and the schedule for such development and certification deserve some skepticism. No attempt was made to evaluate the resonableness of such claims or to assess the likelihood that they would be realized.
- Responses that did a better job of meeting requirements with existing systems tended to focus on the advertized acquisition schedule and did less to address what they might be able to provide beyond that timeframe. In contrast, responses for less developed existing systems tended to spend more effort addressing longer-term prospects for meeting requirements. As a result, this scorecard does not provide a complete picture of future prospects for all responders.
- Some responses chose to focus on a subset of requirements or on issues beyond how a voting system would satisfy the RFI requirements. No attempt was made to compensate for such self-limited responses.
- No attempt was made to weight the requirements or assess whether some requirements were more or less critical than others.
- No attempt was made to give partial credit for meeting parts of a requirement or

otherwise assess how well a requirement was partially met.

- No attempt was made to give extra credit for substantially exceeding a requirement.
- The merits of a response's recommendation to change the requirements were not evaluated.