<div align="center">Legend</div>

Environment

Computer	VM on XEON E5-2430 2.2GHz; assigned 2 cores, 4GB RAM
OS	Windows Server 2012, x64
Storage	iSCSI SAN, using spinning SCSI discs

Tests

log	$repo/ -v --limit 50000	
export	$ruby/trunk -q or $bsd/head -q	(target is same volume on SAN)
null-log	$repo/ -v --limit 50000 -q	
null-export	$ruby/trunk -q or $bsd/head -q	
dump	$repo -q	
cache	(null-export in "fast" configuration with variation in cache size and "block-read" option)	

SVN client and server were run as 32 bit applications.
Uses standard SVN CL client /trunk@1607811, serf 1.3.6, release build.
　　　　　　Server is /trunk@1611382 for null-export　　(b/c consistency fixes for ra_serf runs)
　　　　　　Server is /trunk@1607811 for everything else
Client and server run on the same machine.
Stdout redirected to NUL by TimeWin.EXE.
Machine otherwise idle.

Extra options used in the different configurations

slow	Apache	(all default)
	svnserve	(all default)
	file:	(all default)
	dump	(all default)
medium	Apache	SVNInMemoryCacheSize=256
	svnserve	-M 256
	file:	memory-cache-size=256　　(in config file)
	dump	-M 256
fast	Apache	SVNInMemoryCacheSize=1024
		SVNCacheRevProps=on
		SVNBlockRead=on
		SVNCompressionLevel=0
	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

3 interleaved copies created with 'copy_repo.py $src $dst 3 128'　　　　(51GB repo data)

Methodology

https://wiki.apache.org/subversion/MeasuringRepositoryPerformance
Repeat tests 3x (once per repo copy)
OS disk caches were cleared before each individual "cold" test.
Servers got restarted before each individual test except for "hot SVN".
"Hot" tests ran immediately after the respective "cold" run (preserving disk and / or server caches)
Cache heatup: Repeat OS cache reads and SVN cache reads twice (5 runs total)
　　　　　　In separate "cache" test, start with "cold" and immediately do 14 extra runs without
　　　　　　restarting the server; give results after the 3rd and 15th total run

Legend

Results
Uses the median values from the 3 repetitions

Runtime   lifetime of the respective client process, given in seconds
                 outlier   Data point seems not to correlate with corresponding data in other sequences
                 >10%   Variation between median and MIN or MAX
                 >20%   Variation between median and MIN or MAX

F6 ./. F7   (runtime format 6 repo) / (runtime format 7 repo) – 1
                 > 100%   unchanged   < -50%
                 (twice as fast)   (half as fast)

Pack/nopack   (runtime non-packed repo) / (runtime packed repo) – 1
                 > 100%   unchanged   < -50%
                 (twice as fast)   (half as fast)

serf ./. RA   (runtime ra_serf) / (runtime other RA) – 1
                 > 100%   unchanged   < -50%
                 (twice as fast)   (half as fast)

CPU   Median(user + kernel time) / Median(runtime)   (may exceed 100%)
                 0%   100%

Log -v

Elapsed Time		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-nopack-f6	422.1	413.6	408.7	13.4	13.5	13.8	13.4	7.6	5.0
	ruby-nopack-f7	366.7	354.0	352.8	11.7	11.4	23.5	11.6	7.3	4.9
	ruby-pack-f6	103.9	86.0	79.0	18.5	18.4	11.0	19.1	13.3	5.0
	ruby-pack-f7	33.8	30.3	12.7	16.5	16.5	5.9	16.4	13.0	4.8
	bsd-nopack-f6	650.4	444.5	450.7	26.6	26.7	28.6	26.8	25.1	16.7
	bsd-nopack-f7	434.8	413.6	390.2	24.2	24.2	41.7	24.2	24.1	17.0
	bsd-pack-f6	175.3	172.0	164.3	31.5	31.5	23.9	31.7	31.3	16.8
	bsd-pack-f7	94.7	91.3	41.8	28.6	29.0	20.0	28.7	28.9	16.7
svn:	ruby-nopack-f6	415.7	413.5	414.0	9.6	9.5	10.2	9.5	4.2	3.1
	ruby-nopack-f7	357.9	357.5	352.8	7.9	7.8	19.3	7.8	4.0	3.0
	ruby-pack-f6	103.3	87.6	77.3	14.9	15.0	7.2	14.8	10.1	3.1
	ruby-pack-f7	27.7	26.6	9.7	13.1	13.2	3.5	13.0	10.0	3.0
	bsd-nopack-f6	527.7	432.2	423.0	13.6	13.8	14.1	13.6	13.9	11.7
	bsd-nopack-f7	467.5	400.8	365.7	12.6	12.7	28.6	12.6	12.8	11.9
	bsd-pack-f6	169.1	160.6	154.0	17.7	18.4	12.3	17.7	17.9	11.6
	bsd-pack-f7	77.0	77.9	27.2	15.9	16.0	12.3	15.8	16.0	11.6
file:	ruby-nopack-f6	419.8	435.6	422.5	11.8	11.8	12.0	11.8	11.6	11.9
	ruby-nopack-f7	350.1	381.6	356.6	10.0	9.9	10.0	9.9	9.9	10.0
	ruby-pack-f6	90.5	96.4	97.3	17.3	17.4	17.7	17.4	17.6	17.6
	ruby-pack-f7	30.3	31.5	30.9	15.4	15.2	15.5	15.4	15.4	15.6
	bsd-nopack-f6	437.5	500.8	506.8	21.8	22.0	22.8	21.9	21.9	22.4
	bsd-nopack-f7	407.1	468.7	524.2	20.1	20.2	20.3	20.2	20.2	20.3
	bsd-pack-f6	170.3	186.7	176.1	27.3	26.9	27.3	27.2	27.0	27.2
	bsd-pack-f7	87.5	92.1	92.6	25.2	25.1	25.0	25.1	24.9	24.9

F6 ./. F7		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-nopack	15%	17%	16%	14%	18%	-41%	15%	4%	1%
	ruby-pack	207%	184%	524%	12%	12%	86%	16%	2%	4%
	bsd-nopack	50%	7%	16%	10%	10%	-31%	11%	4%	-2%
	bsd-pack	85%	88%	293%	10%	9%	20%	10%	8%	0%
svn:	ruby-nopack	16%	16%	17%	22%	22%	-47%	21%	3%	4%
	ruby-pack	273%	229%	695%	14%	14%	106%	13%	2%	3%
	bsd-nopack	13%	8%	16%	8%	8%	-51%	8%	9%	-2%
	bsd-pack	119%	106%	466%	11%	15%	0%	12%	12%	0%
file:	ruby-nopack	20%	14%	18%	18%	19%	20%	19%	17%	20%
	ruby-pack	199%	206%	215%	12%	14%	14%	13%	14%	13%
	bsd-nopack	7%	7%	-3%	8%	9%	12%	9%	8%	10%
	bsd-pack	95%	103%	90%	8%	7%	9%	8%	8%	9%

Nopack ./. Pack		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-f6	306%	381%	417%	-28%	-27%	26%	-30%	-43%	-1%
	ruby-f7	985%	1068%	2686%	-29%	-31%	298%	-29%	-44%	2%
	bsd-f6	271%	158%	174%	-16%	-15%	20%	-15%	-20%	0%
	bsd-f7	359%	353%	833%	-15%	-16%	109%	-16%	-17%	2%
svn:	ruby-f6	302%	372%	436%	-35%	-37%	42%	-36%	-59%	1%
	ruby-f7	1191%	1243%	3530%	-40%	-41%	456%	-40%	-60%	-1%
	bsd-f6	212%	169%	175%	-23%	-25%	15%	-23%	-22%	0%
	bsd-f7	507%	415%	1245%	-21%	-20%	133%	-21%	-20%	2%
file:	ruby-f6	364%	352%	334%	-32%	-32%	-33%	-32%	-34%	-32%
	ruby-f7	1057%	1113%	1055%	-35%	-35%	-36%	-35%	-36%	-36%
	bsd-f6	157%	168%	188%	-20%	-18%	-16%	-19%	-19%	-18%
	bsd-f7	365%	409%	466%	-20%	-19%	-19%	-20%	-19%	-19%

Log -v

ra_serf ./. RA		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
svn:	ruby-nopack-f6	2%	0%	-1%	39%	41%	36%	42%	82%	59%
	ruby-nopack-f7	2%	-1%	0%	49%	46%	21%	48%	81%	63%
	ruby-pack-f6	1%	-2%	2%	25%	23%	53%	29%	31%	61%
	ruby-pack-f7	22%	14%	30%	26%	25%	70%	26%	30%	59%
	bsd-nopack-f6	*23%*	3%	7%	96%	94%	103%	97%	81%	44%
	bsd-nopack-f7	-7%	3%	7%	92%	90%	46%	92%	89%	44%
	bsd-pack-f6	4%	7%	7%	78%	71%	95%	79%	75%	45%
	bsd-pack-f7	23%	17%	54%	80%	81%	62%	81%	81%	44%
file:	ruby-nopack-f6	1%	-5%	-3%	13%	14%	16%	13%	-35%	-58%
	ruby-nopack-f7	5%	-7%	-1%	17%	15%	136%	17%	-27%	-51%
	ruby-pack-f6	15%	-11%	-19%	8%	6%	-38%	10%	-25%	-71%
	ruby-pack-f7	12%	-4%	-59%	7%	8%	-62%	7%	-16%	-69%
	bsd-nopack-f6	*49%*	-11%	-11%	22%	21%	25%	22%	15%	-25%
	bsd-nopack-f7	7%	-12%	-26%	20%	20%	105%	20%	19%	-16%
	bsd-pack-f6	3%	-8%	-7%	15%	17%	-12%	17%	16%	-38%
	bsd-pack-f7	8%	-1%	-55%	13%	16%	-20%	14%	16%	-33%

Client CPU		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-nopack-f6	1%	1%	1%	34%	32%	31%	32%	56%	84%
	ruby-nopack-f7	1%	1%	1%	37%	39%	18%	38%	59%	86%
	ruby-pack-f6	5%	5%	6%	23%	24%	39%	21%	34%	84%
	ruby-pack-f7	13%	13%	33%	27%	27%	72%	27%	33%	87%
	bsd-nopack-f6	3%	4%	4%	62%	62%	58%	62%	65%	99%
	bsd-nopack-f7	4%	4%	4%	68%	68%	40%	68%	68%	98%
	bsd-pack-f6	9%	10%	10%	53%	53%	69%	52%	51%	100%
	bsd-pack-f7	17%	18%	39%	57%	56%	82%	58%	57%	100%
svn:	ruby-nopack-f6	1%	1%	1%	31%	33%	29%	32%	71%	96%
	ruby-nopack-f7	1%	1%	1%	39%	39%	15%	39%	76%	100%
	ruby-pack-f6	3%	3%	4%	21%	21%	41%	21%	30%	97%
	ruby-pack-f7	11%	11%	30%	24%	24%	86%	23%	29%	99%
	bsd-nopack-f6	2%	3%	3%	86%	85%	82%	86%	85%	100%
	bsd-nopack-f7	3%	3%	3%	93%	92%	40%	93%	92%	100%
	bsd-pack-f6	7%	7%	8%	66%	62%	95%	65%	64%	100%
	bsd-pack-f7	15%	15%	43%	73%	73%	96%	73%	72%	100%
file:	ruby-nopack-f6	5%	5%	5%	96%	96%	97%	96%	97%	96%
	ruby-nopack-f7	5%	4%	5%	95%	95%	96%	95%	95%	96%
	ruby-pack-f6	21%	20%	21%	100%	100%	100%	100%	100%	100%
	ruby-pack-f7	52%	50%	51%	100%	100%	100%	100%	100%	100%
	bsd-nopack-f6	7%	7%	6%	98%	98%	98%	98%	98%	98%
	bsd-nopack-f7	7%	6%	6%	98%	98%	98%	98%	98%	97%
	bsd-pack-f6	18%	16%	18%	100%	100%	100%	100%	100%	100%
	bsd-pack-f7	31%	30%	29%	100%	100%	100%	100%	100%	100%

Quality of the measured data
- Median data is pretty consistent with a single outlier
- Variation between test runs exceeds 20% on for actual disk I/O
- The noise on CPU load is about 5%
  ("Hot SVN" in "fast" config should not depend on format nor packing unless with file:)

Impact of the repository format
- Cold disks: Packed f7 is 2x .. 3x as fast with defaults; >5x with advanced settings
- Cached: block-read brings unnecessary CPU overhead for non-packed repos (prefetched data never used)
- F6 seems to have a 10..20% disadvantage
  (probably due to reading the revision trailer to find the change lists offset)

Impact of packing
- Cold disks: Packed repositories are massively faster (>10x for f7)
- Cached: 20 .. 50% revprop parsing overhead can be eliminated by revprop caching

Impact on RA layer
- When the protocol overhead is high (client CPU high), ra_svn is 50...100% faster than ra_serf
- file: is slower only against hot SVN caches and advanced options (neither available to it)

Impact of caching and advanced settings
- SVN cache size has little impact when reading from disk or OS caches
- Revprop caching eliminates packing overhead and gives 50% speed up with hot SVN caches
- Block-read is complete overhead for non-packed revs but gives >2x extra boost when SVN cache is cold
- Cached "fast" configuration gets CPU bound by the client side

Null-log -v

Elapsed Time		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-nopack-f6	420.5	*544.4*	427.1	12.6	12.7	13.1	12.5	6.6	3.8
	ruby-nopack-f7	353.5	*420.4*	357.0	10.6	10.9	22.4	10.5	6.7	3.4
	ruby-pack-f6	88.8	95.2	78.5	17.8	17.7	9.8	17.6	12.5	3.7
	ruby-pack-f7	30.3	30.1	11.7	15.6	15.7	5.1	15.5	12.2	3.3
	bsd-nopack-f6	457.3	*527.8*	449.8	26.4	26.6	27.2	26.7	24.8	14.8
	bsd-nopack-f7	421.5	431.7	385.3	23.7	24.4	41.9	23.7	24.2	15.3
	bsd-pack-f6	176.4	174.2	162.5	31.1	31.3	23.8	31.0	31.0	14.7
	bsd-pack-f7	92.0	92.8	40.3	28.3	28.6	19.9	28.5	28.5	13.8
svn:	ruby-nopack-f6	*528.0*	437.8	423.2	9.1	9.1	9.8	9.2	3.4	1.0
	ruby-nopack-f7	419.9	361.2	359.1	7.6	7.4	19.1	8.1	3.3	0.8
	ruby-pack-f6	95.9	*153.2*	77.6	14.7	14.7	6.6	14.6	9.5	1.0
	ruby-pack-f7	33.9	32.6	9.5	12.7	12.7	2.4	12.6	9.4	0.7
	bsd-nopack-f6	*510.7*	*613.9*	433.8	12.9	13.2	13.9	12.8	13.7	1.9
	bsd-nopack-f7	*468.3*	*554.8*	364.6	11.2	11.3	28.6	11.4	11.3	*2.8*
	bsd-pack-f6	203.9	*302.8*	154.8	17.8	18.2	10.4	17.6	18.1	1.9
	bsd-pack-f7	89.8	100.4	26.6	15.6	16.0	7.7	15.4	16.0	1.8
file:	ruby-nopack-f6	416.6	418.5	426.6	8.9	9.1	8.7	8.7	8.9	8.7
	ruby-nopack-f7	360.2	361.4	353.0	7.0	6.8	7.7	6.9	6.8	7.4
	ruby-pack-f6	89.3	88.6	87.6	14.3	14.2	15.1	14.2	14.2	15.1
	ruby-pack-f7	26.8	27.7	28.2	12.3	12.3	12.4	12.3	12.3	12.4
	bsd-nopack-f6	433.6	435.7	430.1	11.9	12.0	12.1	11.7	11.9	12.2
	bsd-nopack-f7	400.6	398.3	402.8	9.9	10.0	10.1	9.9	10.0	10.0
	bsd-pack-f6	161.8	162.0	161.2	16.7	17.0	16.8	16.6	17.0	16.9
	bsd-pack-f7	75.1	76.1	77.6	14.6	14.8	14.8	14.6	14.7	14.9

F6 ./. F7		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-nopack	19%	29%	20%	19%	17%	-41%	19%	-1%	12%
	ruby-pack	193%	217%	574%	14%	12%	94%	14%	3%	13%
	bsd-nopack	9%	22%	17%	11%	9%	-35%	13%	2%	-3%
	bsd-pack	92%	88%	303%	10%	10%	20%	9%	9%	6%
svn:	ruby-nopack	26%	21%	18%	20%	24%	-49%	13%	3%	27%
	ruby-pack	183%	*370%*	717%	15%	16%	171%	16%	1%	43%
	bsd-nopack	9%	11%	19%	15%	17%	-52%	12%	21%	*-33%*
	bsd-pack	127%	*202%*	482%	14%	14%	35%	14%	13%	3%
file:	ruby-nopack	16%	16%	21%	27%	32%	13%	26%	31%	17%
	ruby-pack	234%	220%	211%	17%	15%	22%	15%	16%	21%
	bsd-nopack	8%	9%	7%	20%	19%	20%	17%	19%	22%
	bsd-pack	116%	113%	108%	14%	15%	14%	14%	15%	13%

Nopack ./. Pack		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-f6	373%	472%	444%	-29%	-28%	33%	-29%	-47%	0%
	ruby-f7	1067%	1298%	2964%	-32%	-31%	341%	-32%	-45%	1%
	bsd-f6	159%	203%	177%	-15%	-15%	14%	-14%	-20%	1%
	bsd-f7	358%	365%	856%	-16%	-15%	111%	-17%	-15%	10%
svn:	ruby-f6	451%	*186%*	445%	-38%	-38%	48%	-37%	-65%	-7%
	ruby-f7	1138%	1008%	3680%	-40%	-42%	682%	-36%	-65%	4%
	bsd-f6	150%	*103%*	180%	-28%	-27%	33%	-28%	-24%	0%
	bsd-f7	421%	453%	1272%	-29%	-30%	271%	-26%	-29%	*54%*
file:	ruby-f6	366%	372%	387%	-38%	-36%	-42%	-39%	-37%	-42%
	ruby-f7	1246%	1203%	1152%	-43%	-45%	-38%	-44%	-45%	-40%
	bsd-f6	168%	169%	167%	-29%	-29%	-28%	-30%	-30%	-28%
	bsd-f7	434%	424%	419%	-32%	-32%	-32%	-32%	-32%	-32%

Null-log -v

ra_serf ./. RA		Cold			Hot OS			Hot SVN	
		slow	medium	fast	slow	medium	fast	slow	medium	fast
svn:	ruby-nopack-f6	*-20%*	24%	1%	39%	39%	33%	36%	97%	289%
	ruby-nopack-f7	-16%	16%	-1%	40%	48%	17%	30%	104%	339%
	ruby-pack-f6	-7%	*-38%*	1%	21%	20%	48%	21%	31%	258%
	ruby-pack-f7	-11%	-8%	23%	23%	24%	107%	23%	29%	351%
	bsd-nopack-f6	-10%	-14%	4%	105%	101%	96%	109%	81%	698%
	bsd-nopack-f7	-10%	*-22%*	6%	113%	117%	47%	108%	115%	*453%*
	bsd-pack-f6	-14%	*-42%*	5%	75%	72%	129%	76%	71%	691%
	bsd-pack-f7	2%	-8%	52%	81%	79%	158%	84%	78%	670%
file:	ruby-nopack-f6	1%	30%	0%	42%	40%	50%	44%	-25%	-57%
	ruby-nopack-f7	-2%	16%	1%	52%	59%	191%	53%	-2%	-55%
	ruby-pack-f6	-1%	7%	-10%	25%	25%	-35%	24%	-12%	-75%
	ruby-pack-f7	13%	8%	-59%	27%	28%	-59%	26%	-1%	-73%
	bsd-nopack-f6	*5%*	21%	5%	122%	122%	125%	129%	108%	21%
	bsd-nopack-f7	5%	8%	-4%	141%	143%	316%	139%	142%	52%
	bsd-pack-f6	9%	8%	1%	86%	85%	42%	86%	82%	-13%
	bsd-pack-f7	23%	22%	-48%	94%	94%	34%	94%	93%	-7%

Client CPU		Cold			Hot OS			Hot SVN	
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-nopack-f6	0%	0%	0%	12%	13%	12%	13%	23%	41%
	ruby-nopack-f7	0%	0%	0%	14%	13%	7%	13%	22%	39%
	ruby-pack-f6	2%	2%	2%	8%	9%	15%	9%	12%	40%
	ruby-pack-f7	5%	5%	13%	10%	8%	30%	10%	13%	42%
	bsd-nopack-f6	1%	1%	1%	24%	25%	24%	24%	25%	43%
	bsd-nopack-f7	2%	1%	2%	28%	26%	16%	27%	28%	42%
	bsd-pack-f6	4%	4%	4%	21%	21%	28%	21%	21%	43%
	bsd-pack-f7	7%	7%	16%	22%	22%	33%	23%	22%	47%
svn:	ruby-nopack-f6	0%	0%	0%	3%	4%	3%	4%	11%	35%
	ruby-nopack-f7	0%	0%	0%	5%	5%	2%	4%	11%	51%
	ruby-pack-f6	0%	0%	0%	3%	3%	5%	3%	4%	37%
	ruby-pack-f7	1%	1%	4%	3%	3%	13%	3%	4%	47%
	bsd-nopack-f6	0%	0%	0%	13%	12%	11%	12%	11%	83%
	bsd-nopack-f7	0%	0%	0%	14%	16%	6%	14%	15%	57%
	bsd-pack-f6	1%	1%	1%	9%	8%	14%	8%	9%	82%
	bsd-pack-f7	2%	1%	6%	11%	9%	18%	9%	11%	94%
file:	ruby-nopack-f6	4%	4%	4%	95%	94%	95%	94%	95%	95%
	ruby-nopack-f7	4%	4%	4%	92%	93%	93%	93%	92%	94%
	ruby-pack-f6	18%	18%	19%	100%	100%	100%	100%	100%	100%
	ruby-pack-f7	47%	47%	46%	100%	100%	100%	100%	100%	100%
	bsd-nopack-f6	5%	5%	5%	95%	96%	96%	95%	96%	96%
	bsd-nopack-f7	5%	5%	5%	94%	95%	95%	94%	95%	95%
	bsd-pack-f6	13%	13%	13%	100%	100%	100%	100%	100%	100%
	bsd-pack-f7	23%	22%	22%	100%	100%	100%	100%	100%	100%

Quality of the measured data

- For cached scenarios, median data is pretty consistent with a single outlier
- Variation exceeded 20% for longer periods when requiring disk I/O.
  Due to temporal and physical interleave, relative performance did fluctuate much less (see outliers)
- The noise on CPU load is about +/-10%
  ("Hot SVN" in "fast" config should not depend on format nor packing unless with file:)

Impact of the repository format
- Cold disks: Packed f7 is 2x .. 3x as fast with defaults; >5x with advanced settings
- Cached: block-read brings unnecessary CPU overhead for non-packed repos (prefetched data never used)
- F6 seems to have a 10..20% disadvantage
  (probably due to reading the revision trailer to find the change lists offset)

Impact of packing
- Cold disks: Packed repositories are massively faster (>10x for f7)
- Cached: 20 .. 100% revprop parsing overhead can be eliminated by revprop caching

Impact on RA layer
- ra_svn has up to 8x thepeak throughput of ra_serf when fed from SVN caches
- file: ra_serf has significant protocol overhead unless fed from hot SVN caches with advanced options

Impact of caching and advanced settings
- SVN cache size has little impact when reading from disk or OS caches
- Revprop caching eliminates packing overhead and gives 2x..4x speed up with hot SVN caches
- Block-read is complete overhead for non-packed revs but gives >2x extra boost when SVN cache is cold

Export trunk

Elapsed Time		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-nopack-f6	141.2	149.3	186.7	8.4	6.8	32.5	18.3	8.1	29.4
	ruby-nopack-f7	139.1	143.7	165.8	9.0	7.4	26.3	10.6	7.0	37.0
	ruby-pack-f6	30.5	34.1	79.5	8.3	7.3	40.2	8.2	6.3	37.3
	ruby-pack-f7	21.6	21.2	25.3	10.5	6.9	26.4	10.3	8.1	37.1
	bsd-nopack-f6	1214.6	1323.9	1463.5	312.3	122.7	714.5	278.3	117.3	740.7
	bsd-nopack-f7	1303.4	1272.8	1502.1	246.3	121.3	494.1	302.8	136.9	594.3
	bsd-pack-f6	467.5	520.7	736.8	242.6	119.3	205.8	272.0	111.6	172.8
	bsd-pack-f7	322.7	369.4	409.9	215.5	132.7	272.8	324.1	132.2	275.1
svn:	ruby-nopack-f6	113.1	105.5	109.4	7.3	6.4	6.8	6.3	7.2	6.5
	ruby-nopack-f7	114.7	108.8	86.5	6.2	7.3	6.6	7.0	8.0	7.0
	ruby-pack-f6	37.4	34.8	35.0	7.7	6.1	6.3	6.7	6.9	6.9
	ruby-pack-f7	23.1	23.7	19.4	6.9	6.5	6.4	7.4	7.1	8.4
	bsd-nopack-f6	807.0	749.8	755.9	109.5	106.1	102.5	110.5	105.9	105.1
	bsd-nopack-f7	838.5	770.7	620.1	112.2	108.6	120.9	112.0	110.3	112.1
	bsd-pack-f6	439.9	435.0	418.4	126.9	106.0	99.2	136.5	102.9	103.6
	bsd-pack-f7	391.0	325.5	215.5	139.2	103.5	97.6	116.8	104.3	109.3
file:	ruby-nopack-f6	109.5	129.0	113.6	8.0	8.1	8.4	8.3	11.1	8.3
	ruby-nopack-f7	113.1	132.0	122.2	8.8	9.5	10.9	8.5	9.8	9.4
	ruby-pack-f6	43.2	50.0	44.0	8.6	9.1	9.4	8.2	9.3	10.3
	ruby-pack-f7	30.2	32.5	35.1	8.8	10.2	8.4	9.0	9.4	8.6
	bsd-nopack-f6	866.1	1087.9	876.7	119.0	162.8	122.4	120.5	129.7	139.8
	bsd-nopack-f7	838.0	976.4	868.0	139.0	131.8	136.5	129.0	154.6	124.7
	bsd-pack-f6	490.6	528.3	489.0	122.0	133.0	122.9	122.3	125.8	124.4
	bsd-pack-f7	364.8	395.2	377.9	120.8	167.6	121.8	122.9	165.2	118.9

F6 ./. F7		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-nopack	2%	4%	13%	-7%	-7%	24%	72%	16%	-20%
	ruby-pack	41%	60%	215%	-20%	6%	52%	-20%	-22%	1%
	bsd-nopack	-7%	4%	-3%	27%	1%	45%	-8%	-14%	25%
	bsd-pack	45%	41%	80%	13%	-10%	-25%	-16%	-16%	-37%
svn:	ruby-nopack	-1%	-3%	27%	18%	-13%	2%	-9%	-10%	-7%
	ruby-pack	62%	47%	80%	13%	-6%	-1%	-9%	-3%	-18%
	bsd-nopack	-4%	-3%	22%	-2%	-2%	-15%	-1%	-4%	-6%
	bsd-pack	13%	34%	94%	-9%	2%	2%	17%	-1%	-5%
file:	ruby-nopack	-3%	-2%	-7%	-9%	-15%	-23%	-3%	13%	-12%
	ruby-pack	43%	54%	25%	-2%	-11%	11%	-9%	-1%	20%
	bsd-nopack	3%	11%	1%	-14%	23%	-10%	-7%	-16%	12%
	bsd-pack	34%	34%	29%	1%	-21%	1%	-1%	-24%	5%

Nopack ./. Pack		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-f6	364%	338%	135%	1%	-7%	-19%	122%	29%	-21%
	ruby-f7	545%	577%	556%	-14%	7%	-1%	3%	-13%	0%
	bsd-f6	160%	154%	99%	29%	3%	247%	2%	5%	329%
	bsd-f7	304%	245%	266%	14%	-9%	81%	-7%	4%	116%
svn:	ruby-f6	202%	203%	213%	-5%	5%	7%	-6%	4%	-5%
	ruby-f7	396%	358%	345%	-10%	14%	4%	-6%	13%	-16%
	bsd-f6	83%	72%	81%	-14%	0%	3%	-19%	3%	1%
	bsd-f7	114%	137%	188%	-19%	5%	24%	-4%	6%	3%
file:	ruby-f6	153%	158%	158%	-7%	-11%	-10%	1%	19%	-20%
	ruby-f7	274%	306%	248%	1%	-6%	30%	-6%	4%	9%
	bsd-f6	77%	106%	79%	-3%	22%	0%	-1%	3%	12%
	bsd-f7	130%	147%	130%	15%	-21%	12%	5%	-6%	5%

Export trunk

ra_serf ./. RA		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
svn:	ruby-nopack-f6	25%	42%	71%	15%	7%	381%	189%	13%	350%
	ruby-nopack-f7	21%	32%	92%	45%	0%	298%	53%	-13%	426%
	ruby-pack-f6	-19%	-2%	127%	8%	20%	538%	23%	-9%	442%
	ruby-pack-f7	-7%	-11%	30%	52%	7%	315%	39%	14%	342%
	bsd-nopack-f6	51%	77%	94%	185%	16%	597%	152%	11%	605%
	bsd-nopack-f7	55%	65%	142%	120%	12%	308%	170%	24%	430%
	bsd-pack-f6	6%	20%	76%	91%	13%	108%	99%	8%	67%
	bsd-pack-f7	-17%	13%	90%	55%	28%	180%	177%	27%	152%
file:	ruby-nopack-f6	29%	16%	64%	5%	-16%	286%	120%	-27%	257%
	ruby-nopack-f7	23%	9%	36%	2%	-23%	140%	25%	-28%	296%
	ruby-pack-f6	-29%	-32%	81%	-3%	-19%	329%	0%	-32%	263%
	ruby-pack-f7	-29%	-35%	-28%	19%	-32%	213%	14%	-14%	331%
	bsd-nopack-f6	*40%*	22%	67%	162%	-25%	484%	131%	-10%	430%
	bsd-nopack-f7	56%	30%	73%	77%	-8%	262%	135%	-11%	377%
	bsd-pack-f6	-5%	-1%	51%	99%	-10%	67%	122%	-11%	39%
	bsd-pack-f7	-12%	-7%	8%	78%	-21%	124%	164%	-20%	131%

Client CPU		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-nopack-f6	3%	3%	2%	50%	60%	13%	24%	54%	15%
	ruby-nopack-f7	3%	3%	3%	47%	56%	15%	38%	63%	11%
	ruby-pack-f6	14%	12%	5%	49%	57%	10%	52%	68%	12%
	ruby-pack-f7	19%	21%	17%	39%	62%	16%	40%	53%	11%
	bsd-nopack-f6	5%	5%	4%	18%	47%	9%	21%	50%	8%
	bsd-nopack-f7	5%	5%	4%	24%	49%	13%	19%	43%	10%
	bsd-pack-f6	13%	12%	8%	24%	49%	28%	21%	51%	34%
	bsd-pack-f7	18%	17%	14%	26%	44%	21%	18%	44%	21%
svn:	ruby-nopack-f6	4%	4%	4%	54%	64%	61%	64%	59%	63%
	ruby-nopack-f7	4%	4%	5%	65%	56%	59%	57%	53%	60%
	ruby-pack-f6	11%	13%	12%	52%	65%	62%	58%	62%	61%
	ruby-pack-f7	18%	19%	21%	60%	62%	61%	55%	61%	51%
	bsd-nopack-f6	8%	8%	8%	54%	55%	54%	52%	55%	55%
	bsd-nopack-f7	7%	8%	9%	51%	53%	46%	54%	53%	50%
	bsd-pack-f6	14%	14%	13%	46%	54%	54%	42%	55%	54%
	bsd-pack-f7	16%	18%	25%	42%	55%	54%	49%	54%	50%
file:	ruby-nopack-f6	7%	6%	7%	84%	82%	79%	78%	60%	79%
	ruby-nopack-f7	7%	6%	7%	76%	74%	63%	80%	72%	72%
	ruby-pack-f6	16%	15%	15%	76%	75%	70%	80%	73%	64%
	ruby-pack-f7	22%	23%	21%	76%	68%	80%	72%	74%	79%
	bsd-nopack-f6	11%	9%	11%	71%	53%	68%	70%	66%	60%
	bsd-nopack-f7	11%	10%	11%	63%	67%	65%	68%	59%	70%
	bsd-pack-f6	19%	17%	19%	71%	65%	70%	72%	69%	69%
	bsd-pack-f7	25%	23%	24%	73%	53%	72%	74%	54%	73%

Quality of the measured data
- Reliability of individual data points is poor due to the client writing to the same storage that we read from
- Data for svn: and file: looks consistent but http: is quite eratic
- No specific outliers have been marked

Impact of the repository format
- Cold caches: Packed f7 repositories provide 30..60% better performance, 100% with advanced settings
- Hot caches: too much variation, typ. -20% .. +20% (probably dominated by client, see client CPU load)

Impact of packing
- Cold caches: Packed repos are 2x .. 7x as fast
- Hot caches: too much variation and unreliable http: data, typ. -20% .. +20% (probably dominated by client, see client CPU load)

Impact on RA layer
- Not much difference between ra_svn and ra_local, with a slight advantage of ra_svn
- ra_serf seems to have a relative weakness in default config from hot caches
- ra_serf has a major issue with "fast" config

Impact of caching and advanced settings
- No significant impact apart from the ra_serf issue. Mostly client-limited.

Null-export trunk

Elapsed Time		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-nopack-f6	132.1	132.2	129.3	4.5	4.1	4.1	4.5	1.2	0.47
	ruby-nopack-f7	128.9	130.0	115.7	5.1	4.4	3.9	5.1	1.1	0.48
	ruby-pack-f6	25.0	24.9	24.8	4.0	3.7	3.4	4.0	1.6	0.47
	ruby-pack-f7	17.9	17.4	12.9	4.1	3.7	3.7	4.0	1.5	0.45
	bsd-nopack-f6	1143.6	1151.0	1114.0	55.5	48.7	45.0	55.3	48.4	38.2
	bsd-nopack-f7	1134.5	1192.3	978.2	63.4	52.4	43.6	63.1	51.5	39.3
	bsd-pack-f6	401.3	397.5	385.4	49.1	44.6	39.7	49.1	44.6	32.4
	bsd-pack-f7	260.9	257.7	150.8	51.8	44.7	58.4	51.8	44.3	57.6
svn:	ruby-nopack-f6	99.2	98.9	96.2	4.0	4.2	2.4	3.9	2.1	0.19
	ruby-nopack-f7	105.3	102.4	79.8	4.2	4.4	2.4	4.1	2.1	0.20
	ruby-pack-f6	29.6	30.3	31.9	4.1	4.2	2.3	4.0	2.3	0.19
	ruby-pack-f7	19.9	20.5	13.9	4.1	4.3	2.4	4.0	2.3	0.19
	bsd-nopack-f6	703.0	706.8	668.0	56.1	56.9	27.6	56.0	56.5	18.4
	bsd-nopack-f7	703.0	731.4	521.7	57.8	58.3	27.9	57.7	58.0	21.4
	bsd-pack-f6	379.5	380.4	357.7	58.9	58.3	28.3	58.6	57.8	19.2
	bsd-pack-f7	276.7	278.9	163.9	59.0	59.2	31.9	59.0	58.8	25.4
file	ruby-nopack-f6	98.0	99.1	99.5	1.9	2.1	2.2	1.9	2.2	2.2
	ruby-nopack-f7	101.4	104.1	105.5	2.1	2.3	2.4	2.1	2.3	2.4
	ruby-pack-f6	30.7	31.1	29.0	2.0	2.1	2.2	2.0	2.1	2.2
	ruby-pack-f7	18.5	19.2	19.0	2.0	2.2	2.3	2.0	2.2	2.3
	bsd-nopack-f6	663.7	679.7	659.7	23.0	23.8	24.6	23.1	23.8	24.0
	bsd-nopack-f7	685.3	682.7	669.7	24.4	25.2	25.6	24.6	25.2	25.3
	bsd-pack-f6	355.6	355.5	351.9	25.6	25.3	25.5	25.8	25.2	25.4
	bsd-pack-f7	248.0	250.3	249.5	25.6	26.1	26.4	25.5	25.9	26.2

F6 ./. F7		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-nopack	2%	2%	12%	-11%	-7%	5%	-12%	5%	-3%
	ruby-pack	40%	43%	91%	-2%	1%	-8%	-2%	5%	4%
	bsd-nopack	1%	-3%	14%	-12%	-7%	3%	-12%	-6%	-3%
	bsd-pack	54%	54%	156%	-5%	0%	-32%	-5%	1%	-44%
svn:	ruby-nopack	-6%	-3%	21%	-4%	-6%	-2%	-5%	-1%	-8%
	ruby-pack	49%	48%	129%	-2%	-2%	-6%	-2%	-1%	0%
	bsd-nopack	0%	-3%	28%	-3%	-2%	-1%	-3%	-2%	-14%
	bsd-pack	37%	36%	118%	0%	-2%	-11%	-1%	-2%	-25%
file	ruby-nopack	-3%	-5%	-6%	-10%	-7%	-8%	-9%	-5%	-8%
	ruby-pack	66%	62%	52%	-4%	-4%	-3%	-5%	-4%	-2%
	bsd-nopack	-3%	0%	-1%	-6%	-5%	-4%	-6%	-6%	-5%
	bsd-pack	43%	42%	41%	0%	-3%	-3%	1%	-3%	-3%

Nopack ./. Pack		Cold			Hot OS			Hot SVN		
		slow	medium	fast	slow	medium	fast	slow	medium	fast
http:	ruby-f6	429%	430%	422%	14%	10%	21%	14%	-25%	0%
	ruby-f7	620%	646%	795%	26%	19%	6%	27%	-25%	7%
	bsd-f6	185%	190%	189%	13%	9%	13%	13%	8%	18%
	bsd-f7	335%	363%	549%	23%	17%	-25%	22%	16%	-32%
svn:	ruby-f6	236%	226%	202%	-2%	-1%	5%	-1%	-8%	0%
	ruby-f7	429%	399%	473%	1%	3%	1%	2%	-7%	9%
	bsd-f6	85%	86%	87%	-5%	-3%	-3%	-4%	-2%	-4%
	bsd-f7	154%	162%	218%	-2%	-2%	-13%	-2%	-1%	-16%
file	ruby-f6	219%	218%	243%	-4%	0%	0%	-3%	2%	-1%
	ruby-f7	448%	443%	454%	3%	4%	5%	2%	4%	5%
	bsd-f6	87%	91%	87%	-10%	-6%	-3%	-10%	-6%	-5%
	bsd-f7	176%	173%	168%	-5%	-3%	-3%	-4%	-3%	-4%

Null-export trunk

ra_serf ./. RA	Cold			Hot OS			Hot SVN		
	slow	medium	fast	slow	medium	fast	slow	medium	fast
svn: ruby-nopack-f6	33%	34%	34%	14%	0%	72%	15%	-43%	150%
ruby-nopack-f7	22%	27%	45%	23%	1%	61%	25%	-46%	138%
ruby-pack-f6	-16%	-18%	-22%	-2%	-11%	50%	0%	-30%	150%
ruby-pack-f7	-10%	-15%	-7%	-2%	-13%	54%	0%	-34%	142%
bsd-nopack-f6	63%	63%	67%	-1%	-14%	63%	-1%	-14%	108%
bsd-nopack-f7	61%	63%	87%	10%	-10%	56%	9%	-11%	84%
bsd-pack-f6	6%	4%	8%	-17%	-24%	40%	-16%	-23%	69%
bsd-pack-f7	-6%	-8%	-8%	-12%	-25%	83%	-12%	-25%	126%
file ruby-nopack-f6	35%	33%	30%	143%	96%	88%	140%	-45%	-79%
ruby-nopack-f7	27%	25%	10%	145%	96%	64%	147%	-50%	-80%
ruby-pack-f6	-19%	-20%	-15%	105%	78%	55%	104%	-25%	-79%
ruby-pack-f7	-3%	-9%	-32%	100%	70%	64%	98%	-31%	-80%
bsd-nopack-f6	72%	69%	69%	141%	104%	83%	139%	103%	59%
bsd-nopack-f7	66%	75%	46%	160%	108%	70%	157%	104%	56%
bsd-pack-f6	13%	12%	10%	92%	77%	56%	90%	77%	27%
bsd-pack-f7	5%	3%	-40%	103%	71%	122%	103%	71%	120%

Client CPU	Cold			Hot OS			Hot SVN		
	slow	medium	fast	slow	medium	fast	slow	medium	fast
http: ruby-nopack-f6	0%	0%	0%	8%	10%	9%	7%	29%	53%
ruby-nopack-f7	0%	0%	0%	7%	7%	9%	7%	29%	74%
ruby-pack-f6	2%	2%	2%	9%	12%	10%	7%	25%	60%
ruby-pack-f7	2%	2%	2%	8%	8%	9%	8%	21%	73%
bsd-nopack-f6	0%	1%	0%	8%	10%	11%	8%	9%	12%
bsd-nopack-f7	0%	0%	1%	8%	8%	11%	7%	9%	12%
bsd-pack-f6	1%	1%	1%	9%	11%	12%	10%	10%	14%
bsd-pack-f7	2%	2%	3%	10%	11%	8%	9%	11%	8%
svn: ruby-nopack-f6	0%	0%	0%	1%	1%	3%	2%	2%	50%
ruby-nopack-f7	0%	0%	0%	1%	2%	3%	2%	4%	38%
ruby-pack-f6	0%	0%	0%	2%	1%	5%	2%	3%	58%
ruby-pack-f7	1%	1%	1%	2%	1%	4%	2%	3%	25%
bsd-nopack-f6	0%	0%	0%	1%	1%	5%	1%	1%	8%
bsd-nopack-f7	0%	0%	0%	1%	1%	4%	1%	1%	6%
bsd-pack-f6	0%	0%	0%	1%	1%	5%	1%	1%	7%
bsd-pack-f7	0%	0%	1%	1%	1%	4%	1%	1%	5%
file ruby-nopack-f6	3%	3%	3%	98%	97%	98%	98%	97%	99%
ruby-nopack-f7	3%	3%	3%	99%	98%	97%	98%	98%	98%
ruby-pack-f6	9%	9%	9%	100%	100%	100%	100%	99%	99%
ruby-pack-f7	14%	13%	14%	100%	100%	100%	100%	99%	100%
bsd-nopack-f6	5%	5%	5%	99%	99%	99%	99%	99%	99%
bsd-nopack-f7	5%	5%	5%	99%	99%	99%	99%	99%	99%
bsd-pack-f6	8%	8%	9%	100%	100%	100%	100%	100%	100%
bsd-pack-f7	12%	12%	12%	100%	100%	100%	100%	100%	100%

Quality of the measured data
- Median data is consistent for all data sequences
- Variation >10% is always MEDIAN vs. MAX
- Execution times <2s affected by clock resolution noise (16ms)

Impact of the repository format
- Cold caches: Packed f7 repositories provide 40..50% better performance, 100% with advanced settings
- Hot caches: typ. <10% except for large repos with advanced cache settings; see below for more

Impact of packing
- Cold caches: Packed repos are 2x .. 7x as fast
- Hot caches (OS / SVN): <10% penalty for svn:, file: and 10..20% benefit with serf.
  Exceptions for large repos when using advanced options (bsd-f7) or when the repo is
  fully cached but revprop caching is not active (ruby with medium caches)

Impact on RA layer
- ra_serf is fastest RA when fed from hot and complete (large enough) SVN caches but w/o advanced options
- ra_serf is slower by 20..80% when reading unpoacked repos from cold disks
- ra_svn requires network compression to be disabled for high throughput
- file: is faster for cached data unless SVN caches are hot and network compression is off

Impact of caching and advanced settings
- Cache size only matters when running from hot SVN caches (see file:)
- 1GB covers only 2/3 of the BSD data resulting in different relative number for BSD and RUBY (much smaller)
- Block-read gives an additional 50% speedup reading cold data; penalty is 30% when reading from OS cache
- ra_svn on hot SVN caches benefits (factor 10) from n/w compression off, revprop caching and zero copy code

(more details on caching options in a separate test sequence)

Dump

Elapsed Time	Cold			Hot		
	slow	medium	fast	slow	medium	fast
ruby-nopack-f6	948.5	600.3	573.0	620.4	294.3	270.7
ruby-nopack-f7	947.7	509.6	481.4	623.0	263.9	238.4
ruby-pack-f6	677.2	336.2	315.6	611.1	292.0	265.4
ruby-pack-f7	732.3	292.1	261.0	609.7	260.6	230.4
bsd-nopack-f6	3982.1	3404.3	2786.2	3952.9	3511.5	2752.6
bsd-nopack-f7	4198.0	3130.9	2168.4	4099.5	2868.4	2270.2
bsd-pack-f6	2769.8	2055.6	1604.8	2666.8	1911.5	1577.5
bsd-pack-f7	3108.3	2528.3	1274.4	2511.7	2450.9	1241.4

F6 ./. F7	Cold			Hot		
	slow	medium	fast	slow	medium	fast
ruby-nopack	0%	18%	19%	0%	12%	14%
ruby-pack	-8%	15%	21%	0%	12%	15%
bsd-nopack	-5%	9%	28%	-4%	22%	21%
bsd-pack	-11%	-19%	26%	6%	-22%	27%

Nopack ./. Pack	Cold			Hot		
	slow	medium	fast	slow	medium	fast
ruby-f6	40%	79%	82%	2%	1%	2%
ruby-f7	29%	74%	84%	2%	1%	3%
bsd-f6	44%	66%	74%	48%	84%	74%
bsd-f7	35%	24%	70%	63%	17%	83%

Client CPU	Cold			Hot		
	slow	medium	fast	slow	medium	fast
ruby-nopack-f6	67%	50%	49%	100%	100%	100%
ruby-nopack-f7	67%	53%	52%	100%	100%	100%
ruby-pack-f6	91%	86%	85%	100%	100%	100%
ruby-pack-f7	84%	89%	88%	100%	100%	100%
bsd-nopack-f6	58%	48%	43%	58%	47%	44%
bsd-nopack-f7	57%	52%	45%	59%	56%	43%
bsd-pack-f6	81%	74%	69%	83%	79%	70%
bsd-pack-f7	73%	91%	83%	89%	93%	85%

Quality of the measured data
- Data sequences are fairly consistent with low variation
- bsd-nopack-f7 with medium-sized SVN caches and hot OS caches may have a >10% error

Impact of the repository format
- f6 has a minor (0..10%) advantage with small caches from cold disks
- f7 has a small (10..30%) advantage with larger caches
- f7 suffers a 20% penalty for large repos and medium cache sizes

Impact of packing
- packed repos are 20 .. 80% faster unless all data fits neatly into the OS cache

Impact of caching
- Larger caches translated into faster speed in all cases. Doubled performance is typical.
- F7 uses "block-read" implicitly in medium and fast configs, typ. Giving a 20% advantage
  Same feature is responsible for the 20% penalty with the bsd repo in "medium" config

Cache

Elapsed Time

		1.0G SVN cache				1.7G SVN cache			
		block-read off		block-read on		block-read off		block-read on	
		3rd run	15th run	3rd run	15th run	3rd run	15th run	3rd run	15th run
http:	bsd-nopack-f6	38.7	38.1	38.6	38.2	22.2	11.3	22.1	10.8
	bsd-nopack-f7	38.1	19.3	39.2	36.6	18.0	10.7	22.7	13.5
	bsd-pack-f6	32.5	31.7	32.3	32.1	21.2	9.5	20.2	9.7
	bsd-pack-f7	30.5	30.7	57.5	57.3	18.2	9.7	31.9	18.5
svn:	bsd-nopack-f6	18.4	5.7	18.6	5.7	4.5	2.6	4.5	2.6
	bsd-nopack-f7	18.9	5.9	21.4	7.3	4.4	2.7	6.6	2.6
	bsd-pack-f6	19.0	6.2	18.8	6.0	5.2	2.7	5.2	2.7
	bsd-pack-f7	20.0	6.1	26.2	19.7	5.2	2.6	12.8	2.6

F6 ./. F7

		1.0G SVN cache				1.7G SVN cache			
		block-read off		block-read on		block-read off		block-read on	
		3rd run	15th run	3rd run	15th run	3rd run	15th run	3rd run	15th run
http:	bsd-nopack	1%	98%	-2%	5%	24%	6%	-3%	-20%
	bsd-pack	6%	3%	-44%	-44%	17%	-2%	-37%	-47%
svn:	bsd-nopack	-3%	-3%	-13%	-22%	2%	-2%	-32%	-1%
	bsd-pack	-5%	1%	-28%	-70%	2%	1%	-59%	1%

Nopack ./. Pack

		1.0G SVN cache				1.7G SVN cache			
		block-read off		block-read on		block-read off		block-read on	
		3rd run	15th run	3rd run	15th run	3rd run	15th run	3rd run	15th run
http:	bsd-f6	19%	20%	19%	19%	5%	19%	10%	11%
	bsd-f7	25%	-37%	-32%	-36%	-1%	11%	-29%	-27%
svn:	bsd-f6	-3%	-7%	-1%	-4%	-15%	-2%	-14%	-1%
	bsd-f7	-6%	-3%	-18%	-63%	-15%	1%	-48%	0%

serf ./. svn:

		1.0G SVN cache				1.7G SVN cache			
		block-read off		block-read on		block-read off		block-read on	
		3rd run	15th run	3rd run	15th run	3rd run	15th run	3rd run	15th run
	bsd-nopack-f6	110%	565%	107%	568%	395%	335%	390%	311%
	bsd-nopack-f7	102%	225%	84%	400%	308%	301%	242%	411%
	bsd-pack-f6	71%	413%	72%	439%	305%	256%	286%	266%
	bsd-pack-f7	52%	402%	120%	191%	252%	266%	149%	600%

Client CPU

		1.0G SVN cache				1.7G SVN cache			
		block-read off		block-read on		block-read off		block-read on	
		3rd run	15th run	3rd run	15th run	3rd run	15th run	3rd run	15th run
http:	bsd-nopack-f6	12%	12%	12%	12%	19%	38%	20%	39%
	bsd-nopack-f7	13%	24%	12%	12%	26%	40%	20%	31%
	bsd-pack-f6	14%	15%	14%	13%	20%	44%	21%	45%
	bsd-pack-f7	16%	15%	8%	8%	25%	44%	14%	23%
svn:	bsd-nopack-f6	7%	24%	7%	23%	27%	47%	28%	45%
	bsd-nopack-f7	8%	22%	6%	18%	30%	46%	19%	46%
	bsd-pack-f6	7%	20%	7%	23%	24%	46%	26%	46%
	bsd-pack-f7	6%	21%	5%	7%	24%	47%	10%	47%

Quality of the measured data
- Good consistency with no unexplicable outliers
- Heatup is not a linear process; results fluctuate between runs depending on what data got evicted
- Heatup pattern has been consistent between repeated tests
- RUBY repo omitted from this test as it always fits entirely into these large caches

Impact of the repository format
- Block-read off: no consistent difference; differences in long-term heatup due to "lucky" caching pattern and cannot be expect from other repositories
- Block-read on: Smaller caches don't heat up well due to extra load / data noise

Impact of packing
- Fully heated caches: No difference (f7 block-read makes this harder)
- Partially cached: packed repos are 20% faster with ra_serf (again offset by f7 block-read)

Impact on RA layer
- ra_svn is 2x as fast as ra_serf with partial caches
- ra_svn is 4x as fast as ra_serf after cache heatup, if caches are too small for ra_serf heatup
- ra_serf's access pattern requires approx. twice as much data to be cached – preventing full heatup

Impact of cache size and block-read
- Rule of thumb: cache size needs to be 2x c/o data size, i.e. 1.5G for bsd repo
  (directories, repository meta data, 35% cache addressing overhead)
- ra_svn: 1.7G allows for full heatup, i.e. all data will eventually be cached
- ra_serf: Tree walks for many revisions roughly double cache requirements, preventing heatup
- If the cache size is at least 50% of the required size, repeated access will result in higher hit rates
  (performance improving slowly, cache covers the actually important bits)
- Block-read hurts heat-up (up to factor 2) if caches are too small
- Generously sized caches give a 5x performance boost