

CS 6300 Visualization Final Project Process Book: The International Tournament of DOTA2

Gang Liu; Mai Li

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Title: Welcome to the International 2018 Dota2 Championship

Group Member: Gang Liu; Mai Li

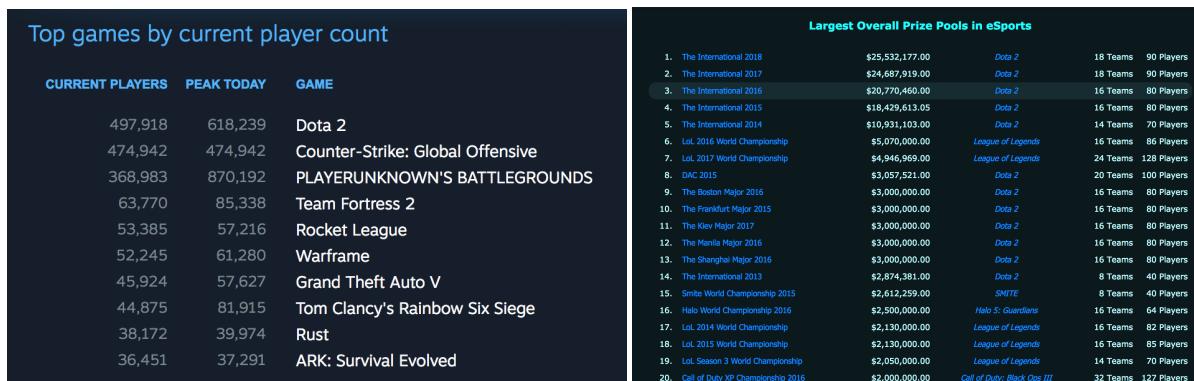
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Project Repository: https://github.com/LLTeamVis/vis_6630

Background and Motivation

DOTA2: Defense of the Ancients 2. Enjoyed by millions for over a decade, Dota2 is a game of strategy momentum and action. Two teams of five players called radiant and dire face-off in a vast battlefield, the first team to destroy the opposing team's ancient will win the match. However there are many strips on the road to the ancient. What is even more surprising is more than half a million people who will play dota2 on steam at the same time all in the whole world every day. Dota 2 is popular because it infused the iconic heroes/gameplay of a groundbreaking War craft 3 custom game with vitality and pioneered the legitimacy of competitive video gaming or e-sports by setting the precedent for tournaments with enormous prize pools.



The International is an annual Dota 2 e-sports tournament hosted by Valve Corporation, the game's developer. Under the temptation of such a huge bonus, a batch of professional players has been born. Every year, a large number of "faith fan" come to this place, and they are keen to pay attention to those professional players. Because 99% of people want to see 1% of people to realize their dreams in dota2. For them, this event is as popular as

the World Cup for those who like soccer. The ti8 that just ended in August this year is undoubtedly a fan's carnival. The appearance of hundreds of heroes in the game brought us a visual feast. However, a large number of games mean generating a large amount of data, which also plays an important role.

Dota 2 is more than just a game; it is also a new profession. Many e-sports teams are planning to employ more data analysts to help players overcome shortcomings and find opponents' weakness, which are ultimate purposes of team coaches and team managers. However, as a fast growing industry, visualizing and analyzing e-sports games has no mature tools and most tools just shows some boring and cumbersome information. As dota2 enthusiasts, we want to develop a visualization tool that is interesting for audience who not familiar with e-sports and informative for players to capture the key to win a game. For this time, we are looking forward to show the data visualization of the international 2018 (TI8) tournament through the multiple features like price pool, matches result, team/player, heroes, etc. We want to help professional players summarize and find strategies more efficiently so that there will be better play in future games. On the other hand, as the die-hard of dota2, we hope that more and more people could have a clearer understanding of this game and tournament, and even love this game.

Project Objectives

Provide the primary questions you are trying to answer with your visualization. What would you like to learn and accomplish? List the benefits

- How much attention Ti8 gets around the world?
- How do I know the matches details about group stage and main event?
- How does Team and Player performance in Ti8?
- How dose hero's performance in Ti8?
- Which match is the most popular in Ti8?
- What the strength or shortcoming for the specific player or hero?
- Which hero is the most frequently appear on ban/pick list?
- etc.

As we said before, we want to develop a visualization tool that is interesting for audience who not familiar with e-sports and informative for players to capture the key to win a game. So the object could be split two parts, one part for normal player or someone who are interested in this game. We would like to show some basic and interesting for them. Another part is professional player; we would like to provide such a useful statics to help them know enemies better. To attain these objectives, we need to first discuss about data we can obtain. For data to visualize the process of TI8, there are some types of data we find after searching.

- Some data that reflects huge influence of Ti. Like price pool, viewers peak stage, team quota of regions, top matches, etc.
Investors and advertisers could find the benefit potential of Ti tournament through these statics.

- League information box; Team information box; Player information box; Hero information box; Group matches and main event etc.
These information's box could help normal player have a basic knowledge about this game and player. They could find the useful information that they are interested.
- Data for Strategies. For example, player's ability graph, hero's bubble graph etc. Professional player could find the strengths and weaknesses of their enemies and other professional player as well by analysis him signature's hero and ability graph. Besides, they also could find the strong or weak heroes on current game version by analysis Hero's bubble graph. It will give them some game advantages in future games.

Data

We will get the dota2 data we need from some statistics website. We found some alternative data sites

- DOTABUFF - Dota 2 Statistics (<https://www.dotabuff.com/>)
- Liquipedia (<https://liquipedia.net/dota2>)
- Datdota (<https://www.datdota.com/>)
- Esports Vistior Statistics (<https://esc.watch/tournaments/dota2/international-2018>)

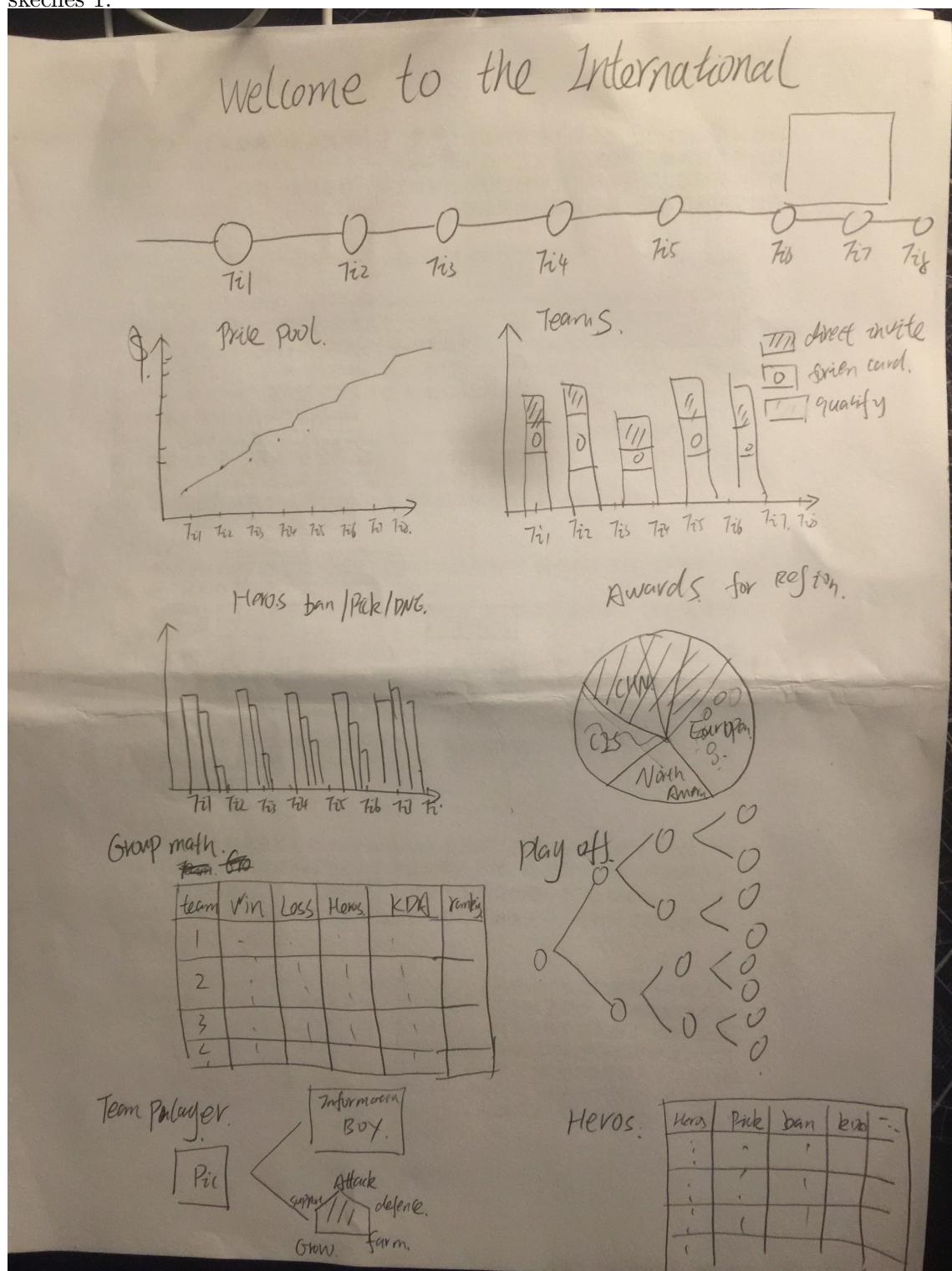
Data Processing

We have to do substantial data cleanup for most of our data since there are some data we don't need. We will need to re-organize some data like game data using Excel and transfer to .csv file eventually. Besides, we might collect some data manually.

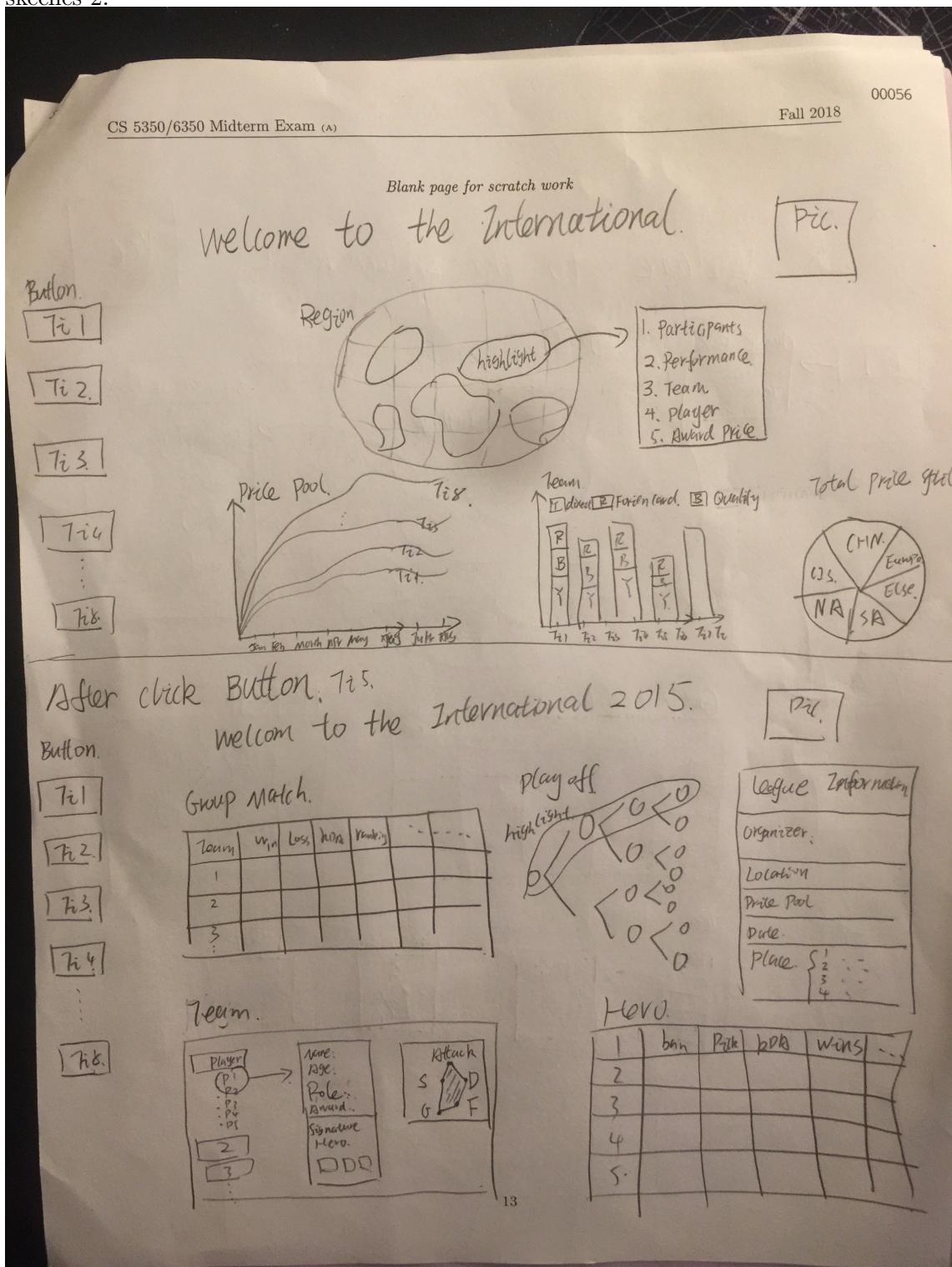
- 2015,2016,2017,2018 Ti daily price pool (120)
- 2018 Price Pool Distribution (12 parts)
- Viewers Peak Stats, 2017 and 2018 (6 to 7 aspects each year)
- Team Quota of Regions (6 regions, 18 teams)
- Total matches (148)
- Team (18) + player(90)
- Hero's Number: more than 100

Sketches and Design

sketches 1:



skeches 2:



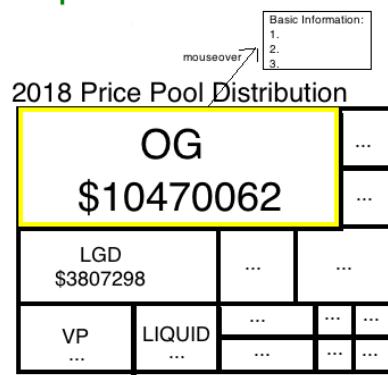
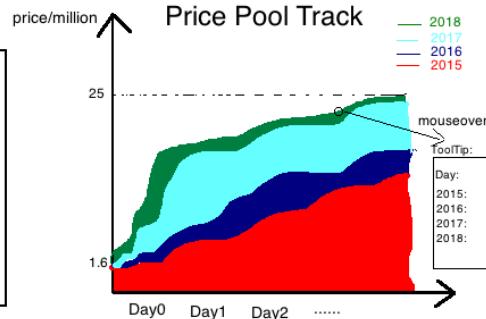
skeches 3:

Final Design:



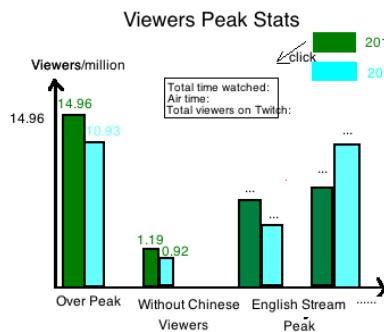
Welcome To The International 2018 Dota2 Championship

League Information	
Series:	
Organizer:	
Version:	
Location:	
Venue:	
Teams:	
Price Pool:	
Date:	

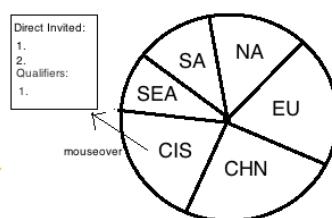


Top Matches

#1	LFY vs LIQUID	91283 viewers
		Video Link: www.....
#2		
#3		
#4		



Team Quota of Regions



Group A Stage:

E	1-1			
A	\			
B	2-0			
C				
	A	B	C	E

Group B Stage:

click

X	\			
W	0-2			
Y		1-1		
Z				
	X	W	Y	Z



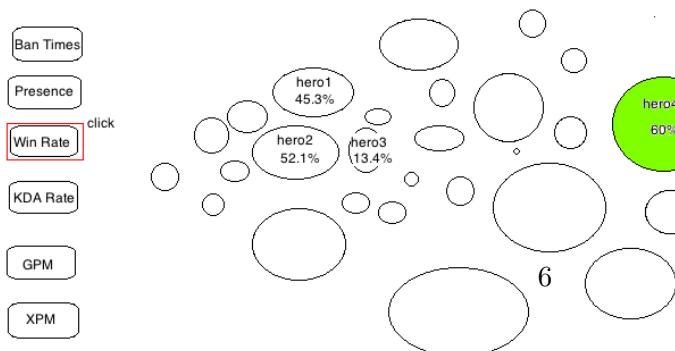
Team A	Team B
Team C	Team d

Team Information: Player Information:

Team Players:
1.
2. click
3.
4.
5.
Honors:
Interviews:
...

Picture

Name:
Role:
Ability:
Attack
EPM
GPM
Defence
Support



Hero Information

Strength Agility Intelligence

Speed:
Damage:
Attack Point:
...

Description

We can roughly divide this design into four parts:

- Introduction of Basic Information
 - Information Box

People could have a basic knowledge about the Ti8 by these information easily and efficiently. They would not be trapped in the encirclement of data.
 - Price Pool Track;

We will visually reflect the popularity of Ti8 by showing the differences in prize pool compared with the past. Certainly, the price pool will be one of the most important aspect to prove how popularity of Ti8.
 - 2018 Price Pool Distribution

It could help people understand the opportunities of team's bonuses in the Ti8, especially encourage for people who would like to be a professional player. Besides,
 - Viewers Peak States;
 - Team Quota of Regions
- Matches
 - Group Matches;

We will show these information's by table, people could query match result easily. Each rectangular represent one match, which includes integration. Besides, we are going to display match details by showing tooltip box.
 - Main Events and Awards. We will show this information by using tree. Since we could track each team match's schedule.
 -
- Team and Player
 - Team Information It includes team player, achievements, Ti8 interviewers link etc. Help people to understand the team information and characteristics.
 - Player Information Section; Include Name, Birth, Country, Role, Signature Hero, etc. Let people have a basic knowledge about this player.
 - Five-Star map. In order to more intuitively reflect the characteristics of the player, we decided to use a five-star map to represent it. Five aspects of ability: Attack(kill), Defense(death), Support(assist), Farm(GPM: gold per min), Grow(EPM: experience per min).
- Heros
 - Bubble Chart The bubble chart is a good idea for visualizing heroes. We come up with some designs for interaction. Using hover and click in visualization is a good way to show more detailed information with less crowded layout.
 - we are going to use hero image in d3 circle, it will help people to looking specific hero without a mount of time.

- We provide some choice like 'Presence', 'Win Rate', KDA Rate etc. It will help people to compare each hero's performance in Ti8 directly by the size of the circle.
- Hoers Basic Information Box Help people to have a basic information about this hero, which include the type of hero(strength, agility, Intelligence),original damage, attack point etc.

Must have Features

- League Information
- 2018 Price Pool Distribution
- Group matches and Playoff
- Team/Player; For each team, show basic information like team player, achievements etc. We need some information for player as well like ability, role etc.
- Heroes; Basic information such as GPM, XPM, win rate, appearance etc.

Optional Features

- Top Matches Section.
- Viewers Peak State
- Team Quota Regions

Project Schedule

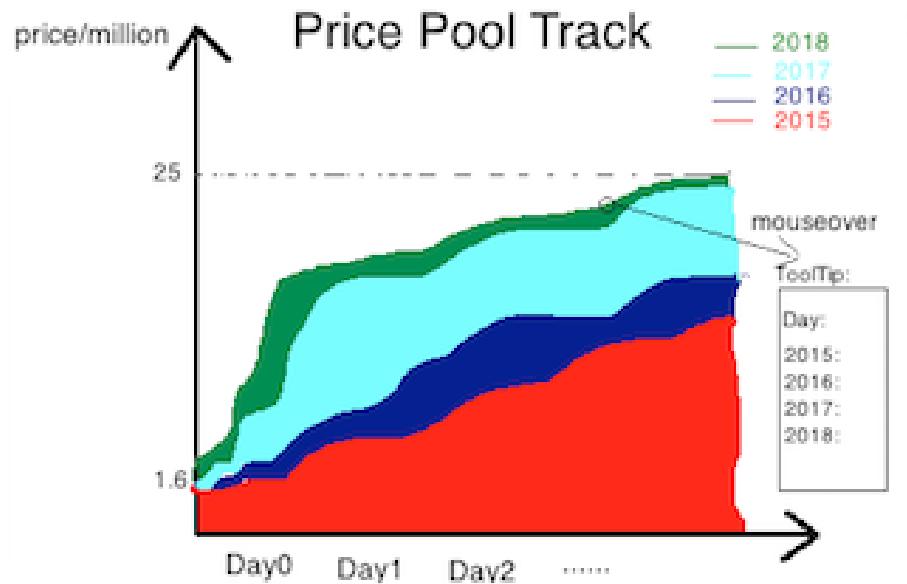
- 10.29 - 11.09 Milestone, prepare all data and finish 'Price Pool Track','2018 Price Pool Distribution' section as possible
- 11.10 - 11.30 Rest of part. Add more section if times allow.

Mileston 1 Current Stage

- data processsing:
 - TI8 infomation
 - * daily price pool from 2015,2016,2017,2018 to make comparision;We collected 110 day's price pool information to show how the Ti development durint these years.

Day	2014	2015	2016	2017	2018
0	1600000	1600000	1600000	1600000	1600000
1	2682056	3527102	4204753	4782066	5669282
2	3412386	4551752	5351325	5939229	6778536
3	3887103	5131860	5942380	6573269	7450646
4	4359369	5599591	6437459	7049884	8004083
5	4751090	5980978	6853407	7422856	8391285
6	5032238	6334299	7158775	7750340	8686008
7	5293739	6621347	7396324	8037183	8958257
8	5556659	6925868	7602951	8329028	9184922
9	5757481	7195787	7789988	8604665	9396175
10	5920247	7385511	7959459	8811893	9600240

We are going to display these information by line chart.



- * price pool distribution; We made a .json file to store the infomation about price distribution and region condition.

```

    "value": [
        {
            "team": "OG",
            "place": "1",
            "prize": 11234158,
            "percent": 0.44
        },
        {
            "team": "PSG.LGD",
            "place": "2",
            "prize": 4085148,
            "percent": 0.16
        },
        {
            "team": "Evil Geniuses",
            "place": "3",
            "prize": 2680879,
            "percent": 0.105
        },
        {
            "team": "Team Liquid",
            "place": "4",
            "prize": 1787252,
            "percent": 0.07
        },
        {
            "team": "Team Secret",
            "place": "5",
            "prize": 1148949,
            "percent": 0.045
        },
        {
            "team": "Virtus.pro",
            "place": "6",
            "prize": 1148949,
            "percent": 0.045
        }
    ],
    "year": "2018",
    "condition": [
        {
            "region": "CHN",
            "direct": ["PSG.LGD", "Vici Gaming", "Newbee", "VGJ.Thunder"],
            "qualify": ["Invictus Gaming", "Team Serenity"]
        },
        {
            "region": "EU",
            "direct": ["Team Liquid", "Team Secret"],
            "qualify": ["OG"]
        },
        {
            "region": "NA",
            "direct": ["VGJ.Storm", "Evil Geniuses", "OpTic Gaming"]
        },
        {
            "region": "SA",
            "direct": [],
            "qualify": ["paiN Gaming"]
        },
        {
            "region": "CIS",
            "direct": ["Virtus.pro"],
            "qualify": ["Winstrike Team"]
        },
        {
            "region": "SEA",
            "direct": ["Mineski"],
            "qualify": ["Fnatic", "TNC Predator"]
        }
    ]
}

```

– Hero

- * hero .csv file; We are going to display the hero's performance on Ti8. We collected all these infomation throung some aspects like: apperance rate, winning rate, lose rate, etc and store them in .csv file. We have 116 heors.

1	Hero	Picks	Picks_Win	Bans	Bans_Win	Combined	Combined_Win	Radiant_vs_Dire	GPM	XPM	KDA
2	Io	49	0.449	363	0.4876	412	0.483	0.3878	273	475	2.58
3	Phantom Lancer	99	0.596	185	0.5243	284	0.5493	0.5859	597	594	4.42
4	Chen	53	0.6226	222	0.4054	275	0.4473	0.434	292	332	2.38
5	Mirana	135	0.6	130	0.5846	265	0.5925	0.4667	520	548	6.24
6	Lycan	57	0.6316	175	0.52	232	0.5474	0.4386	504	500	5.23
7	Bloodseeker	70	0.4714	157	0.5032	227	0.4934	0.4571	503	517	3.82
8	Naga Siren	70	0.4714	141	0.4823	211	0.4787	0.3857	284	339	2.81
9	Windranger	122	0.4344	68	0.4265	190	0.4316	0.5164	365	414	3.06
10	Silencer	73	0.5205	114	0.4825	187	0.4973	0.5616	277	332	2.7

- * hero.json file; We decided to use the fore tree to display the heros. So we stored the hero's informaion in .json file.However, it looks messy if we put all 116 heros together.We plan to split these heors in 3 sets, each set has 30 more heros. Besides, we used three color to show that. 10+ for strength(red), 10+ for agility(green), 10+ for intelligence(blue).

```
1 {  
2     "name": "dota2",  
3     "img": "https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcRLI9YT0baVvGP1FTekbgvT4vKYcHA-x70pe3PvHXRE_SzvIomdSg",  
4     "children": [  
5         {  
6             "name": "strength",  
7             "children": [  
8                 {  
9                     "hero": "EarthShaker",  
10                    "name": "strength",  
11                    "link": "http://www.dota2.com/hero/earthshaker/",  
12                    "img": "http://cdn.dota2.com/apps/dota2/images/heroes/earthshaker_full.png?v=4794286?v=4794286",  
13                    "attr": {"picks": "53", "pick_win": "0.5849", "ban": "24", "ban_win": "0.4167", "combined": "77", "combined_win": "0.5325", "RVD":  
14                    "point": {"DPS": "7.0", "support": "5.6", "Push": "6.8", "gank": "8.0", "tank": "5.9", "group": "8.0"},  
15                    "size": 20000  
16                },  
17            },  
18            {  
19                "hero": "Sven",  
20                "name": "strength",  
21                "link": "http://www.dota2.com/hero/sven/",  
22                "img": "http://cdn.dota2.com/apps/dota2/images/heroes/sven_full.png?v=4794286?v=4794286",  
23                "attr": {"picks": "5", "pick_win": "0.4", "ban": "3", "ban_win": "0.333", "combined": "8", "combined_win": "0.375", "RVD": "0.6",  
24                "point": {"DPS": "8.7", "support": "4.3", "Push": "8", "gank": "7.4", "tank": "6.2", "group": "7.4"},  
25                "size": 20000  
26            }  
27        }  
28    }  
29}
```

– Team and Players

It's coming...

– Matches

- * We made up matches information of group stage in.csv file

1	Team_A	A_G1	A_G2	Team_B	B_G1	B_G2	Id	Id_ins	Score	G1H1	G1H2	G1H3	G1H4	G1H5	G1H6	G1H7	G1H8	G1H9	G1H10
2	Team Liquid	1	0	Fnatic	0	0	1	tl-fn	fn-tl	1:01 EarthShaker	Crystal Maid	Broodmothe	Pugna	Spectre	Io	Gyrocopter	Bane	Tiny	Enigma
3	PSG.LGD	1	0	OG	0	0	1	lgd-og	og-lgd	1:01 Io	Gyrocopter	Wraith King	Lina	Lion	Vengeful Spi	Weaver	Warlock	Monkey King	Skywrath Ma
4	Evil Geniuses	1	1	VGI.Thunder	0	0	0	eg-vgit	vgit-eg	2:00 Phoenix	Ursa	Crystal Maid	Clinkz	Alchemist	Weaver	Vengeful Spi	Wraith King	Winter Wyve	Bloodseeker
5	Invictus Gam	1	0	Mineski	0	0	1	ig-mm	mm-ig	1:01 Earthshaker	Mirana	Crystal Maid	Legion Conn Medusa	Wraith King	Silencer	Necrophos	Vengeful Spi	Terriblade	Lina
6	PSG.LGD	0	1	VGI.Thunder	1	0	0	lgd-vgit	vgit-lgd	1:01 Nature's Pro	Wrath King	Disruptor	Ursa	Leshrac	Silencer	Necrophos	Vengeful Spi	Death Prophet	Earthshaker
7	Mineski	1	1	Winstrike Te	0	0	0	mn-ws	ws-mn	2:00 Wraith King	Crystal Maid	Tiny	Winter Wyve	Bloodseeker	Nature's Pro	Clinkz	Vengeful Spi	Death Prophet	Earthshaker
8	Invictus Gam	0	1	Evil Geniuses	1	0	0	ig-eg	eg-ig	1:01 Wraith King	Pugna	Crystal Maid	Lifestealer	Storm Spirit	Tiny	Phoenix	Clinkz	Enigma	Spirit Breaker
9	Team Liquid	1	1	OG	0	0	0	tl-og	og-tl	2:00 Nyx Assassin	Chen	Ursa	Bloodseeker	Invoker	Pugna	Enchantress	Earthshaker	Tiny	Monkey King
10	PSG.LGD	1	0	Team Liquid	0	0	1	lgd-tl	tl-lgd	1:01 Earthshaker	Clinkz	Crystal Maid	Lina	Enchantress	Silencer	Io	Bloodseeker	Venomancer	Huskar
11	Evil Geniuses	1	1	Mineski	0	0	0	eg-mm	mm-eg	2:00 Weaver	Crystal Maid	Earl Spirit	Bristleback	Io	Gyrocopter	Vengeful Spi	Clinkz	Timbersaw	
12	Fnatic	1	1	VGI.Thunder	0	0	0	fn-vgit	vgit-fn	2:00 Enchantress	Wraith King	Earth Spirit	Visage	None	Dread	Lion	Ursa	Dark Willow	Windranger
13	Invictus Gam	0	0	Winstrike Te	1	0	0	lg-ws	ws-lg	0:02 Wraith King	Wraith King	Visage	None	Shadow Fiend	Clockwerk	Dread	Knight	Wraith King	Alchemist
14	Fnatic	0	1	Mineski	1	0	0	mn-mm	mm-mn	1:01 Winter Wyve	Necrophos	Windranger	Wraith King	Terror Prote	Vengeful Spi	Tiny	Pugna	Wraith King	Tinker
15	Evil Geniuses	1	1	OG	0	0	0	eg-eg	eg-eg	2:00 Necrophos	Crystal Maid	Ursa	Udynd	Storm Spirit	Tiny	Oracle	Centaur War	Warden	Windranger
16	Invictus Gam	1	0	Team Liquid	0	0	1	ip-tl	tl-ip	1:01 Wraith King	Pugna	Tusk	Necrophos	Alchemist	Vengeful Spi	Clinkz	Chen	Visage	
17	PSG.LGD	1	1	Winstrike Te	0	0	0	lgd-ws	ws-lgd	2:00 Weaver	Phoenix	Bane	Drow Ranger	Storm Spirit	Earthshaker	Necrophos	Disruptor	Ursa	Lina
18	PSG.LGD	0	0	Evil Geniuses	1	0	1	lgd-eg	eg-lgd	0:02 Vengeful Spi	Clinkz	Pudge	Weaver	Alchemist	Enchantress	Spectre	Lich	Tiny	Tusk
19	Invictus Gam	0	1	Fnatic	1	0	0	ig-fn	fn-ig	1:01 Dark Willow	Tiny	Ancient App	Clinkz	Bloodseeker	Winter Wyve	Necrophos	Wrath King	Templar Ass	Earth Spirit
20	VGI.Thunder	1	1	Winstrike Te	0	0	0	vgit-ws	ws-vgit	2:00 Silencer	Weaver	Winter Wyve	Necrophos	Lina	Chen	Mirana	Ogre Magi	Wraith King	Templar Ass
21	Mineski	0	0	OG	1	0	1	mn-eg	eg-mn	0:02 Vengeful Spi	Ursa	Phoenix	Sniper	Alchemist	Enchantress	Venomancer	Shadow Shar	Phantom Lar	Pugna
22	Team Liquid	1	1	Mineski	0	0	0	tl-mm	mm-tl	2:00 Vengeful Spi	Necrophos	Windranger	Wraith King	Terror Prote	Vengeful Spi	Tiny	Pugna	Wraith King	Tinker
23	Fnatic	0	1	OG	1	0	0	fn-og	og-fn	1:01 Windranger	Enigma	Udynd	Ursa	Huskar	Chen	Lina	Spectre	Treaty Prote	Invoker
24	Invictus Gam	0	0	VGI.Thunder	1	0	1	ig-vgit	vgit-ig	0:02 Wraith King	Winter Wyve	Dark Willow	Ursa	Alchemist	Silencer	Vengeful Spi	Clinkz	Brewmaster	Storm Spirit
25	Evil Geniuses	1	1	Winstrike Te	0	0	0	eg-ws	ws-eg	2:00 Necrophos	Mirana	Ursa	Silencer	Tusk	Vengeful Spi	Dark Willow	Witch Doctor	Drow Ranger	Storm Spirit
26	Mineski	1	0	VGI.Thunder	0	0	1	mn-vgit	vgit-mn	1:01 Vengeful Spi	Brewmaster	Dark Willow	Bloodseeker	Shadow Fiend	Silencer	Necrophos	Windranger	Luna	Wraith King
27	PSG.LGD	1	1	Fnatic	0	0	0	lgd-fn	fn-lgd	2:00 Drow Ranger	Bane	Windranger	Udynd	Alchemist	Winter Wyve	Wrath King	Dark Willow	Broodmothe	Lone Druid
28	Invictus Gam	0	0	OG	1	0	1	lg-og	og-lg	0:02 Io	Gyrocopter	Rubick	Lina	Axe	Silencer	Morphling	Dark Willow	Centaur War	Pugna
29	Team Liquid	1	1	Winstrike Te	0	0	0	ti-ws	ws-ti	2:00 Wraith King	Dark Willow	Broodmothe	Ogre Magi	Brewmaster	Vengeful Spi	Nature's Pro	Tiny	Spectre	Mirana
30	Evil Geniuses	0	0	Team Liquid	1	0	1	eg-tl	tl-eg	0:02 Tiny	Lich	Ursa	Rubick	Spectre	Vengeful Spi	Phoenix	Venomancer	Clinkz	Drow Ranger
31	Invictus Gam	0	0	PSG.LGD	1	0	1	lg-lgd	lgd-lg	0:02 Necrophos	Silencer	Tusk	Enigma	Templar Ass	Tiny	Winter Wyve	Crystal Maid	Lina	Faceless Void
32	OG	1	1	VGI.Thunder	0	0	0	og-vgit	vgit-og	2:00 Chen	Winter Wyve	Spectre	Treaty Prote	Monkey King	Weaver	Vengeful Spi	Necrophos	Tiny	Phoenix
33	Fnatic	1	1	Winstrike Te	0	0	1	fn-ws	ws-fn	1:01 Wraith King	Winter Wyve	Earth Spirit	Lone Druid	Templar Ass	Ursa	Silencer	Dark Willow	Mirana	Storm Spirit
34	PSG.LGD	1	1	Mineski	1	0	0	lgd-mm	mm-lgd	2:00 Weaver	Udynd	Phantom Lar	Tusk	Zeus	Wraith King	Dark Willow	Crystal Maid	Pangolier	Tinker

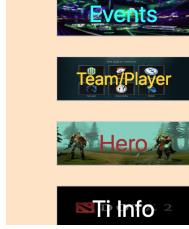
• Design

- Our basic project frame:



League Information

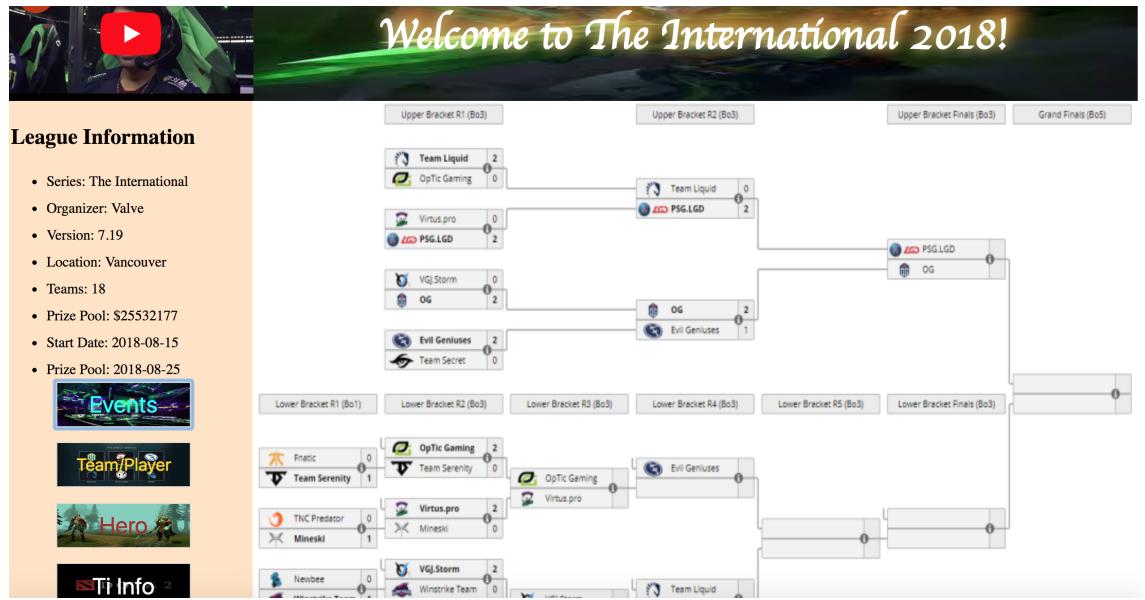
- Series: The International
- Organizer: Valve
- Version: 7.19
- Location: Vancouver
- Teams: 18
- Prize Pool: \$25532177
- Start Date: 2018-08-15
- Prize Pool: 2018-08-25



As we can see, we embeded a introduction video of TI8 at the top. We hope people have straitghtful feeling about Ti8. Besides, we put the league information box on the right of the page. In order to facilitate the interaction between the viewer and the webpage, we have set up four buttons.

* Events

When you click this button, it gonna show the group stage events and main events. Now, I just used the image to be the background. We are going to use d3 to draw graph like that. When you click the team, it will show more details about that match.



- * Team/Player

We are going to show more team and player's information later. The right side will show the information graph. We will add more interaction and coordinate...



Welcome to The International 2018!

League Information

- Series: The International
- Organizer: Valve
- Version: 7.19
- Location: Vancouver
- Teams: 18
- Prize Pool: \$25532177
- Start Date: 2018-08-15
- Prize Pool: 2018-08-25



- * Hero

We would like to show hero information by using force tree. It will add more interesting for vistor. However, it will looks messy if 100 more hero appear together. So we will figure out how to show heros more appropriate later.



When you click the hero's head sculpture, it will show some infomation lik name,attributes. We provide hero link if you want to have more specific information. Besides, there are some graph on right side. We will show TI8 performance graph later.



- * Ti8 info We will show some optional feature in this part. Like price pool, comparision with previou year,team of region,etc.

