

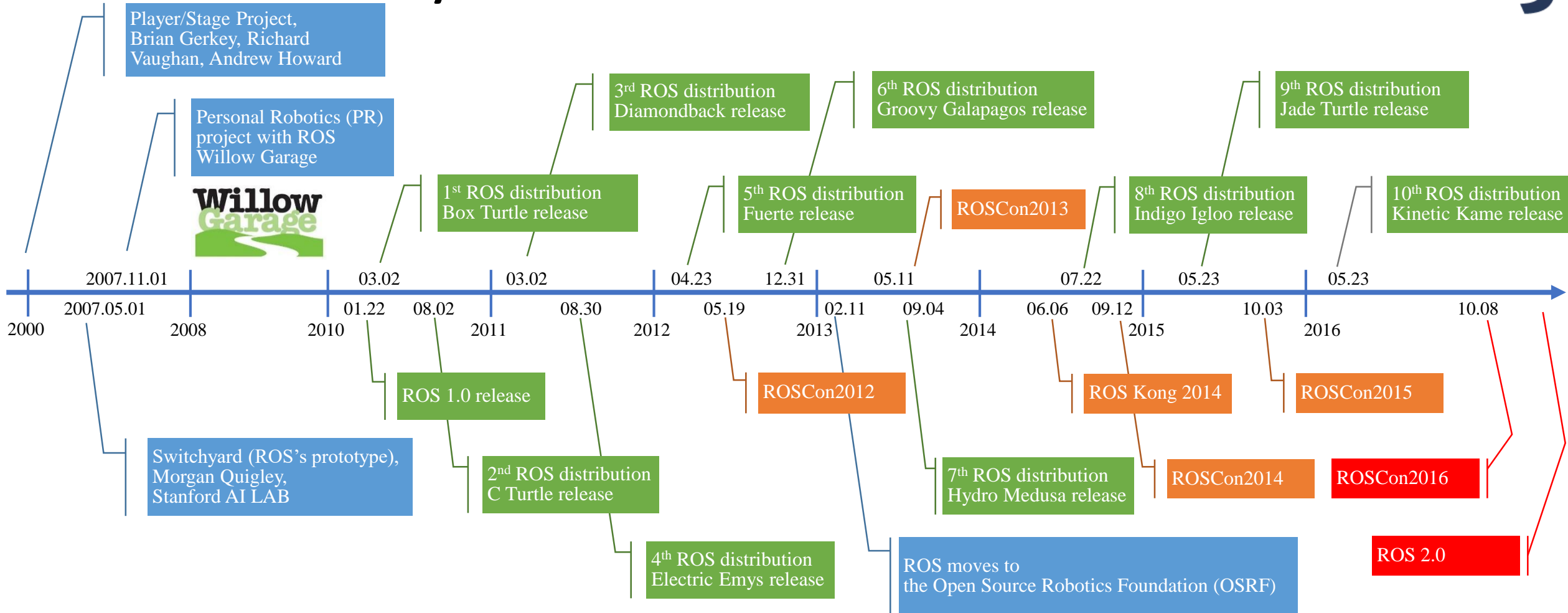
ROS 9년간의 분석

ROBOTIS

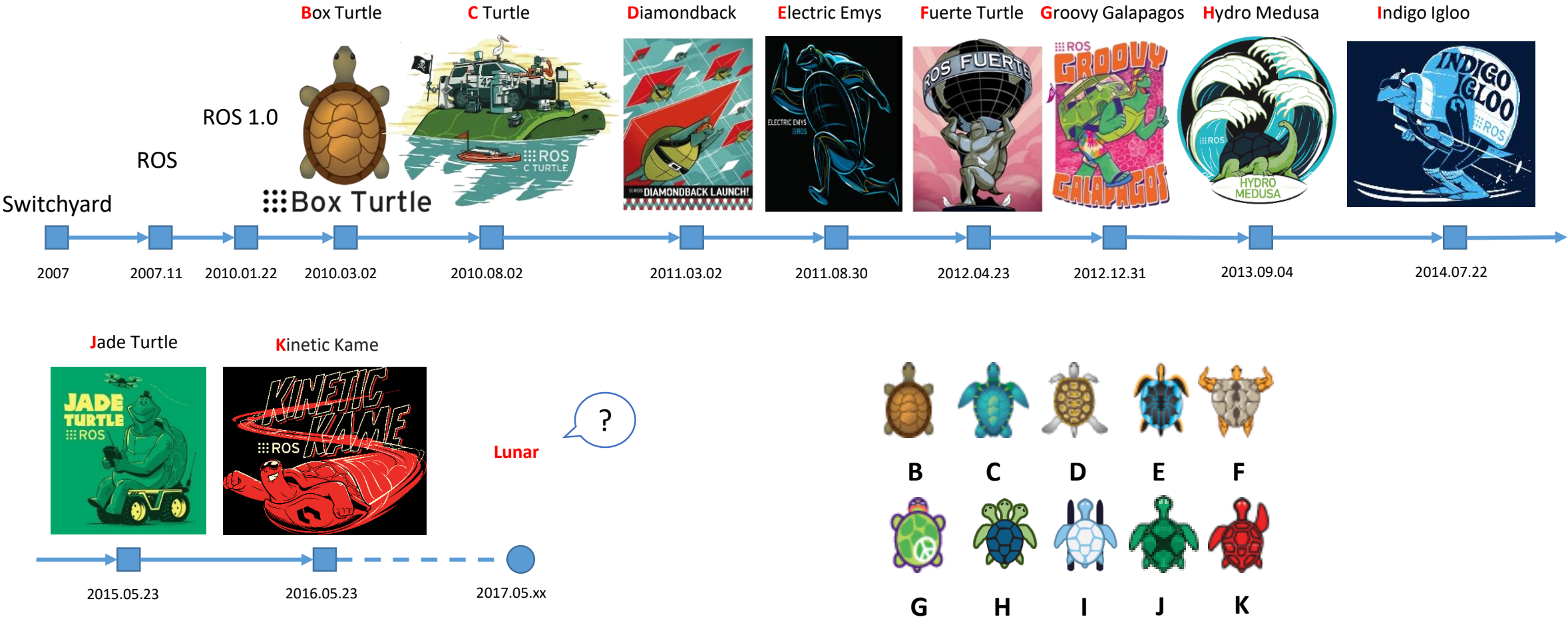
Open Source Team

Yoonseok Pyo

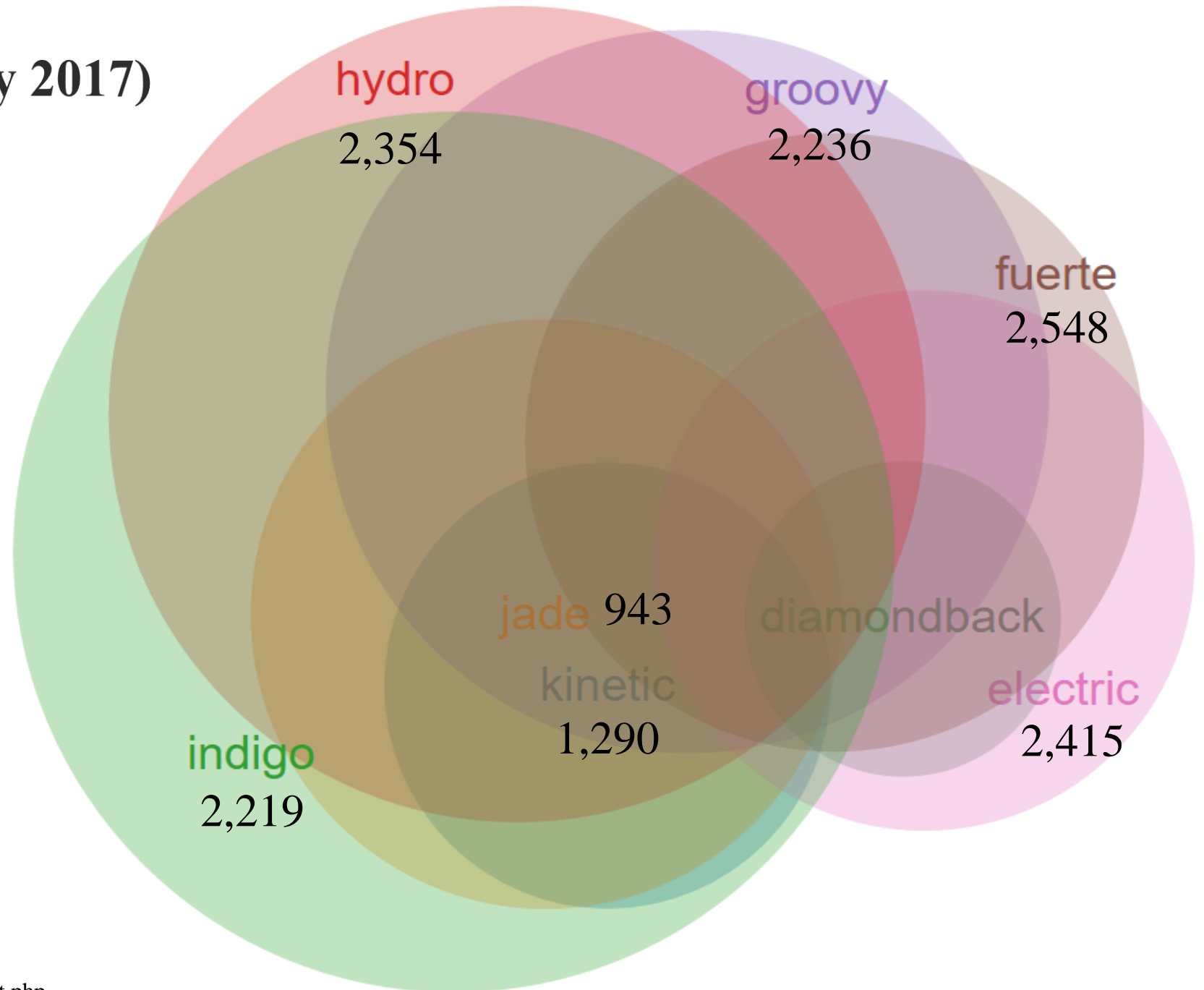
ROS History



ROS Versions, Posters, Icons



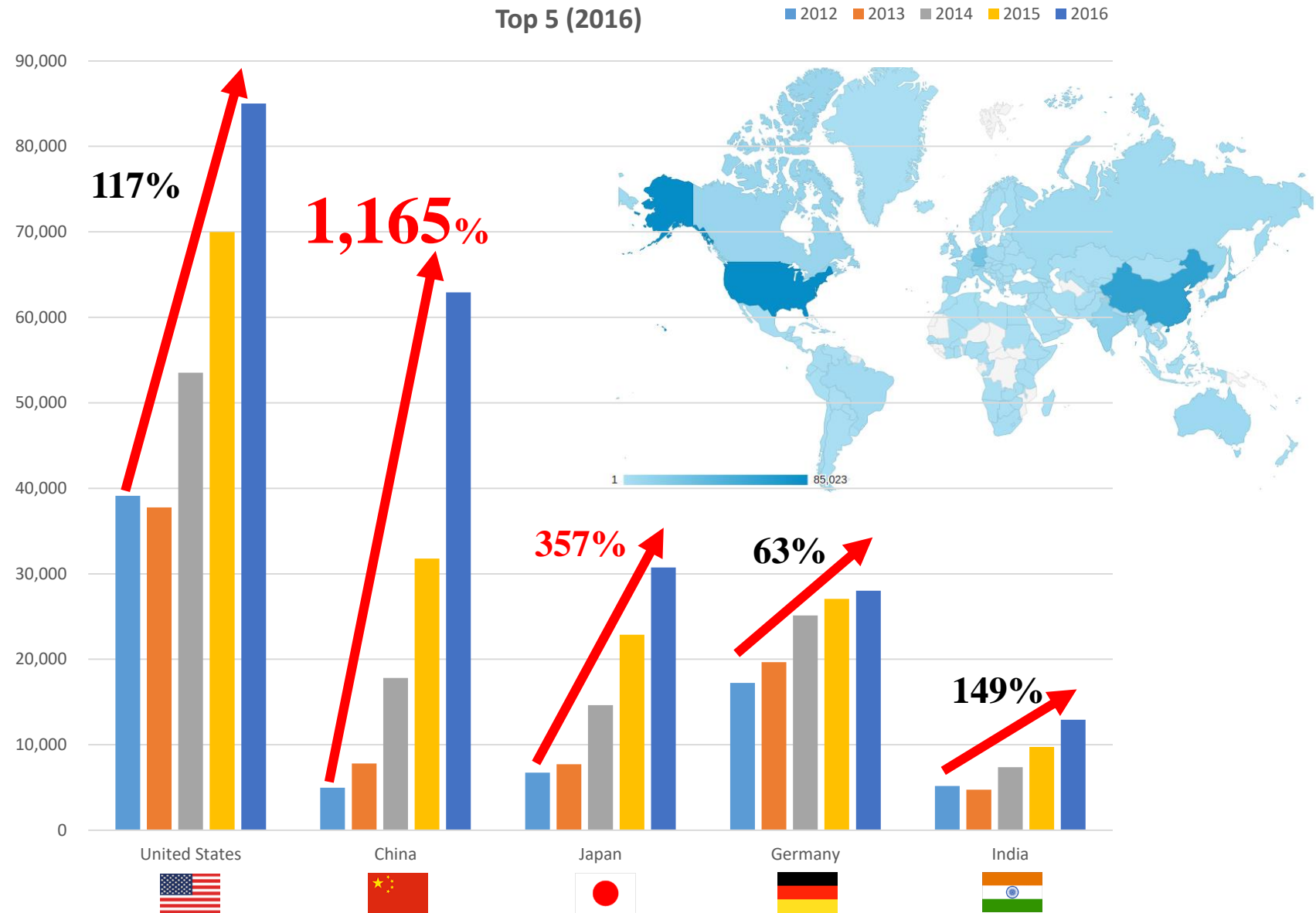
Known packages (May 2017)



Visitor locations (official wiki.ros.org, not include data of mirrors)

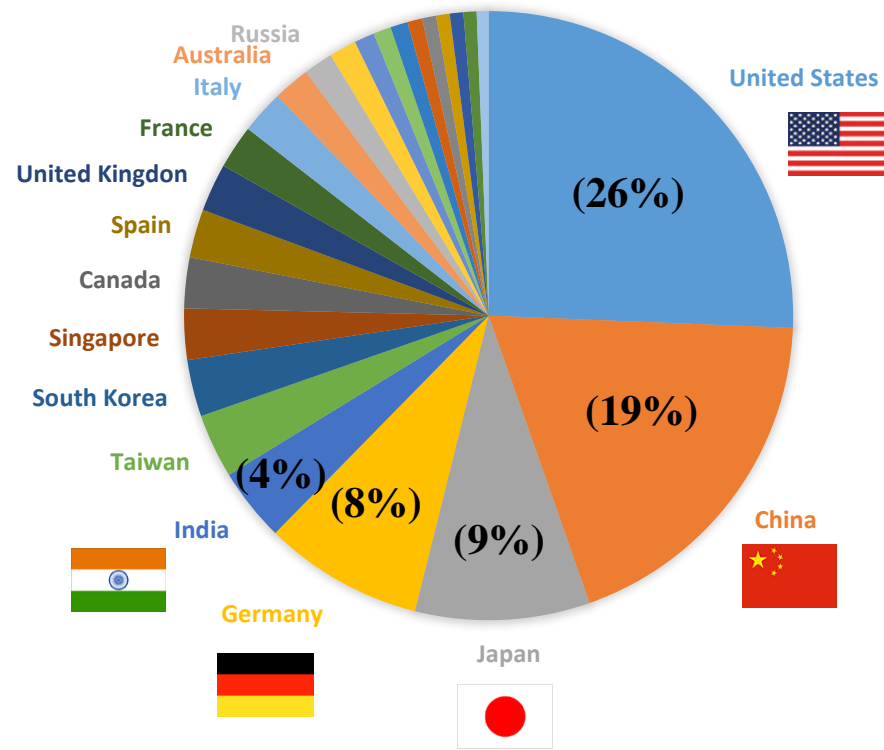
| 2012 | | | 2013 | | | 2014 | | | 2015 | | | 2016 | | |
|---|----------------|--------|---|----------------|--------|---|----------------|--------|---|----------------|--------|---|----------------|--------|
|  | United States | 39,112 |  | United States | 37,773 |  | United States | 53,530 |  | United States | 69,989 |  | United States | 85,023 |
|  | Germany | 17,225 |  | Germany | 19,666 |  | Germany | 25,133 |  | China | 31,778 |  | China | 62,933 |
|  | Japan | 6,725 |  | China | 7,822 |  | China | 17,812 |  | Germany | 27,080 |  | Japan | 30,745 |
|  | Spain | 6,563 |  | Japan | 7,714 |  | Japan | 14,619 |  | Japan | 22,867 |  | Germany | 28,022 |
|  | India | 5,187 |  | Spain | 3,951 |  | Spain | 9,192 |  | India | 9,740 |  | India | 12,918 |
|  | France | 5,074 |  | United Kingdom | 5,672 |  | Canada | 8,611 |  | France | 9,431 |  | Taiwan | 11,301 |
|  | China | 4,975 |  | India | 4,745 |  | France | 8,399 |  | United Kingdom | 9,143 |  | South Korea | 9,990 |
|  | United Kingdom | 4,095 |  | Australia | 4,734 |  | United Kingdom | 7,434 |  | Spain | 8,617 |  | Singapore | 9,015 |
|  | Canada | 3,754 |  | Canada | 4,145 |  | India | 7,360 |  | Canada | 8,497 |  | Canada | 8,928 |
|  | Italy | 3,549 |  | Brazil | 4,122 |  | Italy | 6,623 |  | Italy | 7,176 |  | Spain | 8,517 |
|  | South Korea | 2,890 |  | France | 4,074 |  | Brazil | 5,837 |  | South Korea | 7,022 |  | United Kingdom | 8,436 |
|  | Australia | 2,706 |  | South Korea | 4,050 |  | South Korea | 4,988 |  | Singapore | 5,457 |  | France | 7,678 |
|  | Brazil | 2,341 |  | Spain | 3,951 |  | Australia | 4,828 |  | Taiwan | 5,411 |  | Italy | 7,663 |
|  | Netherlands | 2,214 |  | Italy | 2,849 |  | Singapore | 4,688 |  | Russia | 4,732 |  | Australia | 6,459 |
|  | Mexico | 2,168 |  | Singapore | 2,612 |  | Russia | 3,534 |  | Brazil | 4,359 |  | Russia | 5,171 |
|  | Russia | 2,005 |  | Russia | 2,162 |  | Portugal | 3,194 |  | Australia | 4,252 |  | Brazil | 4,805 |
|  | Portugal | 1,941 |  | Mexico | 2,097 |  | Netherlands | 2,556 |  | Portugal | 3,623 |  | Switzerland | 3,554 |
|  | Sweden | 1,633 |  | New Zealand | 2,073 |  | Switzerland | 2,454 |  | Switzerland | 2,871 |  | Portugal | 3,120 |
|  | Singapore | 1,604 |  | Sweden | 2,040 |  | Poland | 2,279 |  | Poland | 2,706 |  | Netherlands | 3,074 |
|  | Austria | 1,447 |  | Turkey | 1,849 |  | Taiwan | 2,252 |  | Netherlands | 2,431 |  | Turkey | 2,603 |
|  | New Zealand | |  | Switzerland | 1,795 |  | Mexico | |  | Mexico | 2,306 |  | Hong Kong | 2,462 |
|  | Turkey | |  | Portugal | |  | Turkey | |  | Turkey | 2,302 |  | Israel | 2,386 |
|  | Switzerland | |  | Netherlands | |  | Austria | |  | Austria | 2,277 |  | none | 2,374 |
|  | Poland | |  | Poland | |  | New Zealand | |  | New Zealand | 2,019 |  | Mexico | 2,314 |
|  | Taiwan | |  | Taiwan | |  | Israel | |  | Israel | 1,938 |  | Poland | 2,076 |
|  | Israel | |  | Israel | |  | Sweden | |  | Sweden | | | | |

Visitor locations (official wiki.ros.org, not include data of mirrors)

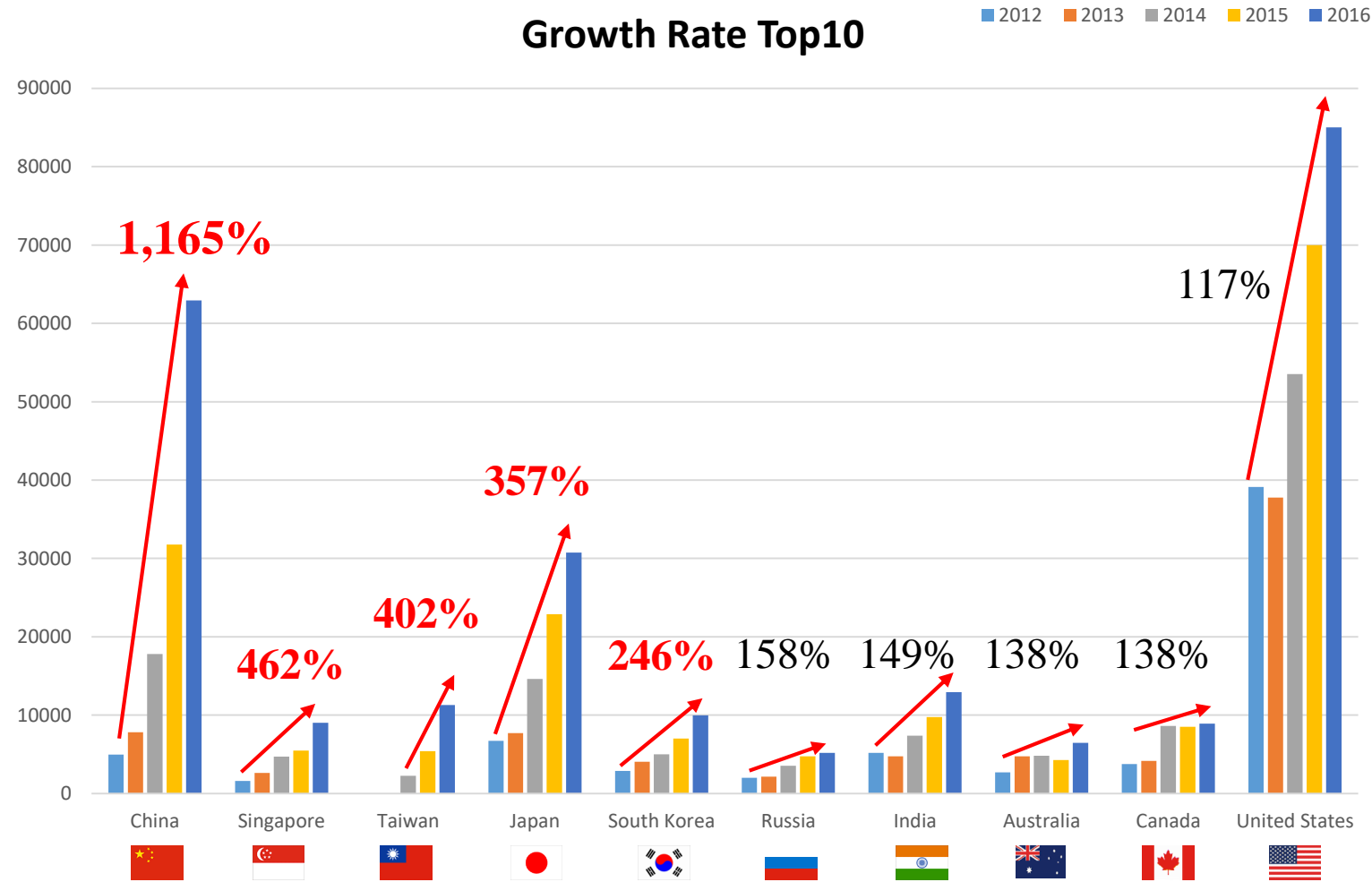


Visitor locations (official wiki.ros.org, not include data of mirrors)

Visitor in 2016

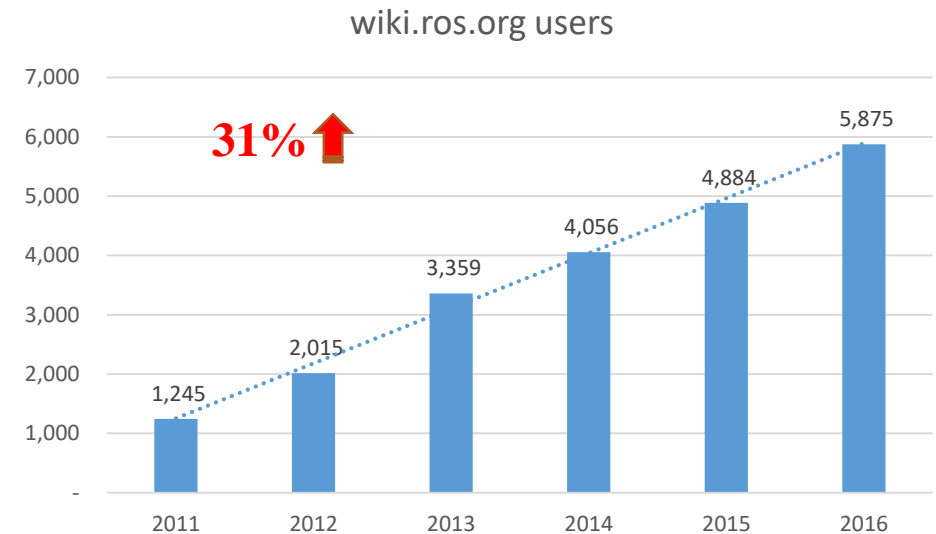
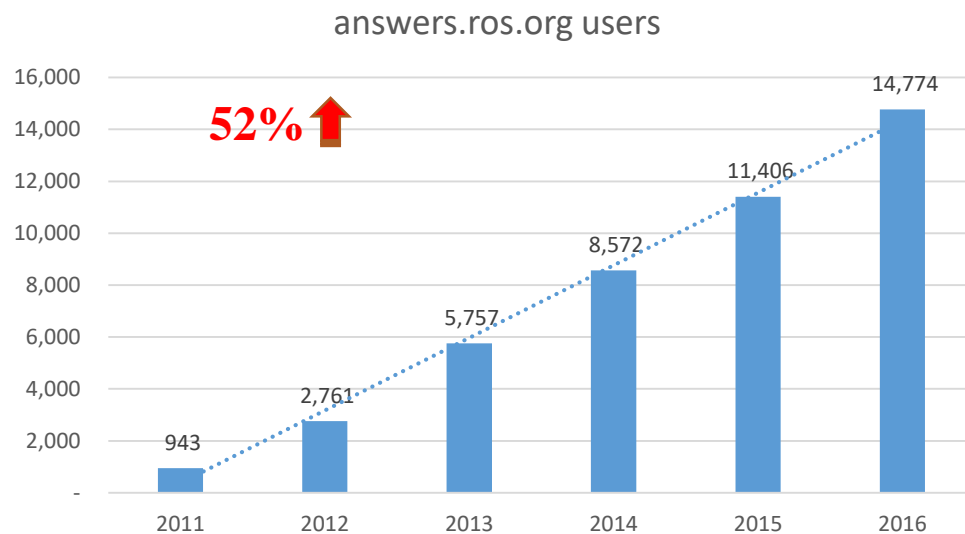
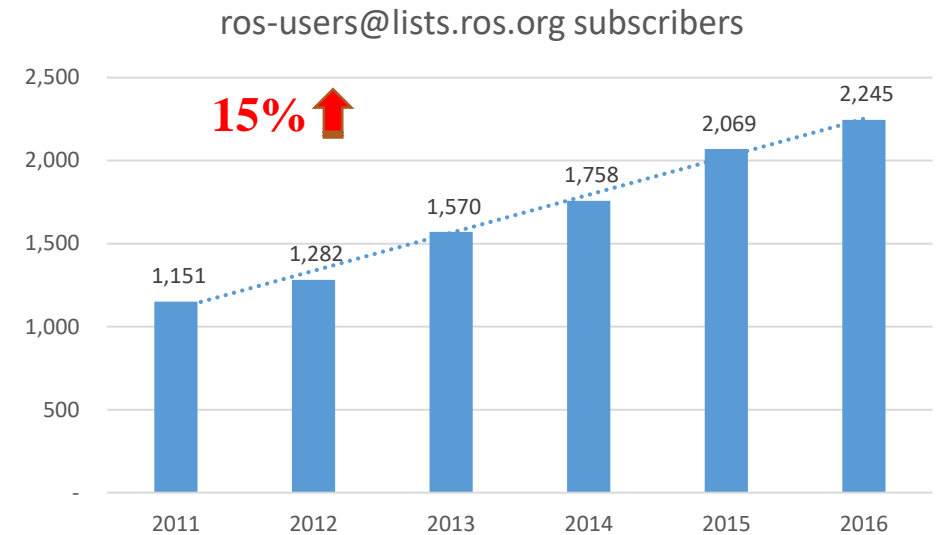


Growth Rate Top10



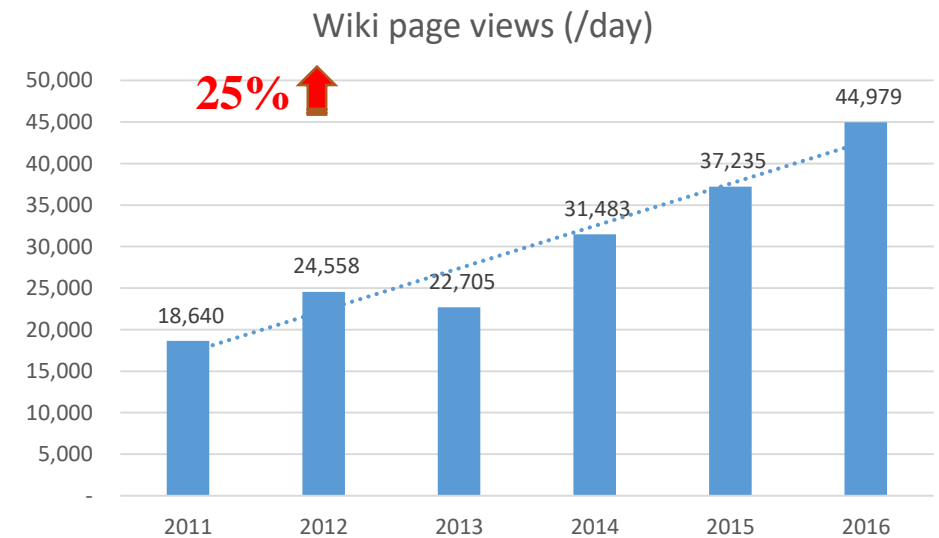
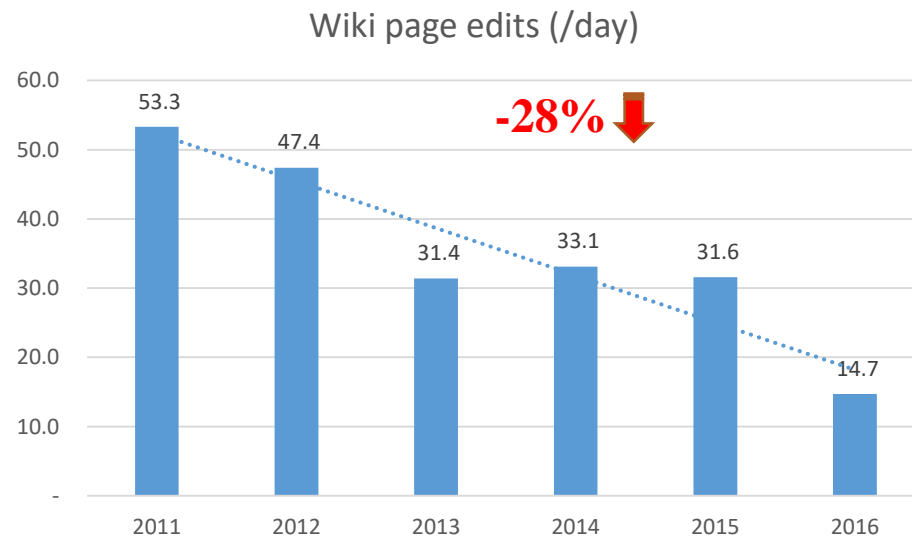
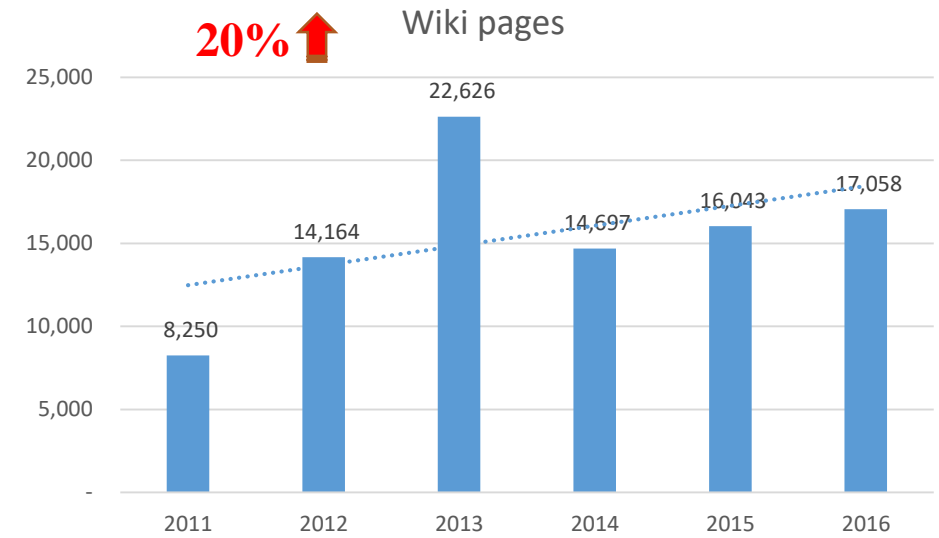
Membership Metrics

| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Compound Annual Growth Rate |
|-------------------------------------|-------|-------|-------|-------|---------------|---------------|-----------------------------|
| ros-users@lists.ros.org subscribers | 1,151 | 1,282 | 1,570 | 1,758 | 2,069 | 2,245 | 15% |
| wiki.ros.org users | 1,245 | 2,015 | 3,359 | 4,056 | 4,884 | 5,875 | 31% |
| answers.ros.org users | 943 | 2,761 | 5,757 | 8,572 | 11,406 | 14,774 | 52% |
| discourse.ros.org users | - | - | - | - | - | 280 | - |



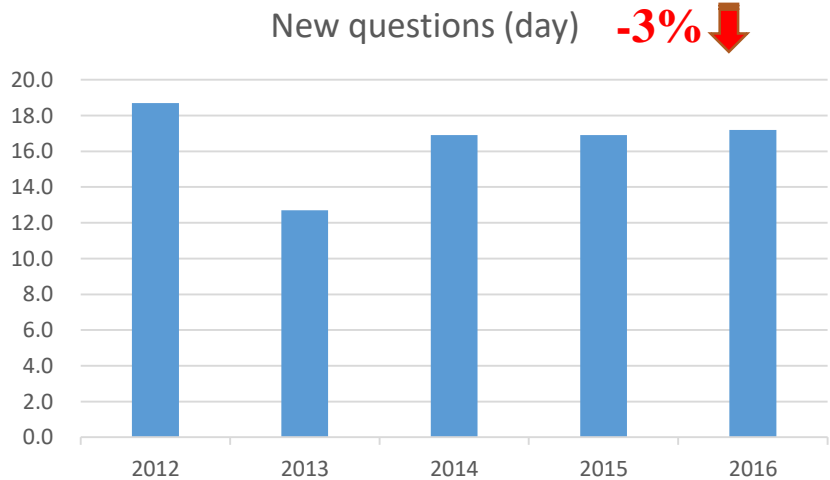
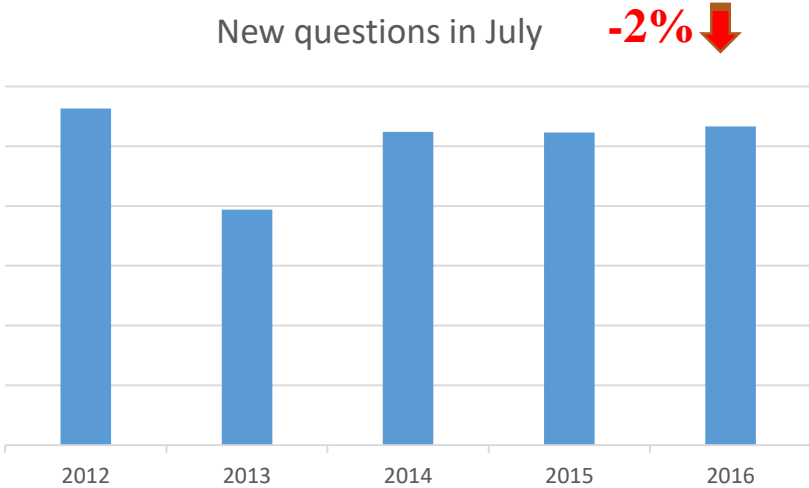
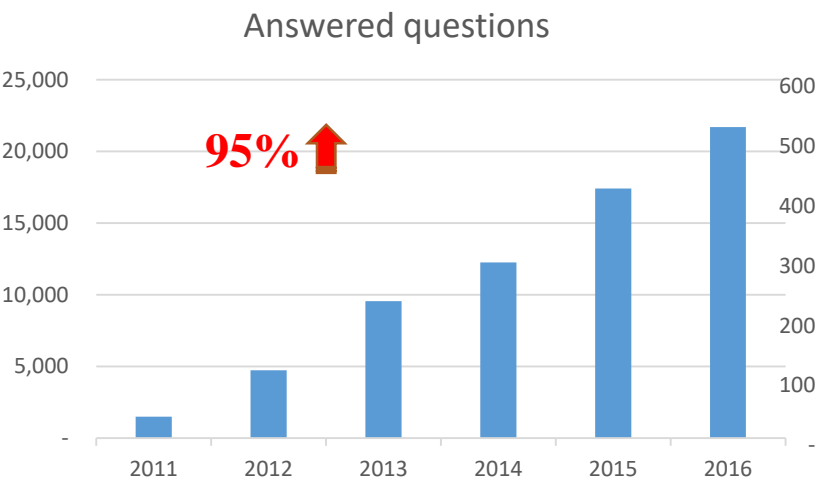
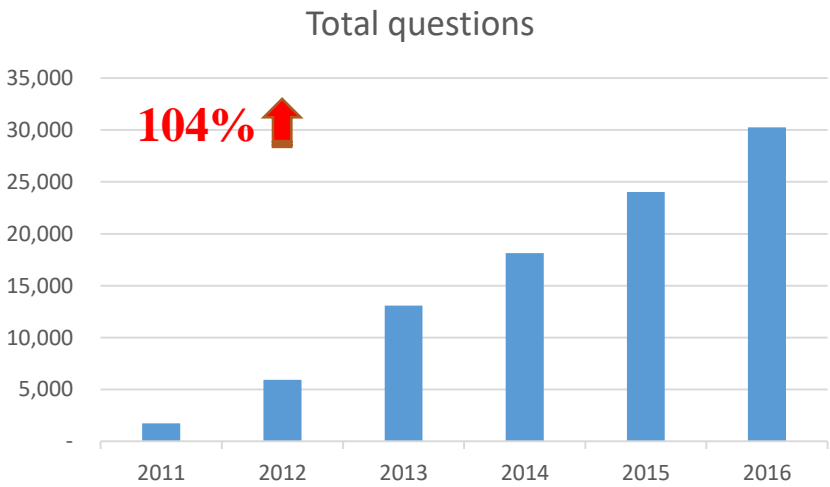
Activity Metrics (wiki.ros.org)

| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Compound Annual Growth Rate |
|------------------------|--------|--------|--------|--------|--------|---------------|-----------------------------|
| Wiki pages | 8,250 | 14,164 | 22,626 | 14,697 | 16,043 | 17,058 | 20% |
| Wiki page edits (/day) | 53.3 | 47.4 | 31.4 | 33.1 | 31.6 | 14.7 | -28% |
| Wiki page views (/day) | 18,640 | 24,558 | 22,705 | 31,483 | 37,235 | 44,979 | 25% |



Activity Metrics (answers.ros.org)

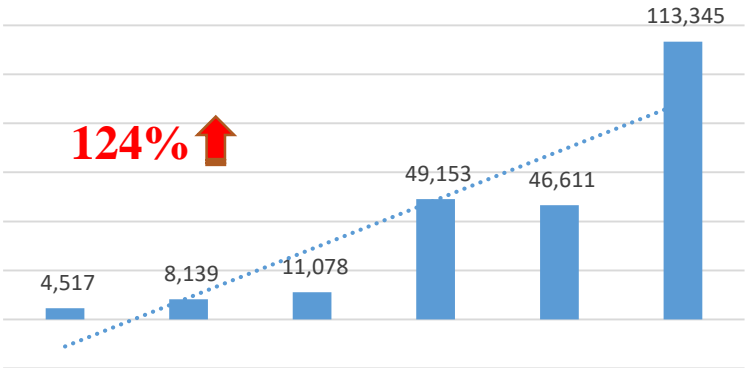
| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Compound Annual Growth Rate |
|-----------------------|-------|-------|--------|--------|--------|--------|-----------------------------|
| Total questions | 1,731 | 5,935 | 13,095 | 18,144 | 24,026 | 30,243 | 104% |
| Answered questions | 1490 | 4728 | 9558 | 12260 | 17414 | 21,697 | 95% |
| New questions (month) | | 563 | 394 | 524 | 523 | 533 | -2% |
| New questions (day) | | 18.7 | 12.7 | 16.9 | 16.9 | 17.2 | -3% |



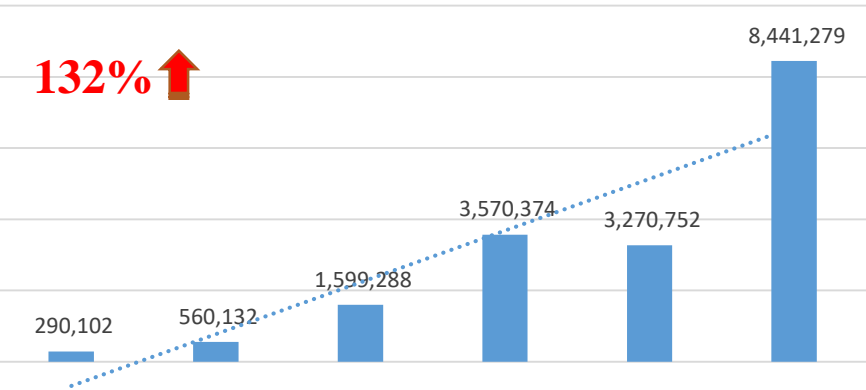
Code Metrics (Binary Downloads)

| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Compound Annual Growth Rate |
|---|---------|---------|-----------|-----------|-----------|-----------|-----------------------------|
| Total Unique IP addresses downloading .deb files | 4,517 | 8,139 | 11,078 | 49,153 | 46,611 | 113,345 | 124% |
| Total downloads of .deb packages | 290,102 | 560,132 | 1,599,288 | 3,570,374 | 3,270,752 | 8,441,279 | 132% |
| Unique package names downloaded as .deb files | | 1,031 | 2,593 | 4,000 | 5,592 | 7,582 | 94% |
| Number of unique versions of .deb packages downloaded | | 16,419 | 32,591 | 46,056 | 38,415 | 63,636 | 57% |

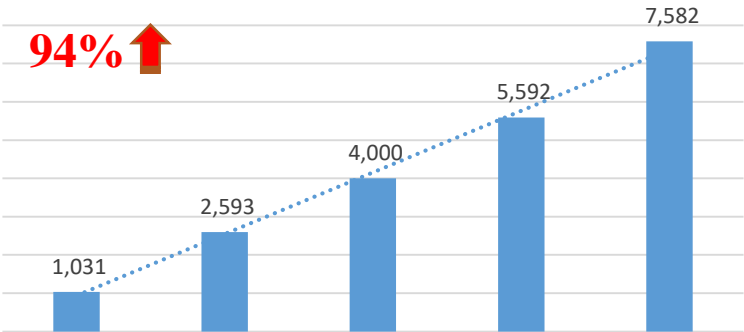
Total Unique IP addresses downloading .deb files



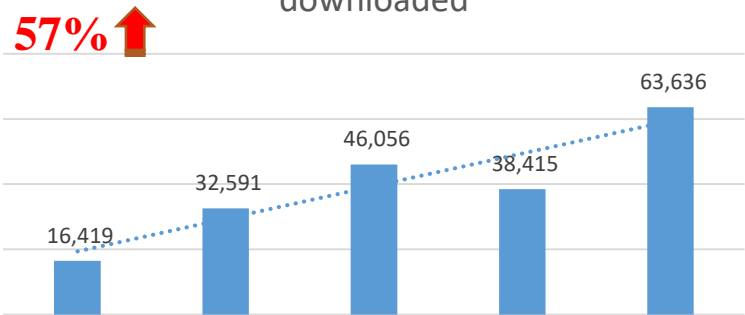
Total downloads of .deb packages



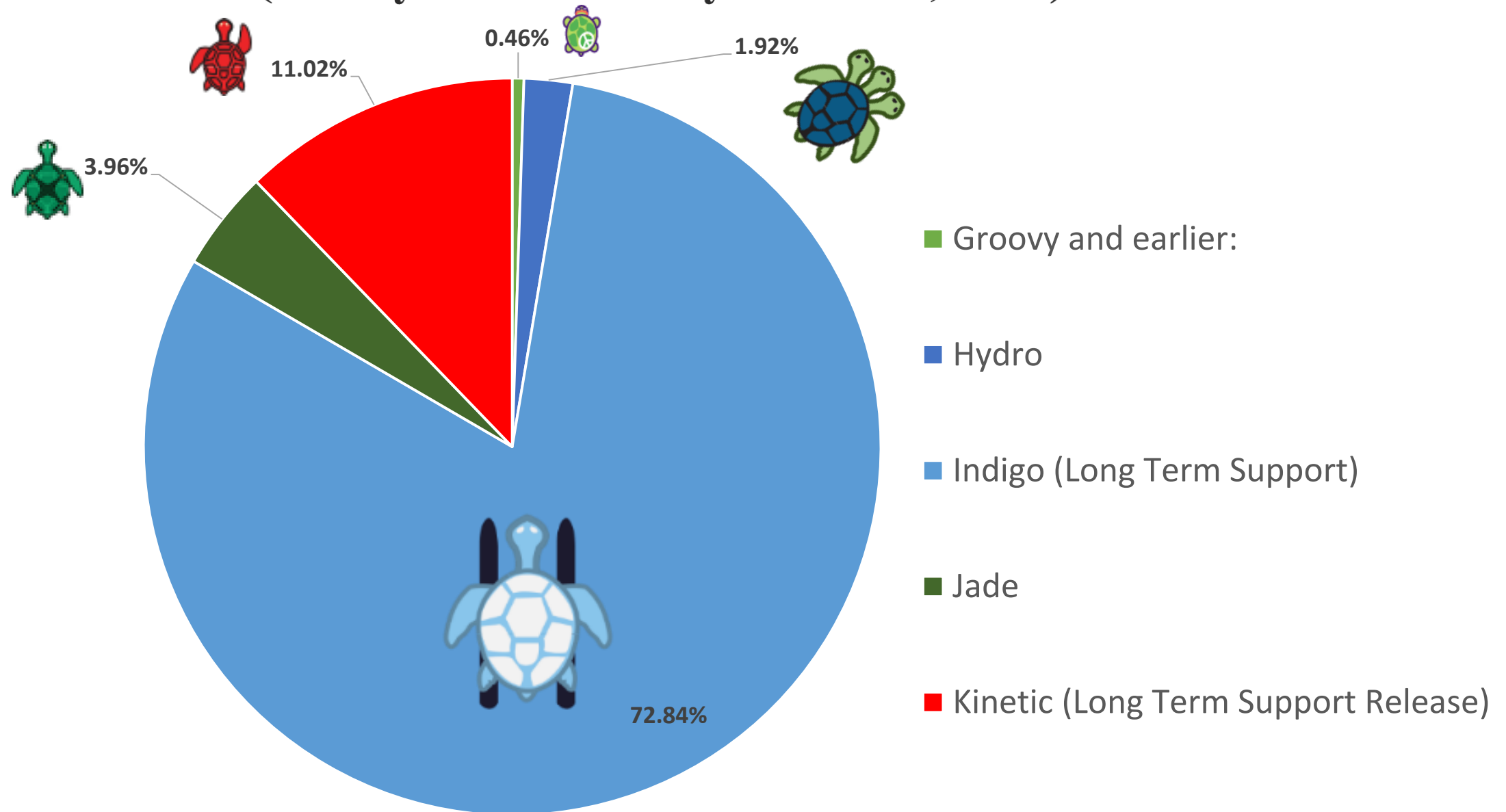
Unique package names downloaded as .deb files



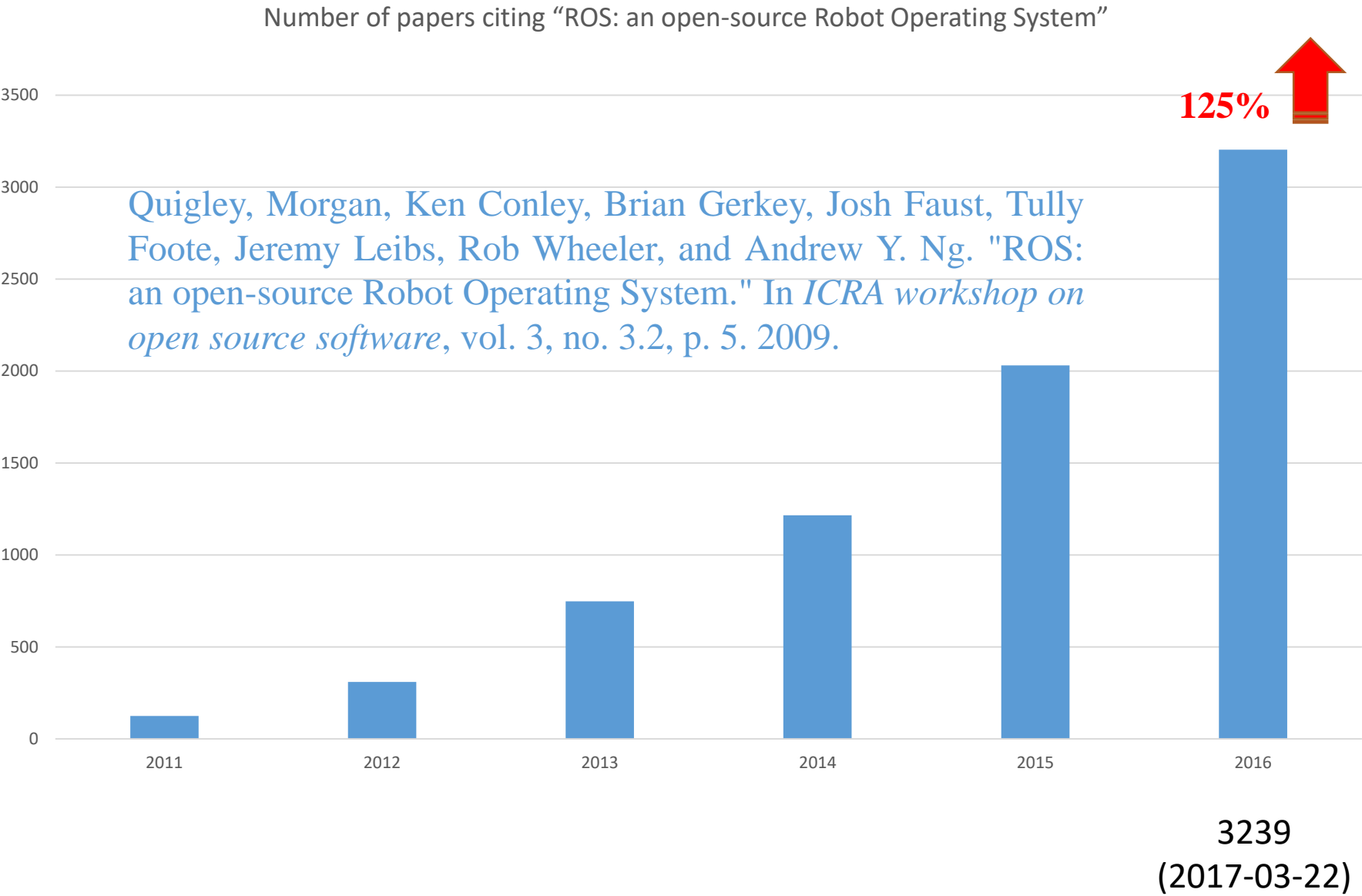
Number of unique versions of .deb packages downloaded



Code Metrics (Binary Downloads by rosdistro, 2016)



Research use

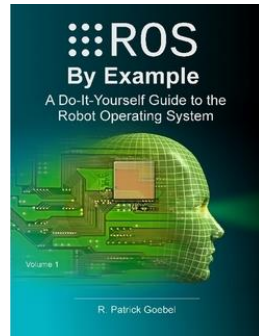


University courses listed on wiki.ros.org/Courses

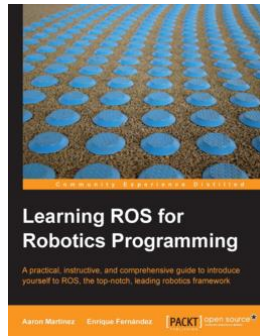
- Brown University, USA
- Case Western Reserve University, USA
- Cornell University, USA
- CU Boulder, USA
- Northwestern University, USA
- Siena College, USA
- Stanford University, USA
- University at Albany, USA
- University of Pennsylvania, USA
- University of South Carolina, USA
- University of Texas at Austin, USA
- Washington University in St Louis, USA
- KU Leuven, Germany
- Leibniz Universität Hannover, Germany
- DEI - University of Padova, Italy
- Sapienza University of Rome, Italy
- Kyushu University, Japan
- Tokyo University, Japan
- Bar-Ilan University, Israel
- Prince Sultan University, Saudi Arabia
- University of Birmingham, United Kingdom
- Université de Sherbrooke, Canada
- University of Zagreb, Croatia



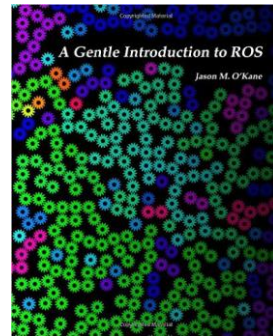
Books for ROS



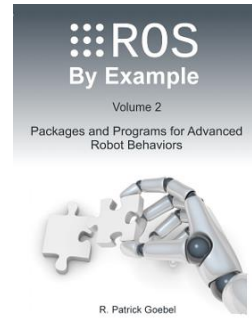
September, 2012



September, 2013



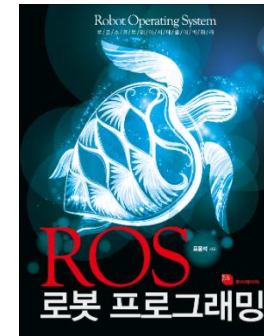
October, 2013



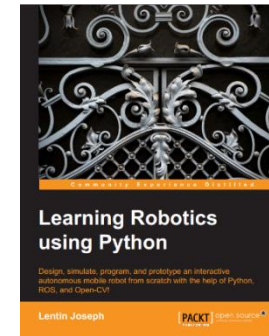
August, 2014



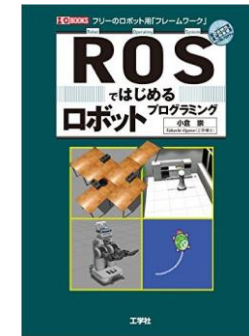
December, 2014



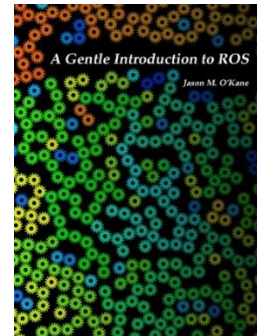
March, 2015



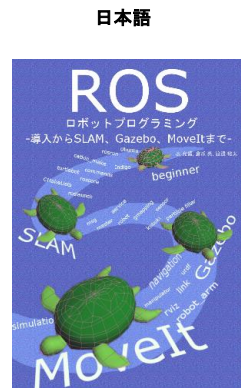
May, 2015



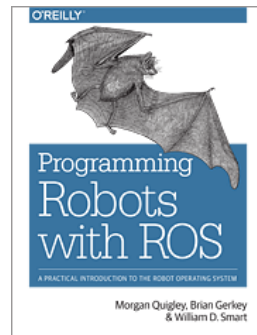
June, 2015



October, 2015



November, 2015



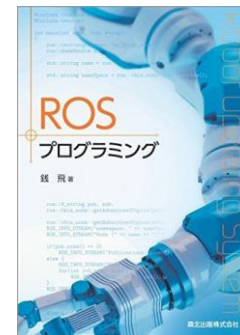
December, 2015



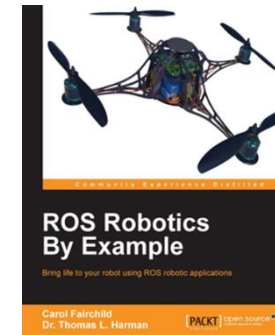
December, 2015



December, 2015



March, 2016



June, 2016























































































December 2016

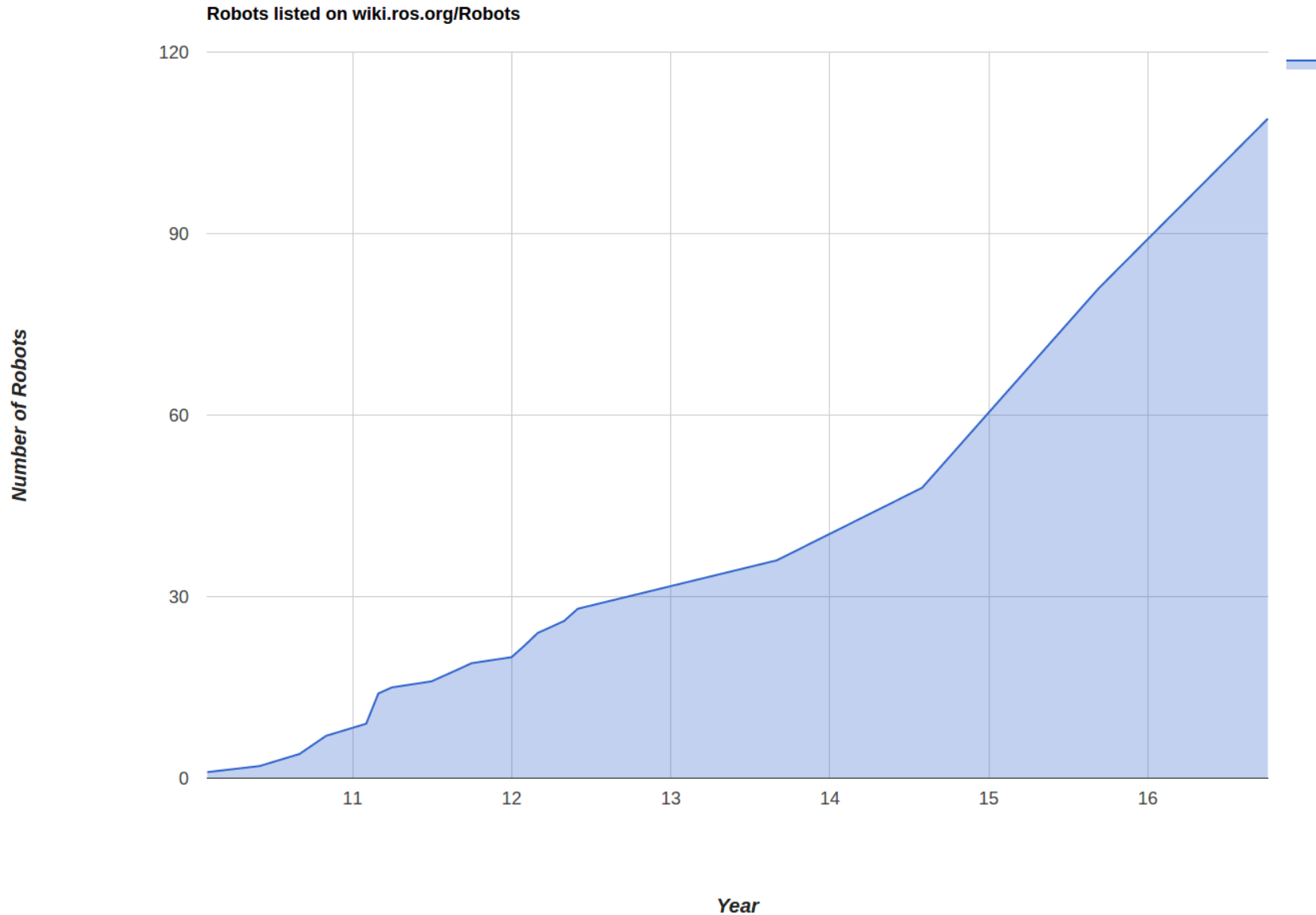


March 2017

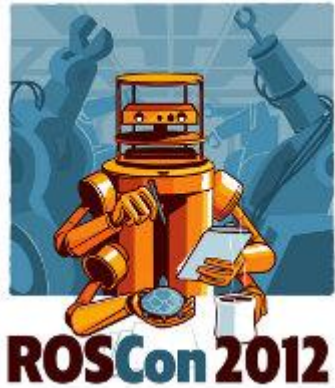
Robots listed on wiki.ros.org/Robots

| | | | | | | | | | | | |
|--|---|--|---|---|--|---|--|---|--|---|---|
|  210 Stanley Innovation V3 Segway |  220 Stanley Innovation V3 Segway |  420 Omni Stanley Innovation V3 Segway |  440LE Stanley Innovation V3 Segway |  Erlc-Brain 2 |  Erlc-Copter |  Erlc-Copter Ubuntu Core special edition |  Erlc-HexaCopter |  Motoman, Yaskawa (ROS-Industrial) |  Nav2 |  Neobotix mpx-500 |  Neobotix mpx-500 |
|  440SE Stanley Innovation V3 Segway |  ABB Robotics (ROS- Industrial) |  Adept MobileRobots Pioneer family (P3-DX, P3-AT, ...) |  Adept MobileRobots Pioneer LX |  Erlc-Plane |  Erlc-Rover |  eurobot |  Fanuc Robotics (ROS- Industrial) |  Neobotix mpx-700 |  Open Unit Robot |  Otto Bock SensorHand Speed |  PAL Robotics PMB-2 |
|  Adept MobileRobots Seekur family (Seekur, Seekur Jr.) |  Aldebaran Nao |  Allegro Hand SlimLab |  AMIGO |  Festo Didactic Robotino |  Fetch robotics: Fetch |  Fetch robotics: Freight |  Fraunhofer IPA Care- O-bot 3 |  PAL Robotics REEM- C |  PAL Robotics Tiago |  RazBot |  REEM |
|  AscTec Quadrotor |  Barrett Hand |  BipedRobot |  Bitcraze Crazyflie |  Fraunhofer IPA Care- O-bot 4 |  Gostai Jazz |  GoTher! Robot |  I-Cart mini |  Robonaut 2 |  RoboSavvy Self- balance platform |  Robotnik AGVS |  Robotnik GUARDIAN |
|  Clearpath Robotics Grizzly |  Clearpath Robotics Husky |  Clearpath Robotics Jackal |  Clearpath Robotics Kingfisher |  Innok Heroes |  Intel Edison |  iRobot Roomba |  Kawada Nextage / Hiro |  Robotnik RB-1 |  Robotnik RBCAR |  Robotnik SUMMIT XL |  Robotnik SUMMIT-X |
|  Clearpath Robotics Ridgeback |  CoroWare Corobot |  Cyton-Gamma |  Denso VB060 |  Kinova JACO |  Kinova MICO |  Kobuki |  Komodo |  ROS-Industrial |  Ros2Bot |  Shadow Hand |  Softbank Pepper |
|  Dr. Robot Jaguar |  Eddlebot |  Enova Robotics MiniLab |  Erlc-Brain |  Lego NXT |  Lizi |  Maggie |  Merlin miobotPro |  Tulip |  TurtleBot |  Universal Robots (ROS-Industrial) |  Videre Elastic |

Robots listed on wiki.ros.org/Robots



ROS Conferences



St. Paul, Minnesota, USA
19-20 May 2012



Stuttgart, Germany
11-12 May 2013



Hong Kong University
June 6, 2014



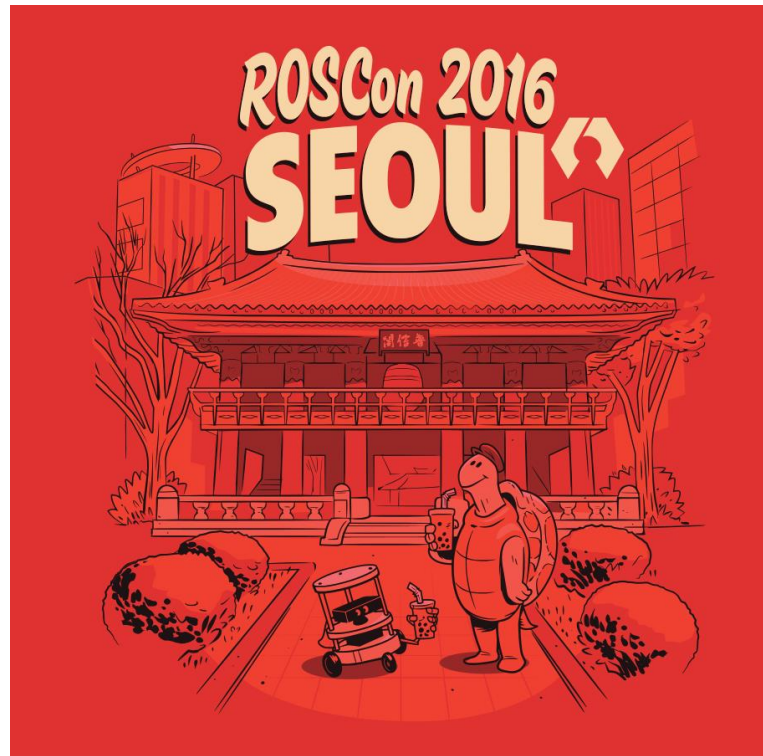
Chicago, Illinois, USA
September 12-13, 2014



Hamburg, Germany
May 3-4, 2015

ROS Conferences

ROSCon will happen October 8th-9th, 2016 in Seoul, Korea!



**Seoul, Korea
October 8th-9th, 2016**

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Thanks for your attention!

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