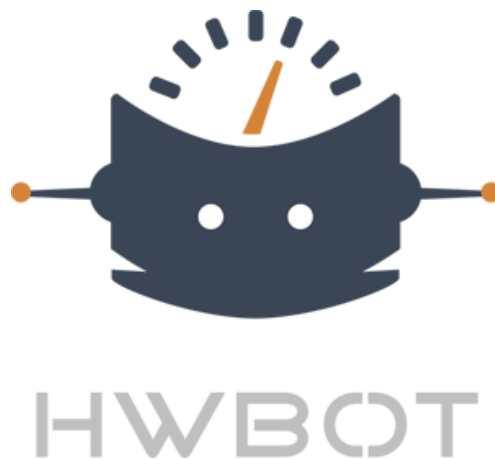# Building the future of competitive overclocking

An introduction to revision 6

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In this article I want to explain the workings of the upcoming HWBOT Revision 6. We will explain why we believe the focus should switch to competitive overclocking and how we plan to do this in Revision 6.

Contents

Preface

I started writing this document as a way to structure the ideas of revision 6. Everything was clear in my head, but I never really managed to explain those ideas on forums or in written format. Usually because the explanation requires a lot of background information, but also because in my explanations I was skipping too much steps of the thought process. To explain revision 6 and the general direction we're taking with HWBOT (and also the overclocking community), I needed to write out everything that was in my head. That resulted in this document.

Over the next couple of pages I will try to explain how the idea of revision 6 came to life and how we want to translate those ideas into a practical competitive overclocking format. You'll have to bear with the long text – 30 pages at the moment I'm writing this preface – and hopefully you won't get lost in the various topics. I will start by briefly describing the environment settings: the history of competitive overclocking and the reference with (arcade) gaming. Then go on to describing the main decision drivers for revision 6, which are basically the main argumentation. From those decision drivers, I will explain the system and highlight where the decision drivers come in place.

There are three main parts in this document:

1) Explanation of the Revision 6 division structure
2) Proposal of the "Team Coefficient"
3) Proposal of a system to establish an independent competitive overclocking platform

For those who are receiving this document ahead of the publication, some parts may be left out.

I hope you will understand the motives, plans and ideas better after reading this document. Enjoy.

A brief history of teams in competitive overclocking

Historically speaking, teams have always been an important factor in the overclocking community. Going back to the Futuremark Hall of Fame where users would point out the forum they were residing at, to the Teams League at HWBOT where communities from around the world compete. I feel I would be pointing out the obvious when I state that the social framework within the teams are what has people join overclocking and what makes people stay in overclocking. Most of the die-hard overclockers have found friends within the teams and would meet up once in a while to share their overclocking passion.

Position	Day	Week	Month	Points	Team	# results
Team rankings.						
1.	▲ +1	◀▶	◀▶	4156.60 points	XtremeSystems	2448
2.	▼ -1	◀▶	◀▶	4131.00 points	Team OCX	1015
3.	◀▶	◀▶	◀▶	2856.10 points	OverClocking-Masters	1328
4.	◀▶	◀▶	▲ +1	1840.70 points	HellasOCTeam	1083
5.	◀▶	◀▶	▼ -1	1807.30 points	OCTeamFinland	1026
6.	◀▶	◀▶	◀▶	1431.90 points	Extreme Prometeia	875
7.	◀▶	◀▶	◀▶	1420.20 points	OC Forums	713
8.	◀▶	▲ +3	▲ +4	1368.70 points	Team MXS ModLabs.net	882
9.	▲ +1	▲ +1	◀▶	1301.20 points	PurePC.pl	1175
10.	▼ -1	▼ -1	◀▶	1257.30 points	Techsweden.org	411

Figure 1 - Teams League on January 15, 2007

The Teams League is one of the oldest leagues at HWBOT and has only seen one revision. After a never-ending cycle of accusations of *Hardware Sharing*, we introduce the *"Team Power Points"*. For those who are unfamiliar with the Teams League I will explain the technical part.

Hardware sharing

Hardware sharing was a very peculiar but interesting problem. Particularly interesting because it was a problem that could only exist because of a specific implementation in a specific environment. It just goes to show that even in the smallest corners of the world problems exist.

As we already explained in the previous section, before revision 4 the Teams League was based on the sum of a points gathered by the team's users. Crucial to the story is that *any* user could contribute in *any* ranking. In other words: if you have ten users in one ranking occupying the top ten spots, each member contributes to the fullest.

The consequence is easy to predict. By sharing your hardware with other team members and having them fill up the rankings where the most points can be earned, you can easily push your team higher in the team rankings. In fact, it is odd that the problem is people sharing the hardware as you could obtain the same effect by sharing the benchmark validations with other members or even simply making additional accounts. Although in all fairness, the moderating staff at HWBOT would have easily caught on to the last two.

The main problem of this hardware sharing was actually not the sharing causing an effect in the Teams League, but the accusations from team to team causing time over time tearing of the social fabric of the overclocking community. After all, the amount of accusations greatly exceeded the amount of actual instances of hardware sharing. In the end, both the accusers and those who are being accused are unhappy.

In addition, finding a solution wasn't simple. We couldn't get rid of the rule against hardware sharing because it formed a logical necessity for the rankings to exist. The reason why it was (and still is) a logical necessity I've pointed out already before. It is because the Teams League is the sum of all user points.

Imagine a situation where hardware sharing is allowed completely. This would allow people to share hardware with all team members to grab points in every ranking. Since points are awarded to every single result that receives *a* ranking, it doesn't matter how good it is: you will always get points. If one person of the team has a golden CPU ("incredibly good overclocking") and shares it within the team, not only does the team take all the points in that category, it also takes away the points of any other user (and by extend) team in that ranking. This kind of system would render the 'team' ranking utterly meaningless since it benefits only the teams with the most members. To prove this point, simply make the sum of the points of the top-20 overclockers in the Hardware Masters ranking and compare it to the current #1 team. The difference is massive. It would be no representation of the team quality, but team quantity.

This violates Principle 2: "The HWBoint Leagues should be representing skill over any other factor (money, luck, etc.)"

Several users made several suggestions to resolve this problem. If you are interested you can read the thoughts on them below. You can also skip them and go straight to the Team Power Points section.

The team average is a historical error

Counterfactual history is a special branch of historiography that attempts to answer the "What if" questions. Although highly speculative, analyzing the benefits and disbenefits of different systems can very educational

When the first revision of the HWBoints was released, people already pointed out that a system as proposed had some flaws. One of them was, for instance, that this system benefits the large and wealthy teams rather than the quality of benchmarking results. Some people, such as Phase, suggested a different way of calculating the team rankings, for instance based on the team average. So what would have happened if we had chosen a team ranking algorithm based on the average team performance rather than the sum of all user performances?

First of all, it's quite clear that there would have been significantly less large teams. A system as proposed by Phase, where teams receive points on their team top-10 average per global ranking, pushes people towards teams of 10 to 15 people at most. Anything more than that amount would not help the team and it's probable that people who not actively help the team change to a team where they do make a difference.

Secondly, a system based on an average team score leaves room for both hardware and score sharing. Therefore this system would have been prone to adjustment to reduce hardware and score sharing. In that case there are two possibilities.

1) "Team benchmark rankings": the first possible change is a system where the team ranking is based on the team's best score. A side-effect is that newcomers would hardly contribute to the team's total.

2) "Variable average": a second idea that could've been brought up is to not have the average score of just the top entries of the team, but filtered on unique CPU or VGA configurations. For instance, instead of using the average of the best 10 global scores, with the contributing team members all using the GTX 480, it would be the average of the 10 best scores of GTX 480, Radeon HD 5870, GTX 470 etc. Possibly even filtered on a user basis so 10 different users would contribute to the team average. A positive aspect of this scenario would be that hardware sharing would change into a team's quest for the best graphics card. Ten members could buy each ten graphics cards and then use the best one for the team scores. The downside is that there would be a huge loophole for result sharing: one member has both GTX 480 and Radeon HD 5870 scores of the team, so shares his best score one with another team member to benefit the most from both cards.

It is not unlikely that in this scenario the community would request for HWBOT to revise the algorithm so all points of any user would be included. After all, this solution does not take into account the thousands of points which can be acquired in the hardware rankings.

Note that possibility 1) is how it was implemented in revision 4, and possibility 2) is the foundation for the Country Cup competition series.

The perfect solution by software

A doctor will tell you there are two ways of dealing with a disease. Either you cure the patient or you treat his symptoms.

In the world of HWBOT, addressing the symptoms is usually the easiest way to a solution. I don't mean easy pejoratively. I just want to express its effectiveness: why bother changing something fundamental when you can solve the problem by adding a rule or fixing a bug. In terms of the hardware sharing problem, treating the symptoms would be improving the hardware sharing detection methodology.

Many people have already given this more than a few minutes of thought, but no one has ever figured out a way to improve the detection of hardware sharing that is both 100% cheat-free and does not make the validation process extremely complicated.

Here are two popular suggestions:

1) *"Serial number picture"*: every product sold in retail caries a unique serial number. This number is used by the hardware manufacturer to identify a specific product and give warranty based on this. A way to reduce the hardware sharing problem would be to make serial numbers obligatory for each submission. There are a few problems which make this method not very effective in terms of reducing hardware sharing. One could ask a local hardware shop to provide a serial number for verification. Or, when you buy a card on eBay the serial number might not be on the

product anymore. Maybe you just happen to buy a sample that has always been registered on HWBOT. Last but not least, one could still share the best out of 10 samples within the team and the 9 recipients can show the serial number of their inferior cards.

2) *"Serial number application"*: one way to counter some of the problems of the serial number picture is to use software that can identify the unique serial number of each sample used to produce a score. This would be a lot less complex and more water-tight than the first suggestion. The problem with this solution isn't that there's no software that can correctly identify the unique code of a processor or video card. At least not publically available tools. There are tools being used by the hardware vendors, but those tools are kept internally. There is also no reference documentation for this value. It is kept as internal information, mostly for privacy reasons.

Another key point in this discussion is whether or not users want to supply the serial numbers to a database like HWBOT. From a legal point of view, overclocking still is considered a violation of the warranty terms, which means that if Intel would have access to a database of samples that have been overclocked, a lot more RMA requests would be denied.

Team power points in revision 4

So as you know by now, the solution we opted for against hardware sharing were the Team Power Points. The poorly chosen name is to distinguish the team-based benchmark and hardware rankings from the actual Team League (or Ranking). The power points feature on the HWBOT site as a separate ranking where teams are ranked by its best score for the particular benchmark or hardware ranking.

The main goals of the power points were to, one, reduce the stress, negativity, and community fights that hardware sharing accusations brought along with them and, two, to maybe allow smaller teams to be competitive in the league.

We succeeded in the first objective. Since the introduction of the fourth revision, we have had only a couple of discussions related to hardware sharing. The second objective was not so much a success. Because of the vast amount of rankings at HWBOT, quantity still trumps quality. The key to success in the Teams League is therefore simply man-power.

Teams in Revision 6

At the moment of writing there has been no conclusive decision yet on how teams will play a role in revision 6. So everything that follows is mostly my own opinion. Based on the business information we can find at HWBOT, I will for the argument that we need something related to teams in revision 6.

The social importance of an overclocking team

Although it's difficult to put the importance of an overclocking team in numbers or charts due to the lack of real scientific research on the subject, but when looking at the data from the HWBOT database we can clearly see indications that being part of a team makes an overclocker more engaged.

In below chart you can see the engagement of the average overclocker when part of a team and when not part of a team. This data includes all the results from 2006 to 2014. We counted the amount of users with and without team ("Users") and then calculated the average amount of results ("Results"), the participation in contests ("Contests"), the amount of used benchmark applications ("Apps") and the diversity of the CPUs used ("CPUs").
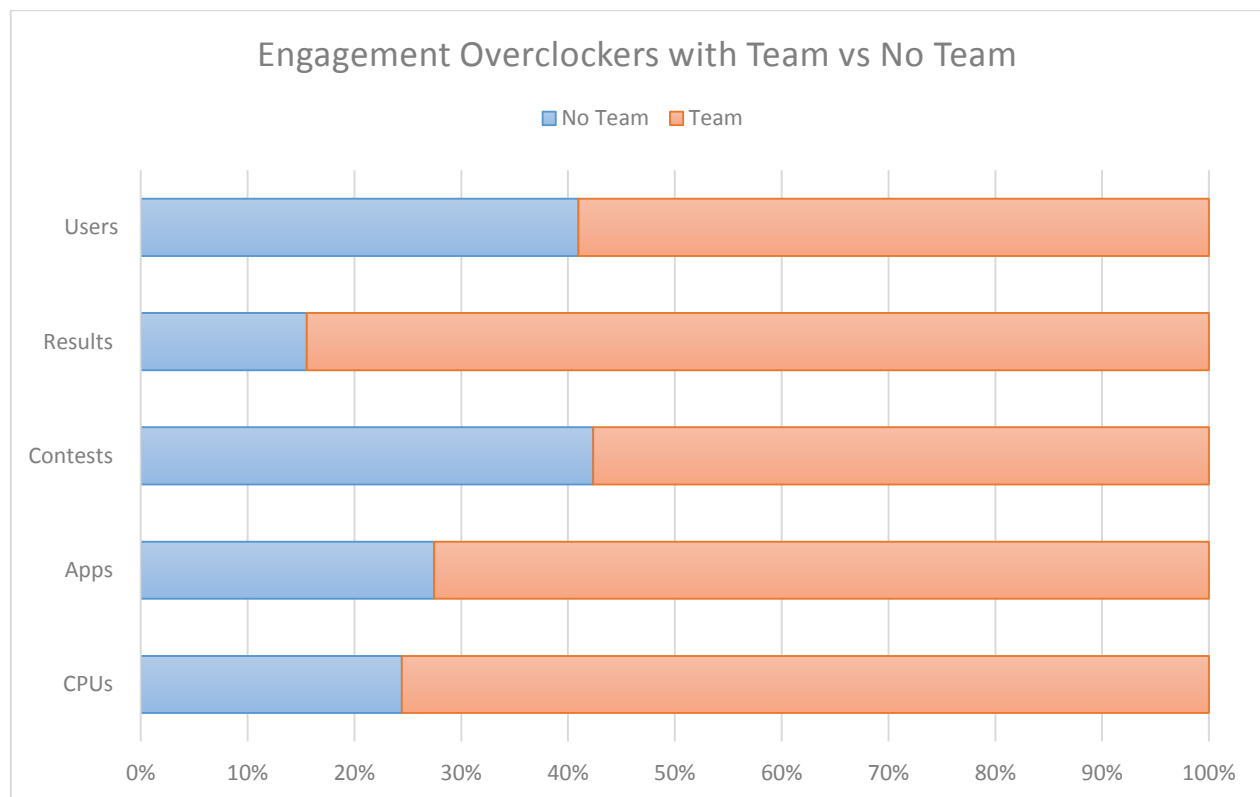

Figure 2 - Engagement of users with and without a team

We can see the following data,

- About 60% of the active users are part of an overclocking team
- Only 15% of the results are from people who have no team
- The activity in competitions is 40% versus 60%, similar to the amount of active users
- Users with a team use 2,5x more benchmark applications and as much different CPUs

Considering the engagement figures we can conclude that overclockers who are part of a team are more active in all the various activities at HWBOT. The make more submissions, participate in more competitions, use more benchmark applications and use a greater diversity of hardware.

Teams in competitions

In addition we pulled data from the database to see the effect of the type of competition on the user participation and activity rate. From the result database, we selected all contests which are not challenges, not live hosted on HWBOT.

Competition type	ratioTeam	ratioUsr	ratioRes
competitionteam	7,4	16,6	129,8
country	40,6	215,2	1010,8
team	5,3438	24,3438	187,4063
user	3,1341	16,6829	100,3293

In the table we can see that there are more teams participating when the competition type is Team than when it is User. In addition, there are also more users participating and the users put out more results. In team-based competitions the users submit on average 7.69 scores where in user-based competitions this is only 6.01.

Overall, team based competitions seem to generate more interest from the community.

Proposing the Team Coefficient ("TC")

The proposal to engage users through the social fabric of the overclocking team is called the Team Coefficient. I specifically do not refer to this statistic as 'league' or 'ranking' because I don't want to confuse it with the Teams League which already exists on HWBOT. Also, the emphasis of revision 6 is only division structure of the Challenger Series and not the team aspect of it. The Team Coefficient exists to engage the users who would otherwise not opt in.

The Team Coefficient has two primary purposes

- Incentivize overclockers to join the different divisions, even the ones which would seem unappealing at first sight
- Complete the story of increasing importance of the non-high-end overclockers who dedicate time and effort to the team

The Team Coefficient is defined as the sum of points of the best results per stage per team. As explained earlier in the article, each division consists of three rounds of each five stages. If we include the Pro OC Series as additional division, it means we have

- 8 divisions
- 3 rounds per season for each division
- 5 stages per round
- In total 120 stages per season

A team that wishes the highest Team Coefficient would need a minimum of 8 members covering the various divisions. A team could use maximum 120 members if each competes in one stage.

Note that the coefficient is based on the best result per stage, not the best overclocker per stage. That means two members of a team could be contributing to the Team Coefficient if each would win a stage in a certain division. Also note that the weight of each division is the same, which means that someone competing in Division III (Core i3) is as important as someone competing in Division I (Core i7).

The meaning of the Team Coefficient is as follows. The higher the TC, the more high-quality and balanced a team is. A low TC may indicate the team is either unbalanced – not participating in all divisions – or its top members are simply not competing for the top spots – maybe they just use air cooling.

I want to highlight the fact that this approach adds to the story of reducing the financial inequality in overclocking. In particular, the effect it has on the importance given to overclocking achievements within the team. With the Team Coefficient, any division is equally important. This means that the person competing in the AMD APU or legacy division is as important as the person competing in the Core i7 division.

Note that creating multiple accounts to participate in multiple divisions is not allowed.

A simulation of the Team Coefficient

I ran a simulation of the Team Coefficient for one round on the database. Using data from the results submitted in 2013, we build rankings based on the idea of the divisions. For each division, we selected the most used benchmark but ensured it was a combination of 2D and 3D. Then, we compiled rankings as they would appear in the division structure and awarded points to the scores. The point algorithm was the same for each stage

> 50-41-36-32-30-28-26-24-22-20-19-18-17-16-15-14-13-12-11-10-9-8-7-6-5-4-3-2-1-…

The hardware and benchmark selection is as follows:

- Division I: Core i7 + 1x GTX 770 or R9 280X
  - 3DMark11 Performance, 3DMark Vantage Performance, XTU, 3DMark Fire Strike, Cinebench R11.5
- Division II: Core i5 + 1x GTX 760 (Ti) or R9 270
  - 3DMark11 Performance, 3DMark Vantage Performance, SuperPI 1M, Cinebench R11.5, XTU

- Division III: Core i3 + 1x integrated GPU
    - SuperPI 1M, Cinebench R11.5, Wprime 32M, XTU, 3DMark03
- Division IV: AMD FX + 1x GTX 780 (Ti) or R9 290X
    - SuperPI 1M, Aquamark, 3DMark 11 Performance, Cinebench R11.5, 3DMark Vantage Performance
- Division V: AMD APU + no GPU
    - 3DMark Vantage Performance, 3DMark11 Performance, Catzilla 576P, SuperPI 1M, Wprime 32M

The final simulation table includes the sum of the stage points per division and the overall total Team Coefficient. We have also included the position in the current Teams League, the amount of members and the active members in 2013.

From the table we can see that having a lot of active members would definitely yield a higher chance of a better Team Coefficient. But small teams like HW Legend OC or OverBR Team Brazil also have a chance to rank high. Most of the teams in the Top-25 are currently not in the top-25 of the Teams League.

Note that this simulation does not include the following parameters:

- One user can only submit in one division
- Results are not grouped per quarter
- The table includes a simulation of only one round

	Teams League	Members	Active Members	Team	I-Tot	II-Tot	III-Tot	IV-Tot	V-Tot	Team Coefficient
#1	3	1504	199	Overclock.net	81	162	121	114	51	529
#2	1	25	24	PURE	146	73	22	66	114	421
#3	22	35	15	HW Legend OC	138	5	15	112	86	356
#4	38	191	42	TechPowerUp!	57	90	55	110	20	332
#5	4	891	105	PC Games Hardware	19	80	135	63	24	321
#6	26	479	30	Team Finland	128	53	1	52	73	307
#7	24	182	19	OverBR Team Brazil	53	7	5	130	97	292
#8	6	671	103	Overclockers.com	19	68	78	81	45	291
#9	9	114	19	Madshrimps Belgium OC Team	30	70	80	64	31	275
#10	33	37	30	ROG Supreme OC	143	36	19	71	1	270
#11	30	66	26	Overclock.pl Team	23	4	81	85	76	269
#12	15	531	27	XtremeSystems	56	44	74	79	9	262
#13	10	69	24	HwBox Hellas O/C Team	67	54	78	32	27	258
#14	23	99	13	i4memory.com	140		82	20	16	258
#15	18	156	37	lab501.ro	25	100	102	8	15	250
#16	90	5	4	ARX	40	39	12	45	102	238
#17	12	115	8	OC-Lab	50	65	23	27	65	230
#18	35	287	46	Overclockers Australia (OCAU)	10	23	102	35	56	226
#19	50	117	13	TechSweden.org	11	96	48	3	65	223

#20	71	5	5	XTREME OC Team Bulgaria	2	5	12	87	107	213
#21	21	29	24	HwMaster OC Team Italy	54	5	110	17	14	200
#22	208	10	7	ArabOverclockers	5	96	5	43	49	198
#23	13	33	25	Klan-OC	90	4	36	32	36	198
#24	89	10	9	JagatReview.com Indonesia	26	23	3	49	96	197
#25	43	8	6	Team KATANA	80	14	101			195

The full excel file is available upon request.