Environment

Computer	Macbook Pro, 2.6+GHz, 4 cores + HT, 16GB RAM
OS	Ubuntu 14.04
SSD	256GB SDD over Thunderbolt, auto-trim enabled, ext4
RAM	8GB tmpfs

Tests

dump	$repo -r0:5000 -q > /dev/null	
export	$ruby/trunk -q or $bsd/head -q	(target is a RAM disk)
log	$repo/ --limit 20000 > /dev/null	

Uses standard SVN CL client and server /trunk@1607306, no debug, with full optimization.
Client and server run on the same machine.
Machine otherwise idle.

Extra options used in the different configurations

slow	svnserve	(all default)
	file:	(all default)
	dump	(all default)
medium	svnserve	-M 256
	file:	memory-cache-size=256 (in config file)
	dump	-M 256
fast	svnserve	-M 1024 -c 0 --cache-revprops yes --client-speed 1000 --block-read yes
	file:	memory-cache-size=1024 (in config file)
	dump	-M 1024

Repositories

ruby	r46054	http://svn.ruby-lang.org/repos/ruby/
bsd	r263988	http://svn0.eu.FreeBSD.org/base

Methodology
OS disk caches were cleared before each individual "cold" test.
Servers got restarted before each individual "cold" test.
"Hot" tests ran immediately after the respective "cold" run (preserving disk and server caches)
The whole test procedure got run twice to get an indication on result variation; results are from 2. run.
Some results vary by 5 to 10% or 50ms (depending on what is larger).

Results

Runtime	lifetime of the respective client process, given in seconds
	outlier
F7 ./. F6	(runtime format 7 repo) / (runtime format 6 repo) – 1
	< -50% unchanged > +50%
	(twice as fast) (1/3 slower)
Pack/nopack	(runtime packed repo) / (runtime non-packed repo) – 1
	< -50% unchanged > +50%
	(twice as fast) (1/3 slower)
CPU	(user + sys time) / (runtime)
	0% 100% *client-only*

Dump - New

Runtime	SSD cold			SSD hot		
	slow	medium	fast	slow	medium	fast
ruby-f6-nopack	18.6	9.9	9.8	15.5	6.8	6.6
ruby-f7-nopack	18.9	9.2	8.8	15.5	6.7	6.5
ruby-f6-packed	15.5	7.1	6.5	15.8	6.9	6.8
ruby-f7-packed	16.4	7.3	6.8	15.2	6.9	6.9
bsd-f6-nopack	7.2	5.9	5.4	4.6	3.3	3.0
bsd-f7-nopack	7.2	5.2	4.7	4.5	3.0	2.7
bsd-f6-packed	4.9	3.5	3.1	4.4	3.3	3.0
bsd-f7-packed	5.1	3.3	2.7	4.3	2.9	2.4

F7 ./. F6	SSD cold			SSD hot		
	slow	medium	fast	slow	medium	fast
ruby-nopack	2%	-8%	-10%	0%	-2%	-1%
ruby-pack	6%	3%	3%	-4%	-1%	2%
bsd-nopack	0%	-12%	-12%	-3%	-11%	-8%
bsd-pack	5%	-4%	-12%	-1%	-10%	-20%

Pack ./. nopack	SSD cold			SSD hot		
	slow	medium	fast	slow	medium	fast
ruby-f6	-17%	-29%	-34%	2%	2%	4%
ruby-f7	-13%	-21%	-24%	-2%	3%	7%
bsd-f6	-32%	-41%	-43%	-4%	-2%	1%
bsd-f7	-29%	-36%	-42%	-3%	-1%	-11%

CPU	SSD cold			SSD hot		
	slow	medium	fast	slow	medium	fast
ruby-f6-nopack	90%	82%	82%	99%	100%	100%
ruby-f7-nopack	91%	85%	84%	100%	100%	100%
ruby-f6-packed	99%	99%	99%	100%	100%	99%
ruby-f7-packed	97%	97%	97%	100%	99%	99%
bsd-f6-nopack	78%	74%	72%	99%	100%	100%
bsd-f7-nopack	78%	73%	71%	100%	100%	100%
bsd-f6-packed	97%	98%	97%	100%	100%	100%
bsd-f7-packed	92%	94%	92%	100%	100%	100%

Interpretation of results

- Mainly CPU bound for low-latency storage.
- Packed repositories are faster on cold SSD due to more linear I/O.
- No significant difference between F6 and F7, in particular no CPU overhead for F7.
- F7 might be slightly faster in block-read mode ("fast" config) but not significantly here.

Load - New

Runtime	SSD			RAM		
	slow	medium	fast	slow	medium	fast
ruby-f6	89	82	76	38	30	29
ruby-f7	91	83	79	40	31	31
bsd-f6	119	119	113	27	25	25
bsd-f7	120	120	116	28	27	27

F7 ./. F6	SSD			RAM		
	slow	medium	fast	slow	medium	fast
ruby	3%	1%	3%	5%	1%	6%
bsd	1%	1%	3%	7%	7%	6%

CPU	SSD			RAM		
	slow	medium	fast	slow	medium	fast
ruby-f6	67%	63%	65%	100%	100%	100%
ruby-f7	68%	64%	67%	100%	100%	100%
bsd-f6	66%	65%	67%	100%	100%	100%
bsd-f7	66%	65%	67%	100%	100%	100%

Interpretation of results
- Commits in F7 are slightly more expensive than in F6, this is due to index data being written. Actual overhead is within measurement error margins.
- F7 overhead is consistent across all configurations, i.e. no extra penalty with the default conf.
- F7 overhead seems to get masked by I/O latency on SSD.

- Disabling file system fsync ("fast" config) seems to have had no effect with this SSD.
- Overhead in medium and fast config is consistent with older measurements; improvements with "slow" config should thus apply to HDD as well.

Export - New

Runtime

Runtime		SSD cold			SSD hot		
		slow	medium	fast	slow	medium	fast
svn://	ruby-f6-nopack	3.38	3.42	2.36	1.51	0.99	0.31
	ruby-f7-nopack	3.76	3.72	2.34	1.57	0.98	0.32
	ruby-f6-packed	3.01	2.95	1.93	1.57	1.03	0.31
	ruby-f7-packed	2.14	2.14	1.33	1.59	1.04	0.31
	bsd-f6-nopack	37.19	37.09	21.17	22.85	23.99	7.60
	bsd-f7-nopack	39.88	39.42	22.42	23.26	23.05	8.17
	bsd-f6-packed	35.73	35.16	19.15	23.49	25.58	8.04
	bsd-f7-packed	29.87	29.52	17.12	24.00	24.15	10.50
file://	ruby-f6-nopack	2.70	2.78	2.70	0.84	0.89	0.86
	ruby-f7-nopack	3.18	3.08	3.06	0.88	0.89	0.93
	ruby-f6-packed	2.26	2.35	2.41	0.89	0.93	0.96
	ruby-f7-packed	1.50	1.53	1.49	0.91	0.94	0.93
	bsd-f6-nopack	26.22	25.93	25.95	11.51	11.62	11.61
	bsd-f7-nopack	28.00	28.10	28.15	12.48	12.11	11.88
	bsd-f6-packed	24.07	23.86	23.79	12.47	12.14	12.47
	bsd-f7-packed	18.69	18.65	18.75	12.97	12.33	12.30

F7 ./. F6

F7 ./. F6		SSD cold			SSD hot		
		slow	medium	fast	slow	medium	fast
svn://	ruby-nopack	11%	9%	-1%	3%	0%	2%
	ruby-pack	-29%	-27%	-31%	2%	0%	0%
	bsd-nopack	7%	6%	6%	2%	-4%	7%
	bsd-pack	-16%	-16%	-11%	2%	-6%	31%
file://	ruby-nopack	18%	11%	13%	5%	0%	8%
	ruby-pack	-33%	-35%	-38%	3%	1%	-4%
	bsd-nopack	7%	8%	8%	8%	4%	2%
	bsd-pack	-22%	-22%	-21%	4%	2%	-1%

Pack ./. nopack

Pack ./. nopack		SSD cold			SSD hot		
		slow	medium	fast	slow	medium	fast
svn://	ruby-f6	-11%	-14%	-18%	4%	5%	1%
	ruby-f7	-43%	-42%	-43%	2%	5%	-1%
	bsd-f6	-4%	-5%	-10%	3%	7%	6%
	bsd-f7	-25%	-25%	-24%	3%	5%	29%
file://	ruby-f6	-16%	-15%	-11%	6%	4%	12%
	ruby-f7	-53%	-50%	-51%	4%	5%	0%
	bsd-f6	-8%	-8%	-8%	8%	4%	7%
	bsd-f7	-33%	-34%	-33%	4%	2%	4%

CPU

CPU		SSD cold			SSD hot		
		slow	medium	fast	slow	medium	fast
svn://	ruby-f6-nopack	18%	17%	18%	31%	47%	100%
	ruby-f7-nopack	16%	16%	20%	30%	47%	100%
	ruby-f6-packed	17%	18%	23%	31%	46%	99%
	ruby-f7-packed	25%	25%	32%	30%	45%	99%
	bsd-f6-nopack	23%	23%	30%	30%	34%	65%
	bsd-f7-nopack	22%	22%	27%	30%	30%	60%
	bsd-f6-packed	24%	24%	32%	30%	37%	62%
	bsd-f7-packed	27%	27%	33%	29%	31%	53%

		Export - New					
file://	ruby-f6-nopack	48%	50%	48%	100%	100%	100%
	ruby-f7-nopack	45%	45%	45%	100%	100%	100%
	ruby-f6-packed	58%	58%	58%	100%	100%	100%
	ruby-f7-packed	76%	77%	75%	100%	100%	100%
	bsd-f6-nopack	61%	62%	62%	100%	100%	100%
	bsd-f7-nopack	59%	59%	59%	100%	100%	100%
	bsd-f6-packed	68%	68%	68%	100%	100%	100%
	bsd-f7-packed	79%	79%	79%	100%	100%	100%

Interpretation of results

- ra_local shows no significant CPU overhead nor advantage of F7 over F6 (no differences in "hot" case).
- Same for svnserve, however the "fast" config needs slightly more cache in F7 (most of bsd fits into the svn-internal caches of 1GB when using f6, f7 needs to read more data from the OS).
- Throughput with fast data sources is limited by network compression (disabled only in "fast" config).
- Client CPU saturates at about ~150MB/s for ruby, svn-bench will scale further; bsd limited by server-side cache size, currently achieving ~100MB/s.

- Packed repos are much faster than unpacked ones even with fast I/O but cold caches.
- F7 consistently faster than F6 even with fast I/O but cold caches.

Log - New

Runtime

Runtime		SSD cold			SSD hot		
		slow	medium	fast	slow	medium	fast
svn://	ruby-f6-nopack	2.94	2.94	3.02	0.14	0.15	0.18
	ruby-f7-nopack	2.94	2.96	2.98	0.12	0.15	0.18
	ruby-f6-packed	0.94	1.02	0.21	0.90	0.82	0.17
	ruby-f7-packed	0.93	1.06	0.24	0.84	0.82	0.18
	bsd-f6-nopack	2.95	2.93	3.02	0.12	0.15	0.12
	bsd-f7-nopack	2.96	2.92	3.00	0.15	0.12	0.12
	bsd-f6-packed	1.00	1.06	0.34	0.77	0.70	0.12
	bsd-f7-packed	1.00	1.12	0.39	0.71	0.76	0.12
file://	ruby-f6-nopack	3.12	3.19	3.16	0.20	0.20	0.21
	ruby-f7-nopack	3.16	3.14	3.18	0.19	0.22	0.22
	ruby-f6-packed	1.19	1.02	1.05	0.96	0.95	0.94
	ruby-f7-packed	1.06	0.99	1.11	0.92	0.91	0.93
	bsd-f6-nopack	3.17	3.16	3.19	0.27	0.21	0.23
	bsd-f7-nopack	3.16	3.15	3.18	0.20	0.21	0.22
	bsd-f6-packed	1.23	1.10	1.31	0.83	0.85	0.84
	bsd-f7-packed	1.19	1.09	1.19	0.87	0.85	0.88

F7 ./. F6

F7 ./. F6		SSD cold			SSD hot		
		slow	medium	fast	slow	medium	fast
svn://	ruby-nopack	0%	1%	-1%	-18%	1%	1%
	ruby-pack	-2%	4%	14%	-7%	0%	8%
	bsd-nopack	0%	0%	0%	22%	-19%	0%
	bsd-pack	0%	6%	14%	-7%	9%	2%
file://	ruby-nopack	1%	-1%	1%	-5%	8%	3%
	ruby-pack	-11%	-4%	6%	-5%	-4%	0%
	bsd-nopack	0%	0%	0%	-27%	1%	-4%
	bsd-pack	-3%	-1%	-9%	4%	-1%	5%

Pack ./. nopack

Pack ./. nopack		SSD cold			SSD hot		
		slow	medium	fast	slow	medium	fast
svn://	ruby-f6	-68%	-65%	-93%	531%	448%	-4%
	ruby-f7	-69%	-64%	-92%	616%	445%	3%
	bsd-f6	-66%	-64%	-89%	530%	376%	4%
	bsd-f7	-66%	-62%	-87%	378%	539%	6%
file://	ruby-f6	-62%	-68%	-67%	387%	371%	339%
	ruby-f7	-67%	-69%	-65%	388%	320%	325%
	bsd-f6	-61%	-65%	-59%	205%	302%	265%
	bsd-f7	-62%	-65%	-63%	337%	295%	301%

CPU

CPU		SSD cold			SSD hot		
		slow	medium	fast	slow	medium	fast
svn://	ruby-f6-nopack	6%	6%	6%	80%	79%	99%
	ruby-f7-nopack	6%	7%	6%	97%	80%	99%
	ruby-f6-packed	13%	13%	70%	21%	14%	99%
	ruby-f7-packed	13%	13%	67%	15%	14%	99%
	bsd-f6-nopack	7%	6%	6%	98%	84%	100%
	bsd-f7-nopack	7%	6%	7%	85%	99%	100%
	bsd-f6-packed	18%	15%	43%	22%	17%	99%
	bsd-f7-packed	16%	16%	44%	17%	23%	100%

				Log - New		
file://	ruby-f6-nopack	21%	23%	22%	100%	100%	100%
	ruby-f7-nopack	22%	22%	22%	99%	100%	100%
	ruby-f6-packed	94%	94%	95%	100%	100%	100%
	ruby-f7-packed	95%	94%	95%	100%	100%	100%
	bsd-f6-nopack	22%	22%	23%	100%	100%	100%
	bsd-f7-nopack	22%	22%	23%	99%	100%	100%
	bsd-f6-packed	86%	83%	87%	100%	100%	100%
	bsd-f7-packed	85%	82%	85%	100%	100%	100%

Interpretation of results

- Packed repositories much faster for cold caches than non-packed ones even with fast I/O.
- In "hot" case, packed revprops require revprop caching to match non-packed speed but that's only Necessary if very high throughput is the goal (>100k revs/s instead of >20k revs/s)
- F6 and F7 deliver quasi identical performance; differences are well within the 50ms jitter.