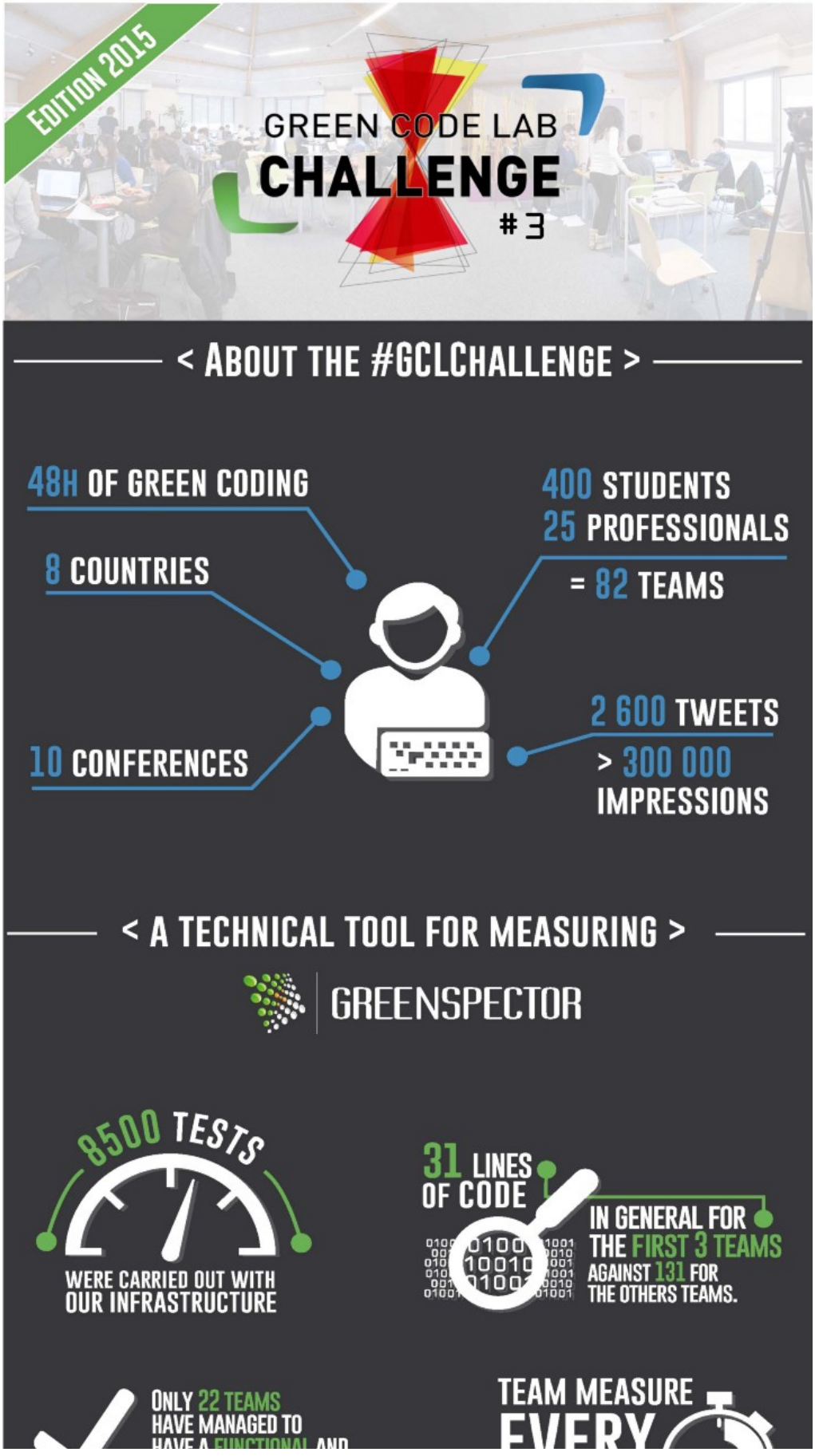
Green Code Lab Challenge 2015 Results

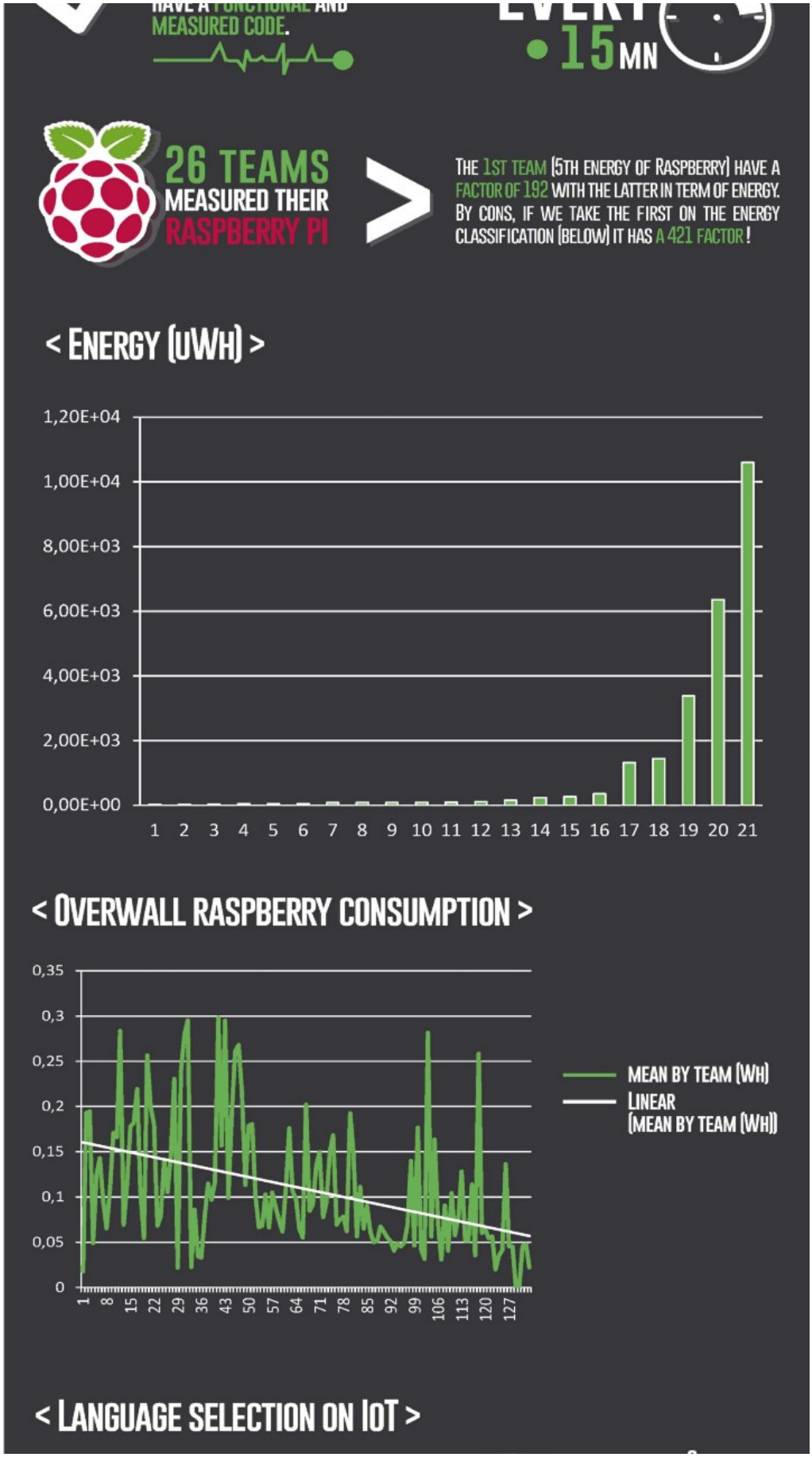
The 3rd Green Code Lab Challenge took place from December 2 to 4. It has helped more than 400 students and 25 professionals to showcase an unsung yet essential topic in the digitalization of our economy, namely eco-design software. Objectives of these 48 hours, optimize team and school in France and eight other countries, a process of communication between a connected object and a server. The Internet Of Things or the connected objects already invaded our lives every day and should explode in the coming years. With a small but significant numbers consumption, there is a strong impact on resources and energy. Indeed, according to an October 2015 study by IDATE, there will be 155 billion objects connected in 2025, with an average annual growth rate of 14%.

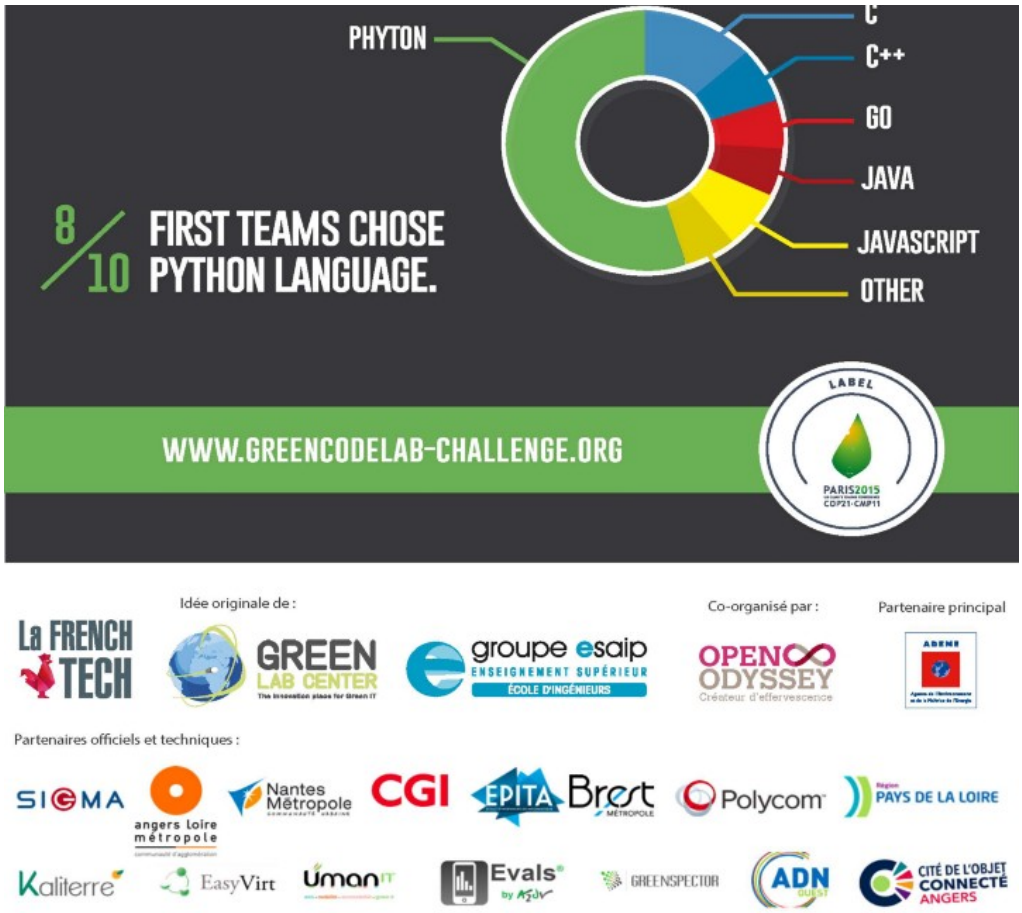
The 85 registered teams have thus worked on an exercise in style to make more efficient a connected object. Only 22 of them managed to have a functional code and measured. Among them, the teams had the choice of language, two teams had the C and C ++ code, other have developed on languages such as JavaScript but mostly Python, probably for reasons of control and implementation speed.

The first 3 were in average 31 lines of code against 131 for the 22 teams. Simplicity is the friend and eco-design! Another interesting metric that corroborates the interest of sobriety in the quest for efficiency software, these three teams averaging using a single outdoor Library 2 against averages for the 22 functional teams.

In earnings on energy, if one takes the 1st place on the energy challenge, it was a factor of 421 with the last! This again demonstrates the impact of the developer in its development choices on energy use in fine.


EDITION 2015
GREEN CODE LAB
CHALLENGE
#3
< ABOUT THE #GCLCHALLENGE >
48H OF GREEN CODING
8 COUNTRIES
10 CONFERENCES
400 STUDENTS
25 PROFESSIONALS
= 82 TEAMS
2 600 TWEETS
> 300 000
IMPRESSIONS
< A TECHNICAL TOOL FOR MEASURING >
GREENSPECTOR
8500 TESTS
WERE CARRIED OUT WITH
OUR INFRASTRUCTURE
31 LINES
OF CODE
IN GENERAL FOR
THE FIRST 3 TEAMS
AGAINST 131 FOR
THE OTHERS TEAMS.
ONLY 22 TEAMS
HAVE MANAGED TO
TEAM MEASURE
EVERY


MEASURED CODE.
15 MN
26 TEAMS
MEASURED THEIR
RASPBERRY PI
THE 1ST TEAM (5TH ENERGY OF RASPBERRY) HAVE A FACTOR OF 192 WITH THE LATTER IN TERM OF ENERGY. BY CONS, IF WE TAKE THE FIRST ON THE ENERGY CLASSIFICATION (BELOW) IT HAS A 421 FACTOR !
< ENERGY (UWH) >
1,20E+04
1,00E+04
8,00E+03
6,00E+03
4,00E+03
2,00E+03
0,00E+00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
< OVERWALL RASPBERRY CONSUMPTION >
0,35
0,3
0,25
0,2
0,15
0,1
0,05
0
1 8 15 22 29 36 43 50 57 64 71 78 85 92 99 106 113 120 127
MEAN BY TEAM (WH)
LINEAR
(MEAN BY TEAM (WH))
< LANGUAGE SELECTION ON IOT >

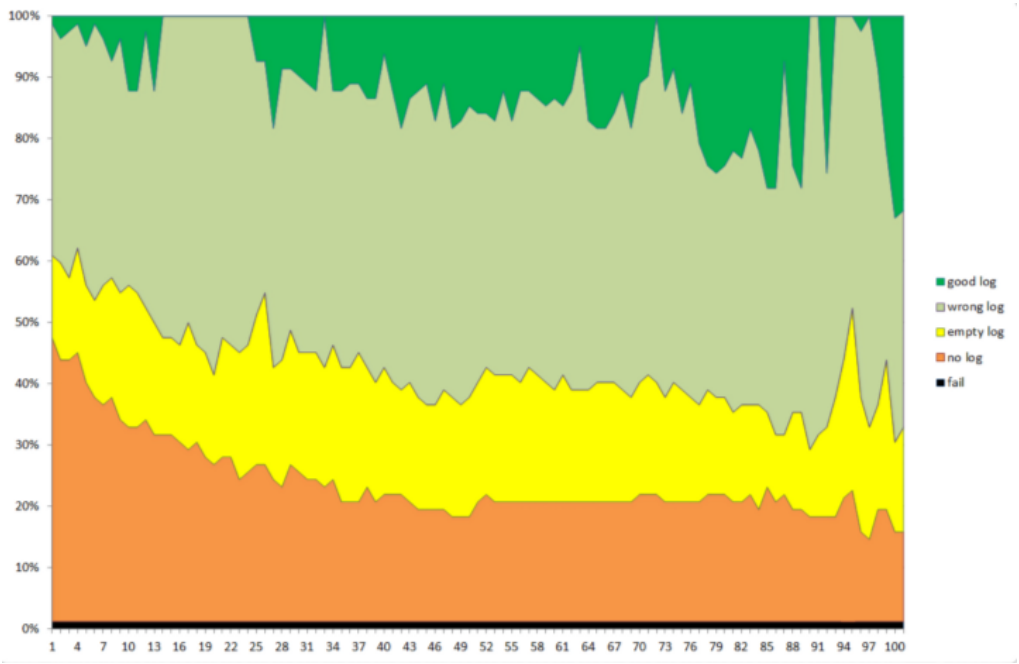


Ranking

The final ranking is as on the Green Code Lab Challenge website . 0 point indicates either that the application was not functional, or that there was no measure or that the code was not shared or that coding was not justified. Indeed, it is difficult to rank team for example simply on a measure without a functional code.

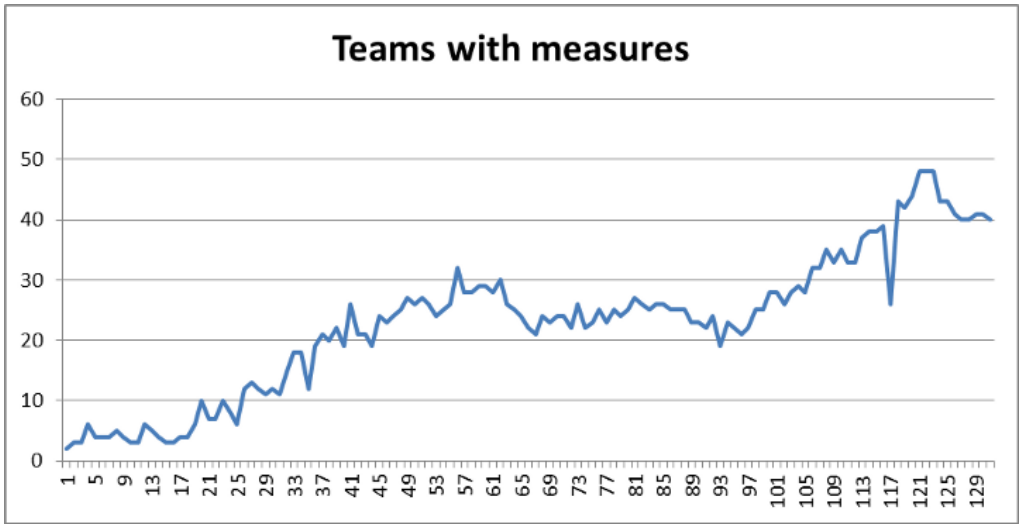
Lot of teams don't success in having measures or functional application. The reasons : no agility for certain teams, tunnel effect with a rush the Friday, application not robust…

Here is an analysis of our partner Sigma on the evolution of functional results of the teams :



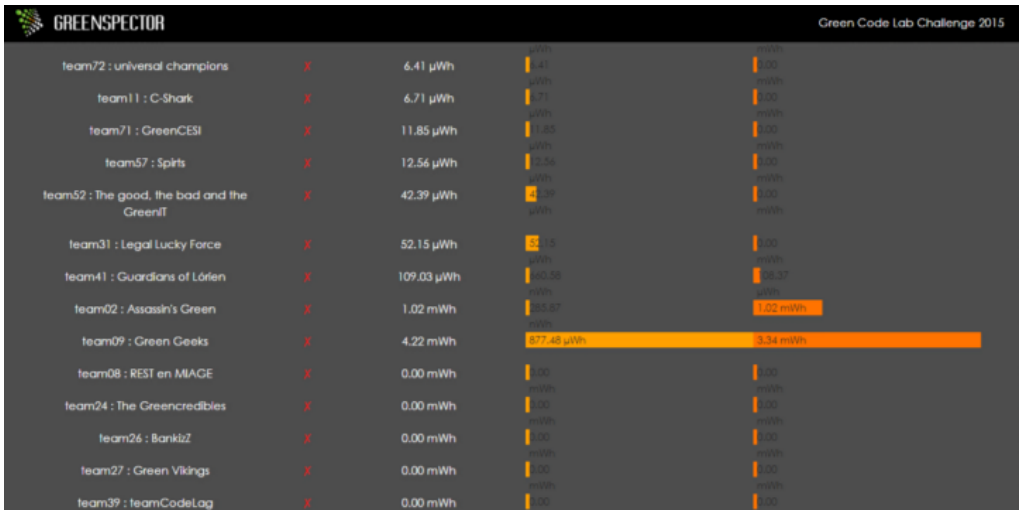
20% of teams do not have a log. This corresponds to the teams that give up. We see a progression on improving logs. Until the end of the contest. The fact that all the teams have not led to a functional application is explained below.

And we have also the evolution of team with measurement ok in Greenspector :

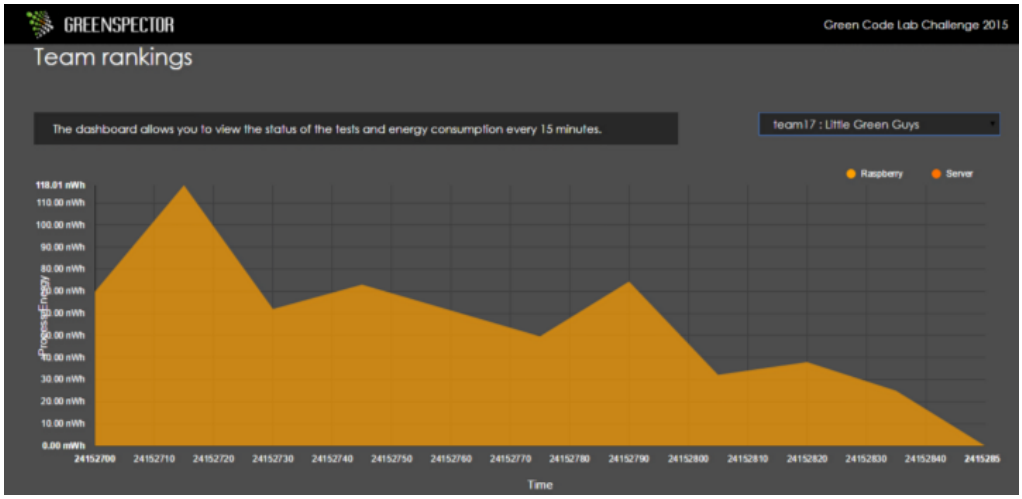


Greenspector & dashboard

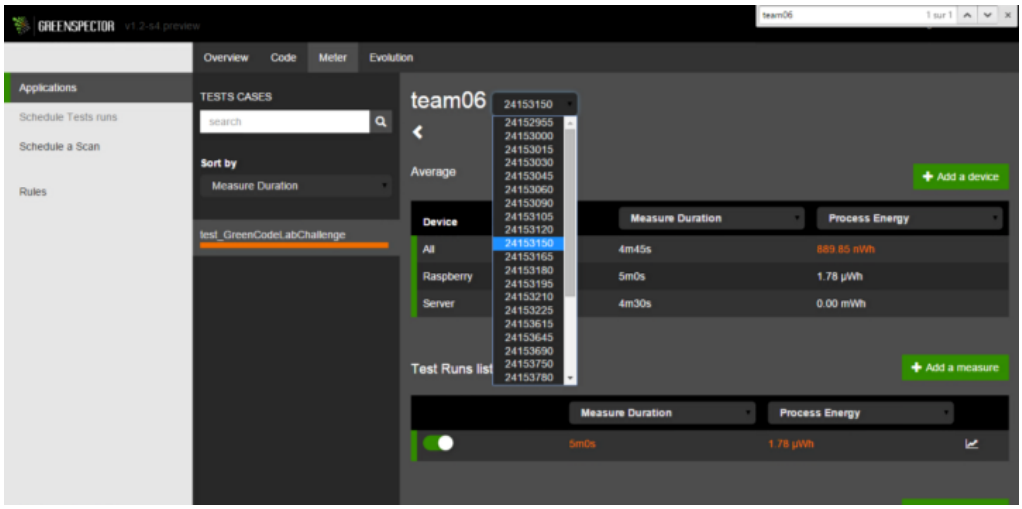
Greenspector was used for the challenge. A single account was used to store the results. A public dashboard and visible was used and allowed to see the rankings



In the dashboard, teams can monitor their consumption:

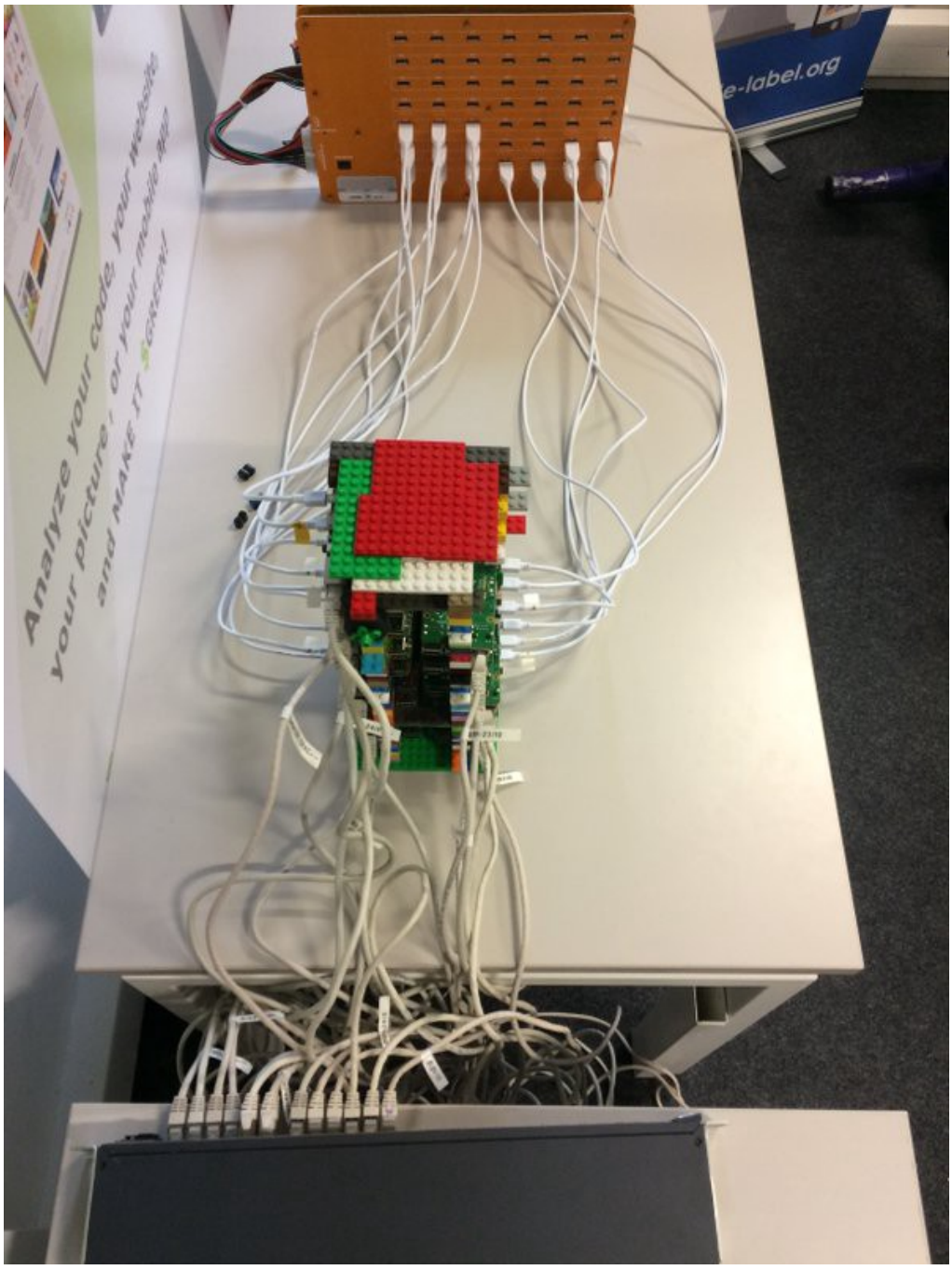


Throughout the challenge, students can send their code and verify that it was functional. 8500 tests were carried out on the competition via our infrastructure. In Greenspector interface, organizing team had access to detailed measures. For a team, we have the opportunity to see the results of each measure.



Infrastructure

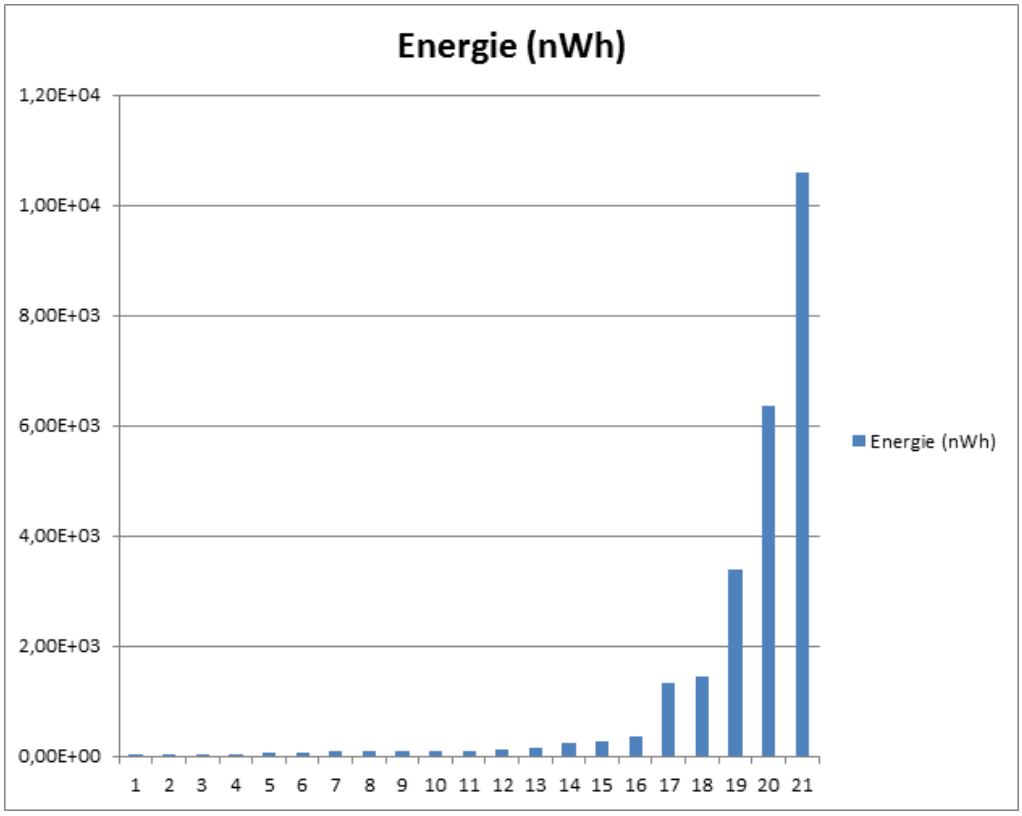
Greenspector managed a quite particular infrastructure: a 100 Raspberry PI cluster.



We have worked many hours on this introduction with all associated problematic : Power has dimension, hub to distribute food … Thanks lara_hogan for his book Device lab building that has served us. http://www.fivesimplesteps.com/products/building-a-device-lab

Some figures on the infrastructure and teams

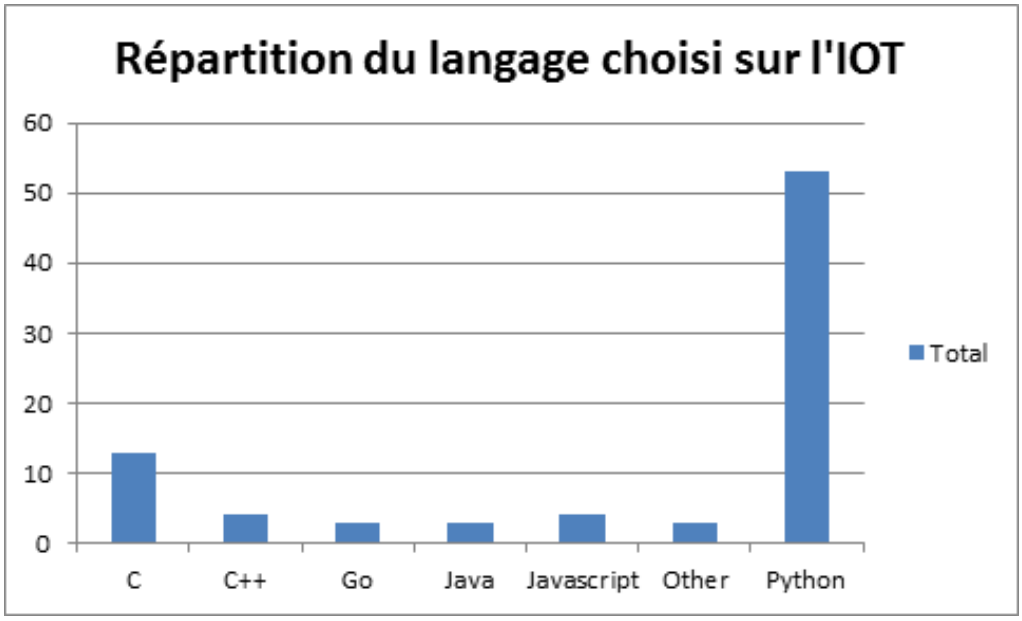
Here the energy of the teams leading to a functional application.



The 1st team(5th energy of Raspberry) have a factor of 192 with the latter in term of energy. By cons, if we take the first on the energy classification (above) was a factor 421!

Analysis of results

Statistics of languages used on the Raspberry:



The languages used on the Raspberry for the first 10:

Classement Langage
1 Python
2 C++
3 Python
4 Javascript
5 Python
6 C++
7 Python
8 Python
9 Python
10 Python

Note on 85 teams, only 22 have managed to have a functional code and measured. Of these 22, only two teams had the C and C ++ code. Does that mean that Python is faster than C? No, our analysis is that the students went on a language they mastered. Moreover within Python lines can make treatment faster. Also C was more difficult to have a functional and stable code in 48 hours. The first 3 were in average 31 lines of code against 131 for the 22 teams. Simplicity is the friend of eco-design. Another metric is used three teams averaging 1 2 External libraries against averages for the 22 functional teams.

Return for Greenspector and next actions

This is a long history of the Greenspector R&D. Since several year, we have worked on the measure of the software layer. It's not easy. A first idea is to put a wattmeter on the computer. But after, how to get back the data ? One measure every 1 second is sufficient for software ? And what if I want to measure only one process and not to be pollute by other process ? We put a lot of R&D to solve these questions. And we work also with a lot of great partners. The infrastructure we mount for the Green Code Lab Challenge contains the essence of this work.

The challenge for us was a technical challenge! We had 85 teams actually measured every 15 minutes. For this we used probes of our partners:

- For Raspberry, the Power API probe. This probe estimates the energy consumption of a process.
- For servers, the DSCope of Easyvirt probe to estimate the energy consumption of a virtual machine.

This challenge is successful, we used to measure each team. However, this implementation has detected our strengths and weaknesses. We are being integrated in the roadmap of these corrections. In particular, the optimization of the probe which is too Raspberry consuming to our taste.

For the best practices, several conclusions :

. The best teams are the team which apply the KISS principle (***Keep it simple, stupid)***

. So language can be more efficient but you need to master them, and it depend of the context. One language for one need.

. IoT doesn't imply naturally an efficient code. We need to apply best practices to make it efficient.

And now ? We will integrate the Challenge experience feedback in Greenspector and prepare for the next challenge.

Team #	Team Name	Team Origin	Criteria 1 Energy	Criteria 2 Data	Criteria 3 Practices	Criteria 4 Justification	Criteria 5 Communication	SCORE
team22	Le Quintuplet	Iut de Nantes	395	200	58	75	100	828
team26	BankizZ	EPITA	500	200	0	90	0	790
team03	GreenOuille	ESAIP	380	200	75	50	80	785
team78	La Poste (PRO)	France	328	180	31	100	60	699
team63	Team 7	PERCCOM	270	200	27	80	100	677
team60	PERCCOM_Team01	Université de Lorraine	341	180	33	60	60	674
team65	CO2	University of Lorraine	317	180	17	90	60	664
team61	Green 3Pillar SOFAA		367	90	37	50	60	604
team46	Hello Green !	ESEO	315	90	47	90	60	602
team64	importIO	Lulea University Of Technology	252	200	58	30	60	600
team33	StackOverSwag	Universidad de Valladolid Escuela Técnica Superior de Ingenieros de Telecomunicación	334	90	53	60	60	597
team36	Green Lantern	IUT informatique Nantes	317	90	25	100	55	587
team68	Sigma (PRO)	Sigma Informatique	313	200	20	40	0	573
team01	GREAM	ESAIP	271	90	56	50	80	546
team48	Michel Boujenah	Epita	254	200	0	60	5	519
team21	La Greenance	EPITA	254	200	0	60	5	519
team72	universal champions	Epita	251	200	0	60	0	511
team77	Mirage	IUT de Nantes	282	180	0	30	0	492
team73	Rabat	ISTIA - École d'Ingénieurs - Université Angers	301	45	0	70	60	476
team79	CGI (PRO)	France	264	180	0	10	0	454
team71	GreenCESI	CESI Nantes	250	90	0	20	5	365
team10	Ecolo is MIAGIC	Université de Nantes	397	200	16	Code not found	100	-
team55	PolyGreen	École Polytechnique de Montréal	Measure not ok	Measure not ok	26	100	100	-
team58	Green Arrow	Lulea University of Technology	Nonfunctional	Nonfunctional	48	60	100	-
team24	The Greencredibles	Universite de Lorraine/ Lulea tekniska universitet	Nonfunctional	Nonfunctional	52	90	60	-
team35	Compu Global Hiper Mega Net	Universidad de Valladolid	Nonfunctional	Nonfunctional	78	100	5	-
team53	GTchallengers	Ecole Centrale de Nantes	Nonfunctional	Nonfunctional	36	80	60	-
team12	Creeper	l'Ecole Central de Nantes	Nonfunctional	Nonfunctional	17	95	60	-
team17	Little Green Guys	Université de Poitiers	Measure not ok	Measure not ok	0	70	100	-
team09	Green Geeks	Université de Nantes	Nonfunctional	Nonfunctional	11	95	60	-
team30	Party&Code	Universidad de Valladolid, ETSIT	Nonfunctional	Nonfunctional	21	40	100	-
team51	ESEO_I3	ESEO,Angers	Nonfunctional	Nonfunctional	21	80	60	-
team02	Assassin's Green	ESAIP	Nonfunctional	Nonfunctional	21	30	100	-
team20	ESEO Team	ESEO	Nonfunctional	Nonfunctional	61	30	55	-
team80	Wouep! (PRO)	France	Nonfunctional	Nonfunctional	20	30	80	-
team06	Greench	ESAIP	Nonfunctional	Nonfunctional	17	50	60	-
team19	Les carottes	ESAIP	Nonfunctional	Nonfunctional	20	100	5	-
team82	Power Ranger	EPITA	Nonfunctional	Nonfunctional	50	75	0	-
team05	Optimization Means GreenIT	ESAIP	Nonfunctional	Nonfunctional	0	80	40	-
team08	REST en MIAGE	Université de Nantes	Nonfunctional	Nonfunctional	31	20	60	-
team16	Greender	ESAIP	Nonfunctional	Nonfunctional	0	10	100	-
team23	RIREMI	IMERIR / Obuda University	Measure not ok	Measure not ok	30	80	0	-
team04	Green Worms	ESAIP	Nonfunctional	Nonfunctional	30	30	40	-
team25	GreenWater	EPITA	Nonfunctional	Nonfunctional	0	40	60	-
team07	Green MIAGE Team	université de Nantes	Nonfunctional	Nonfunctional	0	30	60	-
team42	Eco++	Epita	Measure not ok	Measure not ok	20	70	0	-
team41	Guardians of Lórien	EPITA	Nonfunctional	Nonfunctional	0	25	60	-
team62	The Architects	IUT informatique Nantes	Nonfunctional	Nonfunctional	0	80	0	-
team11	C-Shark	Sup'Esaip	Nonfunctional	Nonfunctional	0	70	5	-
team40	Java Bien	EPITA	Nonfunctional	Nonfunctional	0	75	0	-
team31	Legal Lucky Force	Epita	Nonfunctional	Nonfunctional	0	70	0	-
team69	GPHY M1	Université de Poitiers	Nonfunctional	Nonfunctional	0	30	35	-
team27	Green Vikings	University College Nordjylland	Nonfunctional	Nonfunctional	0	No justification	60	-
team59	Esaip DIT (Do it together)	ESAIP	Nonfunctional	Nonfunctional	16	No justification	40	-
team49	Qualified	EPITA	Nonfunctional	Nonfunctional	0	55	0	-
team70	Sun7	IUT de Nantes	Nonfunctional	Nonfunctional	0	No justification	55	-
team34	Sparks	EPITA	Nonfunctional	Nonfunctional	0	40	0	-
team52	The good, the bad and the GreenIT	EPITA	Nonfunctional	Nonfunctional	0	40	0	-
team39	teamCodeLag	Esaip dijon	Nonfunctional	Nonfunctional	0	30	5	-
team75	GCL-2	EPITA	Nonfunctional	Nonfunctional	0	30	0	-
team43	Enigma	Universidad de Valladolid	Nonfunctional	Nonfunctional	0	20	0	-
team45	Eco-Logic	EPITA	Nonfunctional	Nonfunctional	0	20	0	-
team54	iLoop	Óbudai Egyetem Neumann János Informatikai Kar	Nonfunctional	Nonfunctional	0	20	0	-
team15	LabTaupe	Lycée Saint Joseph	Nonfunctional	Nonfunctional	0	10	5	-
team56	Green Lantern	Epita	Nonfunctional	Nonfunctional	0	10	0	-
team13	Unix-code of love	Lycée Saint Joseph	Nonfunctional	Nonfunctional	0	No justification	5	-
team14	Logicode	LTP St Joseph	Nonfunctional	Nonfunctional	0	No justification	5	-
team18	Enigma	IUT de Nantes	Nonfunctional	Nonfunctional	0	No justification	5	-
team81	Icoz S.A.R.L (PRO)	Marocco	Nonfunctional	Nonfunctional	0	No justification	0	-
team28	Pegasus	Epita	Nonfunctional	Nonfunctional	0	No justification	0	-
team29	Green Lanterns	EPITA	Nonfunctional	Nonfunctional	0	No justification	0	-
team32	GreenTech	Epita	Nonfunctional	Nonfunctional	0	No justification	0	-
team37	They c#	Obuda University	Nonfunctional	Nonfunctional	0	No justification	0	-
team38	Thè Green	EPITA GRADUATE SCHOOL OF COMPUTER SCIENCE	Nonfunctional	Nonfunctional	0	No justification	0	-
team44	Mario and Co	Universidad de Valladolid	Nonfunctional	Nonfunctional	0	No justification	0	-
team47	Verte Watt	EPITA	Nonfunctional	Nonfunctional	0	No justification	0	-
team50	Aristocrabes	EPITA	Nonfunctional	Nonfunctional	0	No justification	0	-
team57	Spirts	Epita	Nonfunctional	Nonfunctional	0	No justification	0	-
team66	World Campions	Epita	Nonfunctional	Nonfunctional	0	No justification	0	-
team67	Blue Tigers	University of Óbuda (NIK), Budapest	Nonfunctional	Nonfunctional	0	No justification	0	-
team74	GCL-1	EPITA	Nonfunctional	Nonfunctional	0	No justification	0	-
team76	GCL-3	EPITA	Nonfunctional	Nonfunctional	0	No justification	0	-