MIPS Management for a Mobile World

Session 16983

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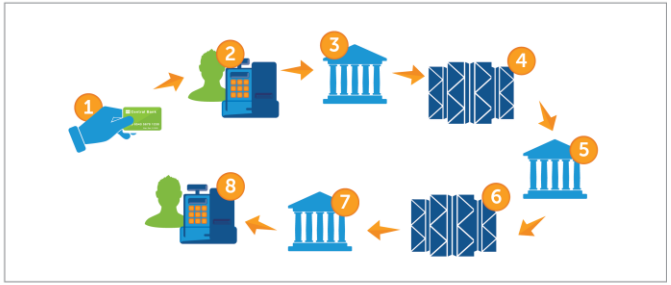
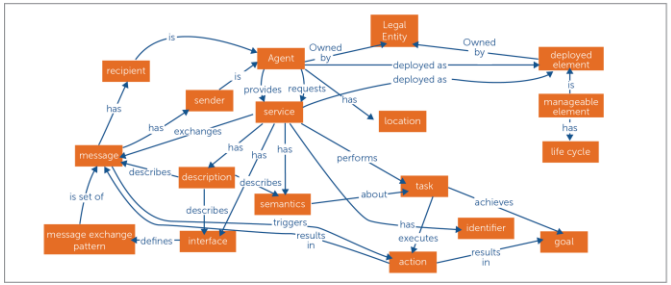
Current Mainframe Environment

Users

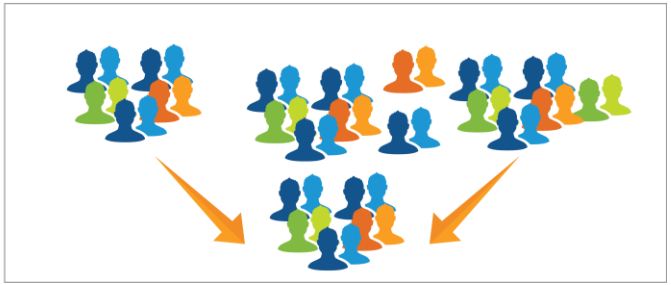
Transactions



Applications



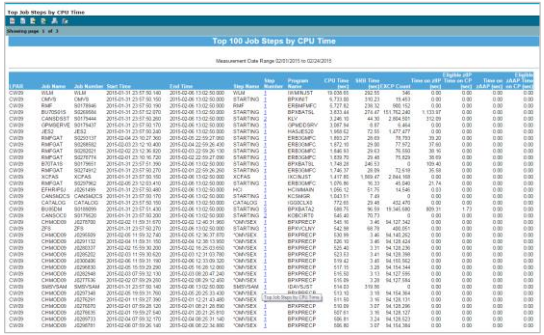
Workforce



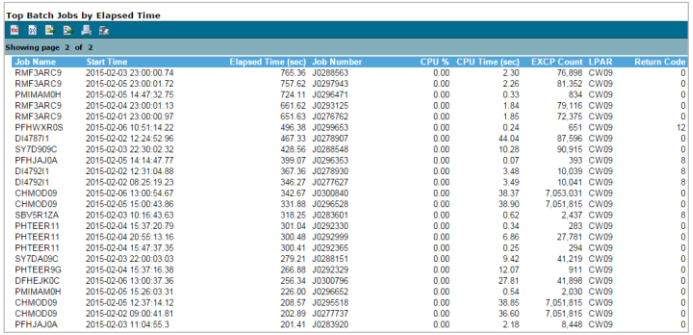
MIPS Management in the past

MIPS Mgt in the past: “Top Jobs Lists”

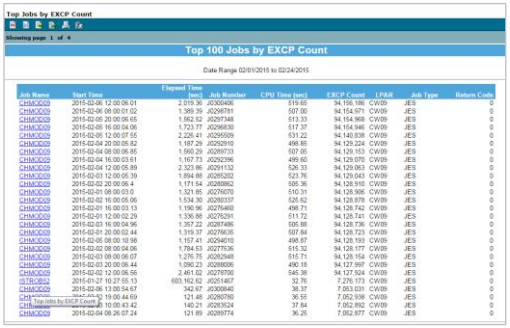
CPU Time



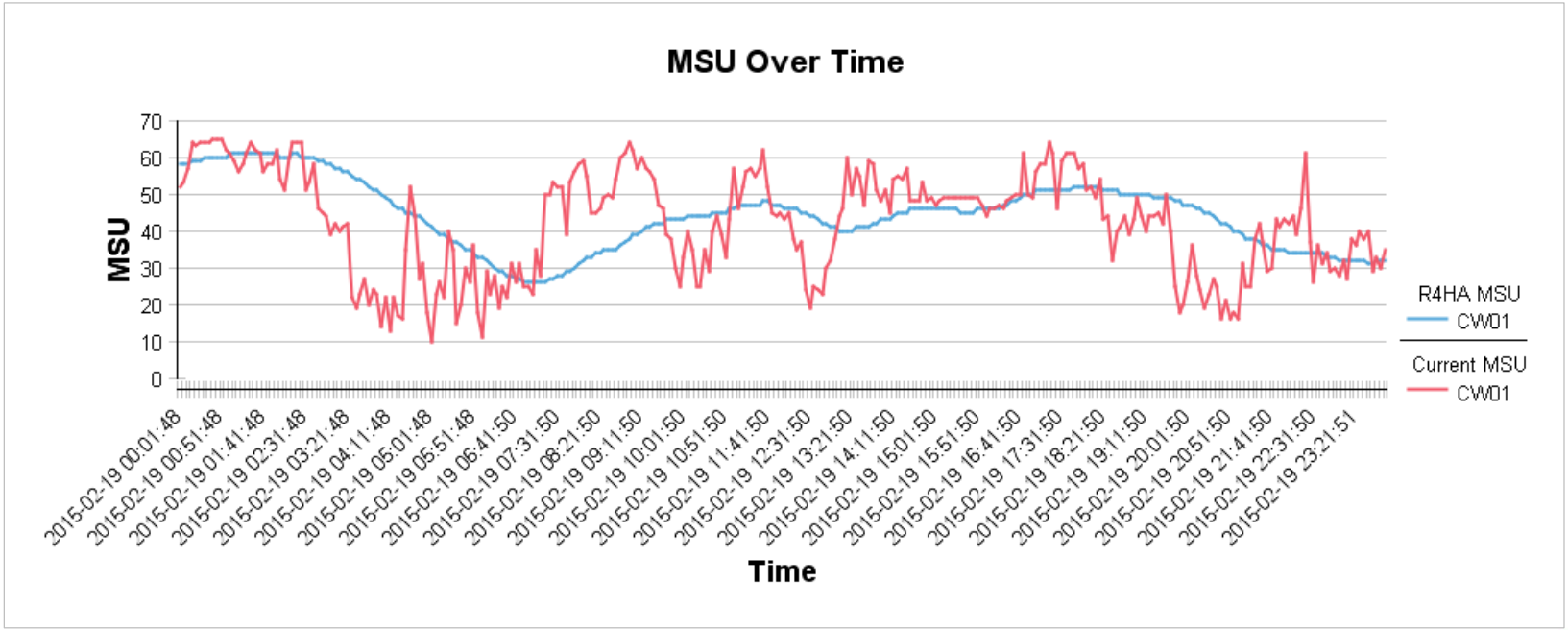
Elapsed Time



I/O’s

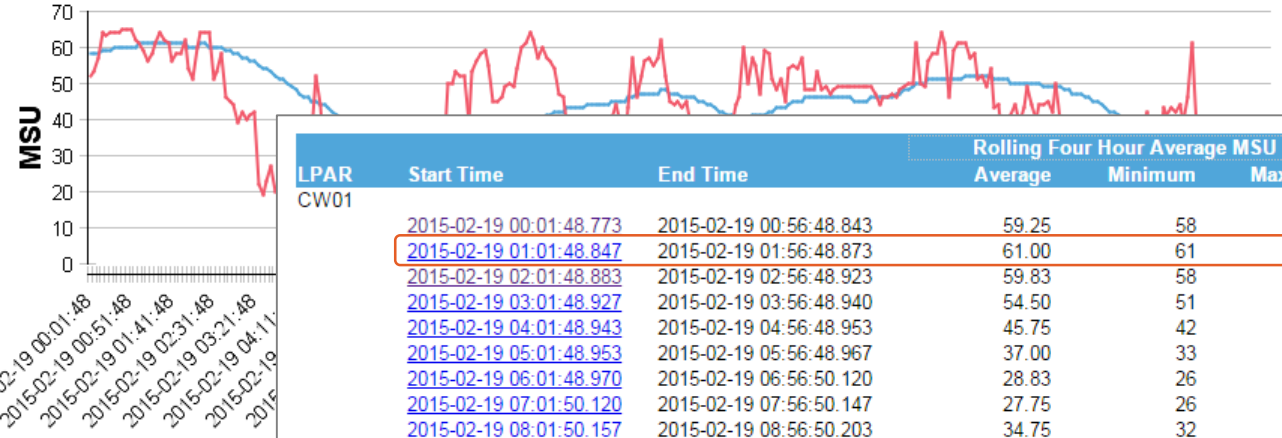


Costs based on Rolling 4-hour Average



Measurement Date Range 02/19/2015 to 02/20/2015

MSU Over Time

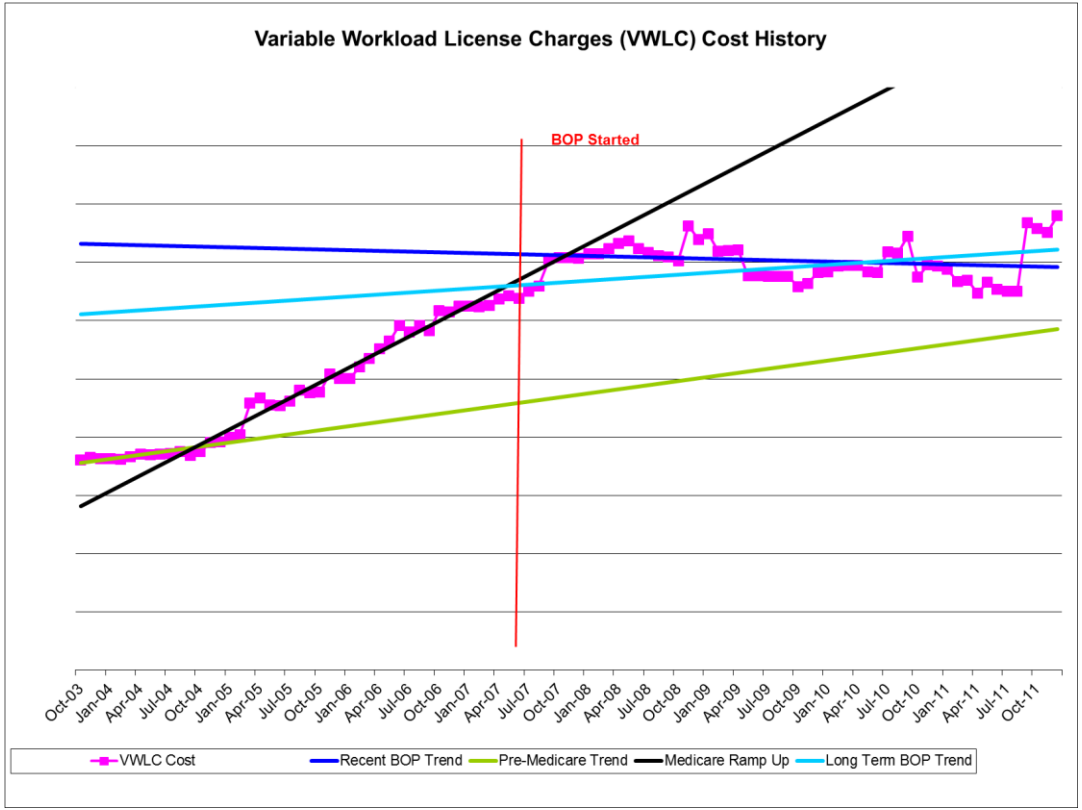


LPAR	Start Time	End Time	Rolling Four Hour Average MSU			Current MSU		
			Average	Minimum	Maximum	Average	Minimum	Maximum
CW01								
	2015-02-19 00:01:48.773	2015-02-19 00:56:48.843	59.25	58	60	61.50	52	65
	2015-02-19 01:01:48.847	2015-02-19 01:56:48.873	61.00	61	61	59.67	56	64
	2015-02-19 02:01:48.883	2015-02-19 02:56:48.923	59.83	58	61	54.50	44	64
	2015-02-19 03:01:48.927	2015-02-19 03:56:48.940	54.50	51	58	30.17	19	42
	2015-02-19 04:01:48.943	2015-02-19 04:56:48.953	45.75	42	50	25.92	13	52
	2015-02-19 05:01:48.953	2015-02-19 05:56:48.967	37.00	33	41	25.08	10	40
	2015-02-19 06:01:48.970	2015-02-19 06:56:50.120	28.83	26	33	24.58	11	31
	2015-02-19 07:01:50.120	2015-02-19 07:56:50.147	27.75	26	31	45.75	23	58
	2015-02-19 08:01:50.157	2015-02-19 08:56:50.203	34.75	32	38	53.08	45	64
	2015-02-19 09:01:50.207	2015-02-19 09:56:50.230	41.50	39	43	47.58	25	62
	2015-02-19 10:01:50.230	2015-02-19 10:56:50.247	44.42	43	46	35.08	25	44
	2015-02-19 11:01:50.290	2015-02-19 11:56:50.337	47.08	46	48	52.33	44	62
	2015-02-19 12:01:50.340	2015-02-19 12:56:50.427	44.17	41	46	31.25	19	45
	2015-02-19 13:01:50.427	2015-02-19 13:56:50.470	41.00	40	43	51.08	38	60
	2015-02-19 14:01:50.480	2015-02-19 14:56:50.570	45.08	43	46	50.83	45	57
	2015-02-19 15:01:50.573	2015-02-19 15:56:50.620	45.67	45	46	48.58	47	49
	2015-02-19 16:01:50.637	2015-02-19 16:56:50.700	47.75	46	50	48.83	44	61

Identify the Jobs at the Peak

Start Time	End Time	Job Name	Job Number	CPU Time (sec)	SRB Time (sec)	EXCP Count	Time on zIIP (sec)	Eligible zIIP Time on CP (sec)	Time on zAAP (sec)	Eligible zAAP Time on CP (sec)
2015-02-19 01:00										
2015-02-19 01:12:52.820	2015-02-19 01:57:50.000	SY935012	J0351613	1,368.06	7.25	531,537	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.560	2015-02-19 01:57:50.000	CATALOG	CATALOG	538.29	14.59	22,478	0.00	0.00	0.00	0.00
2015-02-19 01:13:08.050	2015-02-19 01:57:50.000	DFHSM01	S0274817	277.24	91.10	5,842,156	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.610	2015-02-19 01:57:50.000	TWSZ	S0337487	260.85	0.06	1,686	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.560	2015-02-19 01:57:50.000	WLM	WLM	122.49	1.50	0	0.00	0.00	0.00	0.00
2015-02-19 01:17:48.060	2015-02-19 01:23:48.370	SU82397	J0351661	103.19	0.59	80,068	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.620	2015-02-19 01:57:50.000	RMFGAT	S0351541	79.75	1.52	3,361	1.06	0.00	0.00	0.00
2015-02-19 01:12:50.600	2015-02-19 01:57:50.000	RMF	S0178766	52.23	1.00	4,898	0.00	0.00	0.00	0.00
2015-02-19 01:12:52.840	2015-02-19 01:57:50.000	DFHMXS00	J0349623	32.50	0.03	10,985	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.580	2015-02-19 01:57:50.000	GPMSERVE	S0178929	18.25	0.03	0	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.610	2015-02-19 01:57:50.000	MVSPZS01	S0186110	17.70	0.29	1,221	4.67	0.00	0.00	0.00
2015-02-19 01:12:50.590	2015-02-19 01:57:50.000	AEWIOGPR	S0179170	17.55	1.31	164,430	1.03	0.00	0.00	0.00
2015-02-19 01:12:50.560	2015-02-19 01:57:50.000	XCFAS	XCFAS	16.58	7.82	20,083	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.620	2015-02-19 01:57:50.000	JES2	JES2	15.89	0.37	7,726	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.600	2015-02-19 01:57:50.000	MVCABBCS	S0189722	13.35	0.13	2,079	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.610	2015-02-19 01:57:50.000	HS	S0179564	12.00	0.18	236	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.580	2015-02-19 01:57:50.000	CANSM2CS	CANSM2CS	11.65	0.02	0	0.00	0.00	0.00	0.00
2015-02-19 01:13:55.860	2015-02-19 01:57:50.000	DIFMON30	S0178906	10.36	0.75	13,118	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.620	2015-02-19 01:57:50.000	ZFS	ZFS	10.04	0.43	4,556	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.610	2015-02-19 01:57:50.000	DFRMM01	S0198051	9.51	0.69	20,922	0.00	0.00	0.00	0.00
2015-02-19 01:17:47.300	2015-02-19 01:18:39.870	PU792	J0351660	9.31	0.08	9,360	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.620	2015-02-19 01:57:50.000	OMVS	OMVS	8.81	0.80	69	0.00	0.00	0.00	0.00
2015-02-19 01:54:57.210	2015-02-19 01:55:40.650	XDEVREG2	S0351774	8.44	0.27	23,326	0.00	0.00	0.00	0.00
2015-02-19 01:53:44.670	2015-02-19 01:54:20.490	XDEVREG1	S0351773	6.19	0.19	15,033	0.00	0.00	0.00	0.00
Top CPU Utilization Jobs	2015-02-19 01:48:32.660	XDEVREG8	S0351767	6.14	0.20	17,252	0.00	0.00	0.00	0.00
2015-02-19 01:24:31.620	2015-02-19 01:24:52.990	PFHLVA3C	J0351663	5.53	0.14	33,224	0.00	0.00	0.00	0.00
2015-02-19 01:08:58.740	2015-02-19 01:13:31.810	VAULT01	J0351652	5.45	0.61	33,379	0.00	0.00	0.00	0.00
2015-02-19 01:56:00.130	2015-02-19 01:56:27.500	XDEVREG3	S0351775	5.10	0.17	14,850	0.00	0.00	0.00	0.00
2015-02-19 01:04:33.450	2015-02-19 01:57:50.000	DIFMON15	S0178897	4.58	0.35	5,722	0.00	0.00	0.00	0.00
2015-02-19 01:46:36.880	2015-02-19 01:46:59.800	XDEVREG6	S0351765	4.43	0.14	11,936	0.00	0.00	0.00	0.00
2015-02-19 01:45:52.520	2015-02-19 01:46:17.600	XDEVREG5	S0351764	4.41	0.14	11,953	0.00	0.00	0.00	0.00
2015-02-19 01:44:31.960	2015-02-19 01:44:56.850	XDEVREG3	S0351675	4.29	0.14	11,654	0.00	0.00	0.00	0.00
2015-02-19 01:47:18.610	2015-02-19 01:47:41.380	XDEVREG7	S0351766	4.25	0.14	11,708	0.00	0.00	0.00	0.00
2015-02-19 01:43:47.370	2015-02-19 01:44:11.950	XDEVREG2	S0351674	3.97	0.14	11,189	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.560	2015-02-19 01:57:50.000	SMSVSAM	SMSVSAM	3.47	1.88	0	0.00	0.00	0.00	0.00
2015-02-19 01:12:50.540	2015-02-19 01:57:50.000	MSTJCL00	MSTR	3.16	43.35	368	0.00	0.00	0.00	0.00

Potential Results of Actively Managing R4HA



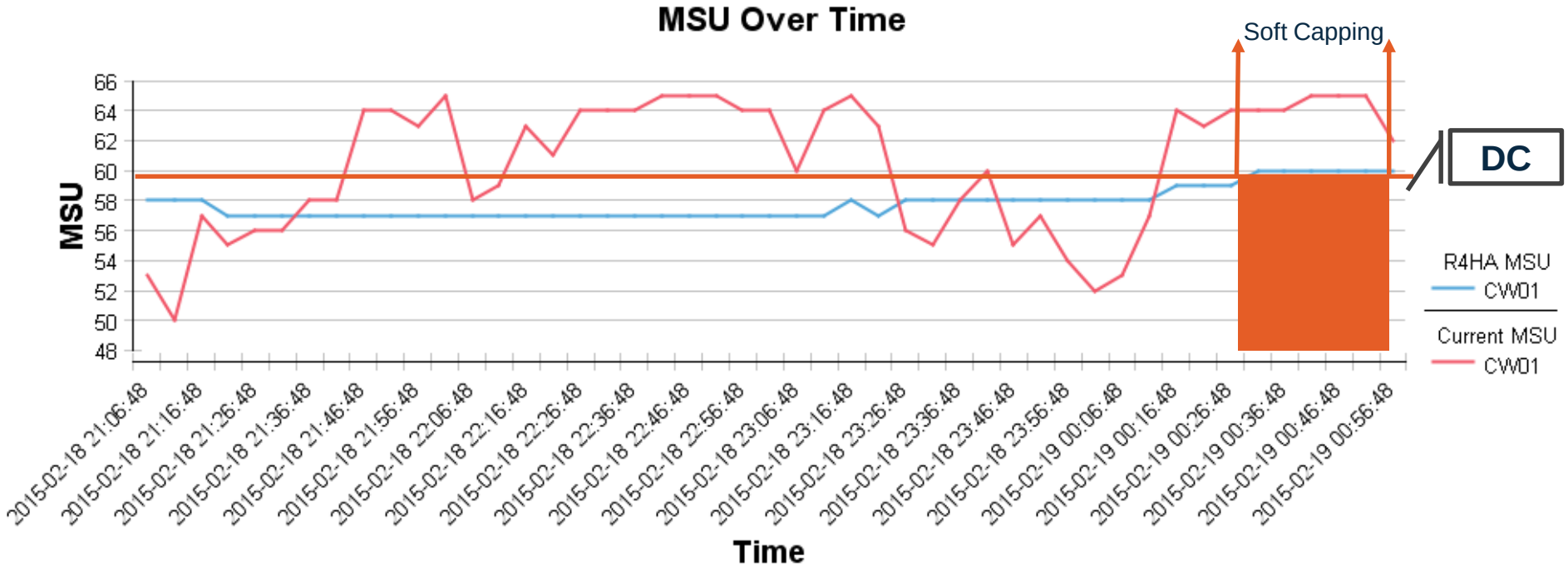
MIPS Mgt Strategies to Mitigate the R4HA

1. Soft Capping
2. Move workloads / Push Peaks into Valleys
3. Tune high consumers
4. Employ Specialty Processors
5. Provide explanation of SCRT
6. Identify and quantify mobile workload
7. Do nothing

Strategy 1: Soft Capping

- Set ‘Defined Capacity’ in WLM
- While DC is employed, charged for whichever is lower the DC or R4HA
- Important workloads could be negatively impacted
- Consider tools that automatically manage DC

Soft Capping



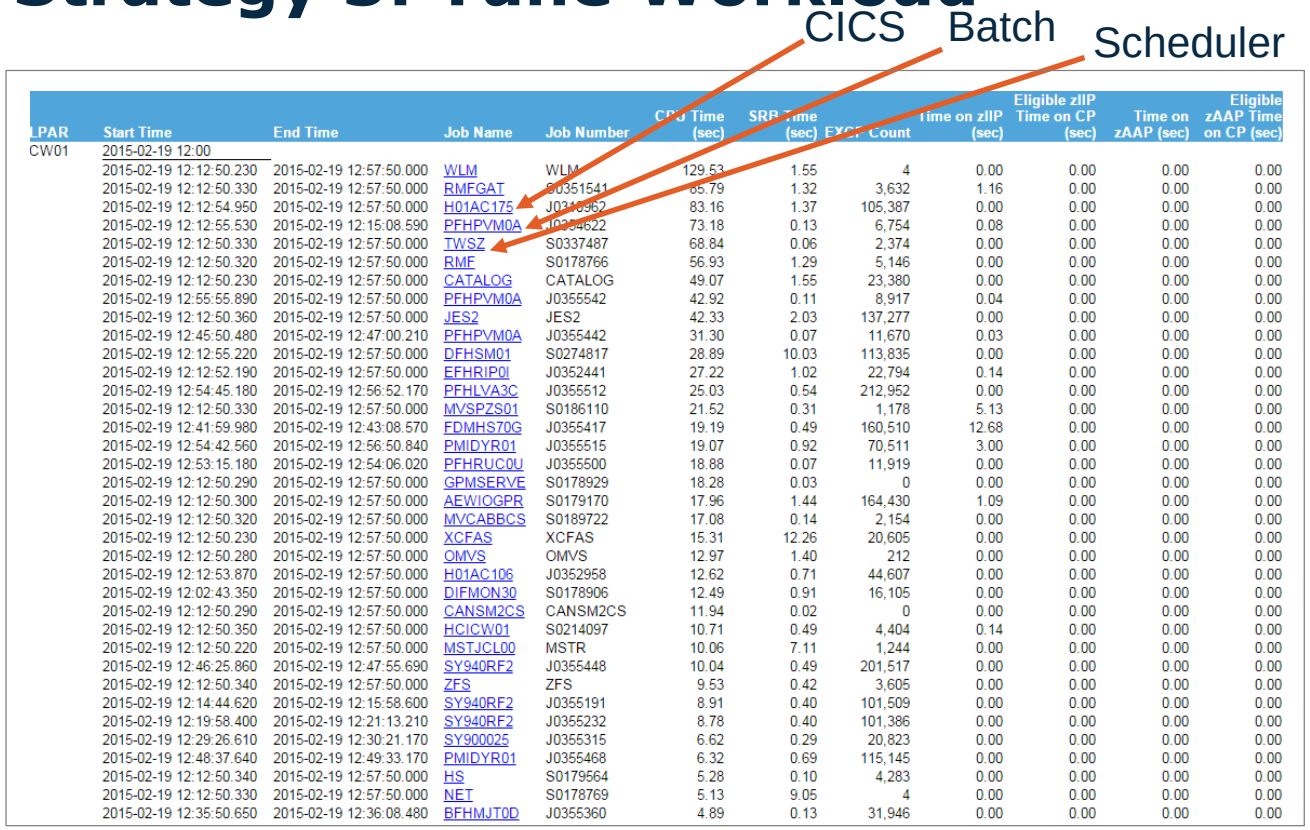
Strategy 2: Move Workload

- Look at Active Jobs during R4HA peaks
  - Can discretionary work be moved to different time?
    - Utilities
    - Batchjobs that might not need to run during those 4 hours
- What Products are you charged for that might be able to move off that LPAR?
  - DB2, CICS, WAS, IMS all charged on the LPAR Peak MSU for month IF they are on that LPAR

Strategy 3: Tune Workload

- Identify jobs to tune
  - Problem jobs this month might not be problem jobs in last or next month
- Utilize tools like Strobe to identify Resource usage and tune
- Identify the contribution of 3rd party software
- COBOL V5
  - 10%-20% Performance gain from prior versions of COBOL
  - "COBOL V5 Migration Strategies" by Jim Liebert

Strategy 3: Tune Workload



LPAR	Start Time	End Time	Job Name	Job Number	CPU Time (sec)	SRB Time (sec)	EXCP Count	Time on zIIP (sec)	Eligible zIIP Time on CP (sec)	Time on zAAP (sec)	Eligible zAAP Time on CP (sec)
CW01	2015-02-19 12:00										
	2015-02-19 12:12:50.230	2015-02-19 12:57:50.000	WLM	WLM	129.53	1.55	4	0.00	0.00	0.00	0.00
	2015-02-19 12:12:50.330	2015-02-19 12:57:50.000	RMFGAT	S0351541	85.79	1.32	3,632	1.16	0.00	0.00	0.00
	2015-02-19 12:12:54.950	2015-02-19 12:57:50.000	H01AC175	J0340962	83.16	1.37	105,387	0.00	0.00	0.00	0.00
	2015-02-19 12:12:55.530	2015-02-19 12:15:08.590	PFHPVM0A	J0354622	73.18	0.13	6,754	0.08	0.00	0.00	0.00
	2015-02-19 12:12:50.330	2015-02-19 12:57:50.000	TWSZ	S0337487	68.84	0.06	2,374	0.00	0.00	0.00	0.00
	2015-02-19 12:12:50.320	2015-02-19 12:57:50.000	RMF	S0178766	56.93	1.29	5,146	0.00	0.00	0.00	0.00
	2015-02-19 12:12:50.230	2015-02-19 12:57:50.000	CATALOG	CATALOG	49.07	1.55	23,380	0.00	0.00	0.00	0.00
	2015-02-19 12:55:55.890	2015-02-19 12:57:50.000	PFHPVM0A	J0355542	42.92	0.11	8,917	0.04	0.00	0.00	0.00
	2015-02-19 12:12:50.360	2015-02-19 12:57:50.000	JES2	JES2	42.33	2.03	137,277	0.00	0.00	0.00	0.00
	2015-02-19 12:45:50.480	2015-02-19 12:47:00.210	PFHPVM0A	J0355442	31.30	0.07	11,670	0.03	0.00	0.00	0.00
	2015-02-19 12:12:55.220	2015-02-19 12:57:50.000	DFHSM01	S0274817	28.89	10.03	113,835	0.00	0.00	0.00	0.00
	2015-02-19 12:12:52.190	2015-02-19 12:57:50.000	EFHRIP0I	J0352441	27.22	1.02	22,794	0.14	0.00	0.00	0.00
	2015-02-19 12:54:45.180	2015-02-19 12:56:52.170	PFHLVA3C	J0355512	25.03	0.54	212,952	0.00	0.00	0.00	0.00
	2015-02-19 12:12:50.330	2015-02-19 12:57:50.000	MVSPZS01	S0186110	21.52	0.31	1,178	5.13	0.00	0.00	0.00
	2015-02-19 12:41:59.980	2015-02-19 12:43:08.570	FDMHS70G	J0355417	19.19	0.49	160,510	12.68	0.00	0.00	0.00
	2015-02-19 12:54:42.560	2015-02-19 12:56:50.840	PMIDYR01	J0355515	19.07	0.92	70,511	3.00	0.00	0.00	0.00
	2015-02-19 12:53:15.180	2015-02-19 12:54:06.020	PFHRUC0U	J0355500	18.88	0.07	11,919	0.00	0.00	0.00	0.00
	2015-02-19 12:12:50.290	2015-02-19 12:57:50.000	GPMSERVE	S0178929	18.28	0.03	0	0.00	0.00	0.00	0.00
	2015-02-19 12:12:50.300	2015-02-19 12:57:50.000	AEWIOGPR	S0179170	17.96	1.44	164,430	1.09	0.00	0.00	0.00
	2015-02-19 12:12:50.320	2015-02-19 12:57:50.000	MVCABBCS	S0189722	17.08	0.14	2,154	0.00	0.00	0.00	0.00
	2015-02-19 12:12:50.230	2015-02-19 12:57:50.000	XCFAS	XCFAS	15.31	12.26	20,605	0.00	0.00	0.00	0.00
	2015-02-19 12:12:50.280	2015-02-19 12:57:50.000	OMVS	OMVS	12.97	1.40	212	0.00	0.00	0.00	0.00
	2015-02-19 12:12:53.870	2015-02-19 12:57:50.000	H01AC106	J0352958	12.62	0.71	44,607	0.00	0.00	0.00	0.00
	2015-02-19 12:02:43.350	2015-02-19 12:57:50.000	DIFMON30	S0178906	12.49	0.91	16,105	0.00	0.00	0.00	0.00
	2015-02-19 12:12:50.290	2015-02-19 12:57:50.000	CANSM2CS	CANSM2CS	11.94	0.02	0	0.00	0.00	0.00	0.00
	2015-02-19 12:12:50.350	2015-02-19 12:57:50.000	HCICW01	S0214097	10.71	0.49	4,404	0.14	0.00	0.00	0.00
	2015-02-19 12:12:50.220	2015-02-19 12:57:50.000	MSTJCL00	MSTR	10.06	7.11	1,244	0.00	0.00	0.00	0.00
	2015-02-19 12:46:25.860	2015-02-19 12:47:55.690	SY940RF2	J0355448	10.04	0.49	201,517	0.00	0.00	0.00	0.00
	2015-02-19 12:12:50.340	2015-02-19 12:57:50.000	ZFS	ZFS	9.53	0.42	3,605	0.00	0.00	0.00	0.00
	2015-02-19 12:14:44.620	2015-02-19 12:15:58.600	SY940RF2	J0355191	8.91	0.40	101,509	0.00	0.00	0.00	0.00
	2015-02-19 12:19:58.400	2015-02-19 12:21:13.210	SY940RF2	J0355232	8.78	0.40	101,386	0.00	0.00	0.00	0.00
	2015-02-19 12:29:26.610	2015-02-19 12:30:21.170	SY900025	J0355315	6.62	0.29	20,823	0.00	0.00	0.00	0.00
	2015-02-19 12:48:37.640	2015-02-19 12:49:33.170	PMIDYR01	J0355468	6.32	0.69	115,145	0.00	0.00	0.00	0.00
	2015-02-19 12:12:50.340	2015-02-19 12:57:50.000	HS	S0179564	5.28	0.10	4,283	0.00	0.00	0.00	0.00
	2015-02-19 12:12:50.330	2015-02-19 12:57:50.000	NET	S0178769	5.13	9.05	4	0.00	0.00	0.00	0.00
	2015-02-19 12:35:50.650	2015-02-19 12:36:08.480	BFHMJT0D	J0355360	4.89	0.13	31,946	0.00	0.00	0.00	0.00

Measure Jobs

- Online regions – measure at peaks
  - If peak is 12:30 p.m. on Tuesday, measure at 12:30 p.m. on Tuesday
- Batch jobs
  - Measure next time they run
- Make one change at a time and re-measure

Third Party and System Software

- Ensure maintenance is current
- Review parameters/JCL changes
- Check monitors
  - Which options are active and how much overhead is added to monitored job?
  - Read the Manual
  - Is it zIIP enabled?
  - Are special parameters necessary for zIIP?
- Talk to vendor

Strategy 4: Specialty Processors

- CPU to Specialty Processors do not count against R4HA
- Run at full speed
- Underutilized or over-utilized
- Starting with zEC 12, 2:1 ratio for every CP

LPAR	Start Time	End Time	Job Name	Job Number	CPU Time (sec)	SRB Time (sec)	EXCP Count	Eligible zIIP Time on zIIP (sec)	Eligible zIIP Time on CP (sec)	Eligible zAAP Time on zAAP (sec)	Eligible zAAP Time on CP (sec)
CW01	2015-02-18 19:00										
	2015-02-18 19:12:54.060	2015-02-18 19:57:50.000	EFHRIP0I	J0344994	1,655.76	50.33	77,925	0.00	0.00	0.00	0.00
	2015-02-18 19:12:50.580	2015-02-18 19:57:50.000	TWSZ	S0337487	255.99	0.05	1,504	0.00	0.00	0.00	0.00
	2015-02-18 19:12:50.520	2015-02-18 19:57:50.000	WLM	WLM	121.54	1.51	0	0.00	0.00	0.00	0.00
	2015-02-18 19:12:50.570	2015-02-18 19:57:50.000	RMFGAT	S0346230	78.29	1.45	3,543	1.04	0.00	0.00	0.00
	2015-02-18 19:12:50.570	2015-02-18 19:57:50.000	RMF	S0178766	50.78	0.98	4,987	0.00	0.00	0.00	0.00
	2015-02-18 19:12:50.560	2015-02-18 19:57:50.000	AEWIOGPR	S0179170	19.50	1.16	164,430	1.15	0.00	0.00	0.00
	2015-02-18 19:12:50.530	2015-02-18 19:57:50.000	CATALOG	CATALOG	19.22	0.58	4,781	0.00	0.00	0.00	0.00
	2015-02-18 19:12:50.550	2015-02-18 19:57:50.000	GPMSERVE	S0178929	17.78	0.03	0	0.00	0.00	0.00	0.00
	2015-02-18 19:12:50.580	2015-02-18 19:57:50.000	MVSPZS01	S0186110	16.86	0.27	1,027	4.45	0.00	0.00	0.00
	2015-02-18 19:12:50.530	2015-02-18 19:57:50.000	XCFAS	XCFAS	16.41	8.52	20,005	0.00	0.00	0.00	0.00
	2015-02-18 19:12:50.570	2015-02-18 19:57:50.000	MVCABBCS	S0189722	12.54	0.13	2,115	0.00	0.00	0.00	0.00
	2015-02-18 19:12:50.580	2015-02-18 19:57:50.000	HS	S0179564	12.18	0.17	364	0.00	0.00	0.00	0.00
	2015-02-18 19:12:50.550	2015-02-18 19:57:50.000	CANSM2CS	CANSM2CS	11.44	0.02	0	0.00	0.00	0.00	0.00
	2015-02-18 19:14:40.160	2015-02-18 19:15:21.590	MIBTZM0G	J0350936	11.24	0.46	55,455	0.00	0.00	0.00	0.00
	2015-02-18 19:14:21.830	2015-02-18 19:57:50.000	DIFMON30	S0178906	10.01	0.78	13,073	0.00	0.00	0.00	0.00
	2015-02-18 19:12:50.590	2015-02-18 19:57:50.000	JES2	JES2	9.84	0.30	4,697	0.00	0.00	0.00	0.00
	2015-02-18 19:12:50.580	2015-02-18 19:57:50.000	ZFS	ZFS	9.63	0.41	3,629	0.00	0.00	0.00	0.00
	2015-02-18 19:12:50.560	2015-02-18 19:57:50.000	OMVS	OMVS	9.06	0.73	52	0.00	0.00	0.00	0.00
	2015-02-18 19:12:50.600	2015-02-18 19:57:50.000	HCICW01	S0214097	6.44	0.27	2,890	0.02	0.00	0.00	0.00

Strategy 4:Specialty Processors

- Check with vendors to see if zIIP is enabled in software
  - Version
  - Steps needed to activate
- DB2 DDF
  - Native Stored Procedures versus 3GL Stored Procedures
- DB2 Utilities
  - More zIIP enablement

Strategy 5: Provide Explanation

- If valid reason for peak, let IBM know
  - "Maintenance to CICS caused 20 extra MSUs during R4HA Peak"
- Need data to understand and explain peak
- Compare last month to this month
- Identify what drove peak

Strategy 6: Mobile Workload

- Mobile devices are increasingly driving mainframe workloads
- April 2014: Mobile Workload Pricing
  - 60% reduction in mobile workload CPU to R4HA peak
- **MUST** be from mobile device
- **MUST** show connection to mobile device
  - Mobile Safari = good
  - Desktop Safari = not good
- Mobile to mainframe is handled differently, depending on organization

Questions that need Answering

- What percentage of workload comes from mobile devices?
- When do peaks occur?
- Are Batch workloads driving peaks?
- Do CICS/IMS/DB2 affect peaks?
- How much could be saved by implementing Mobile Workload Program?
  - High barriers to entry
  - Ongoing costs are low

Process: MWP Implementation Decision

1. Ask distributed teams to quantify what portion of workload is mobile and what is not
2. Quantify total CICS or IMS region CPU time by hour and apply mobile percentage
3. Run data through SCRT and MWRT and compare peaks
   - Is it worth implementing?

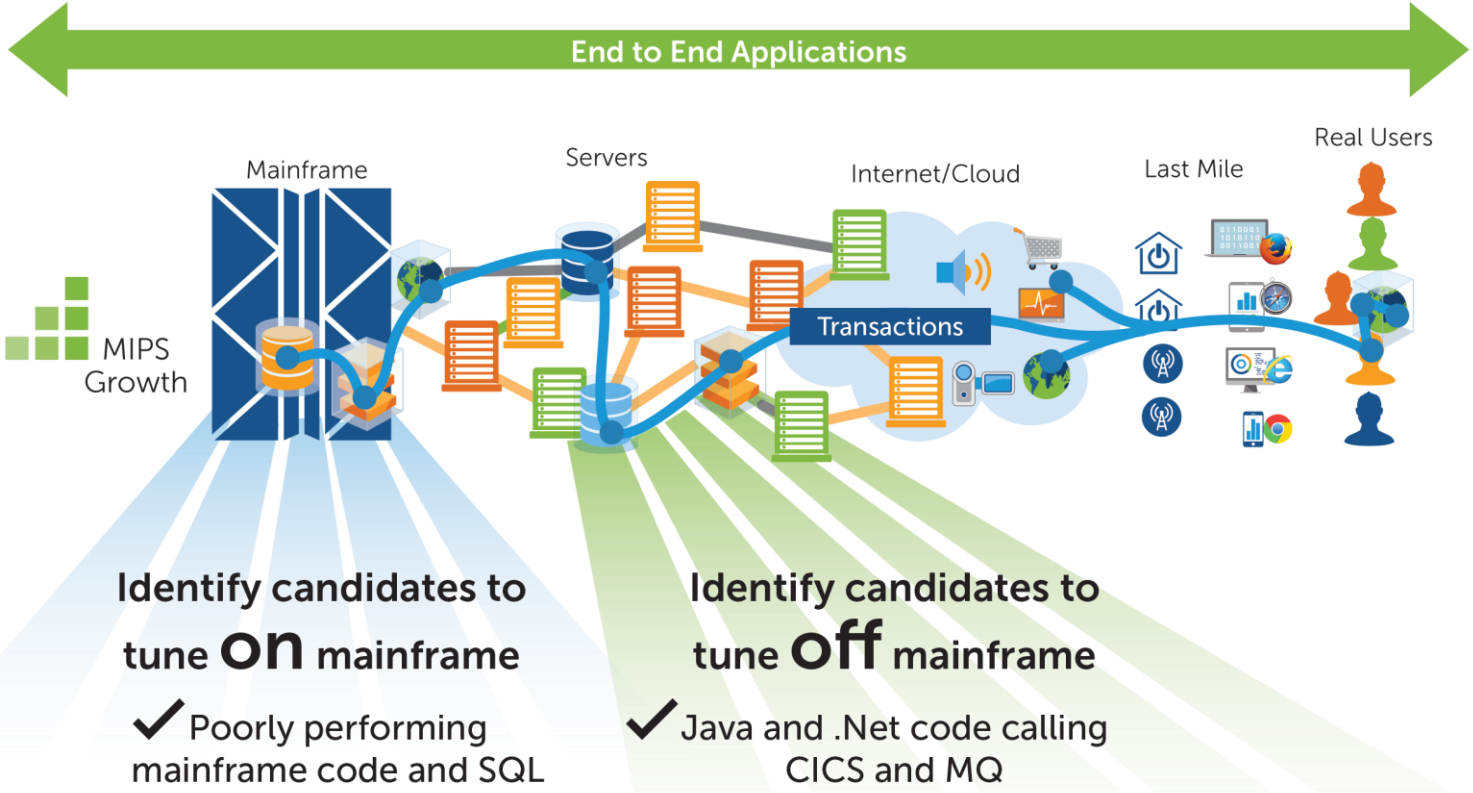
Implementing Mobile Workload Program

- Determine how to quantify mobile workload
- IBM White Paper
  - *"Measuring CPU Eligible for Mobile Workload Pricing"* by Ian J. Mitchell
  - "All acceptable distinctions (for quantifying mobile workload) originate outside of System z and z/OS. It is not possible to measure CPU eligible for MWP without using a distinction flowing into the system"

Implementing Mobile Workload Program

- White paper identifies four methods
- IBM must approve method
- Requires effort from distributed teams

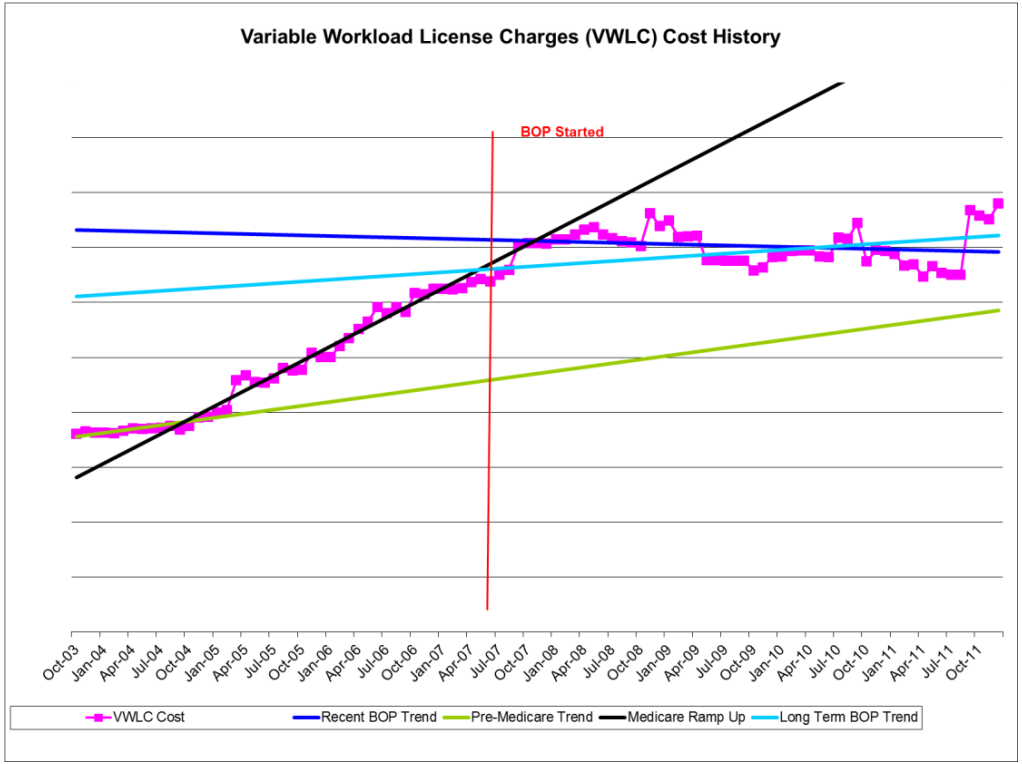
Strategy 7: End to End Applications



Off-platform Strategy for Reducing MSU

- Determine how distributed applications use mainframe
  - What is the context of DB2 usage or CICS txns to the Business Transaction? - Starburst Effect
- Mitigate damage before it happens
  - Create APIs and services developers should call
  - Stored Procedures versus Dynamic SQL
  - Are you returning too much data to the Distributed Application
- Educate distributed teams on mainframe

Your Mileage may vary…



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