

KDR ROS

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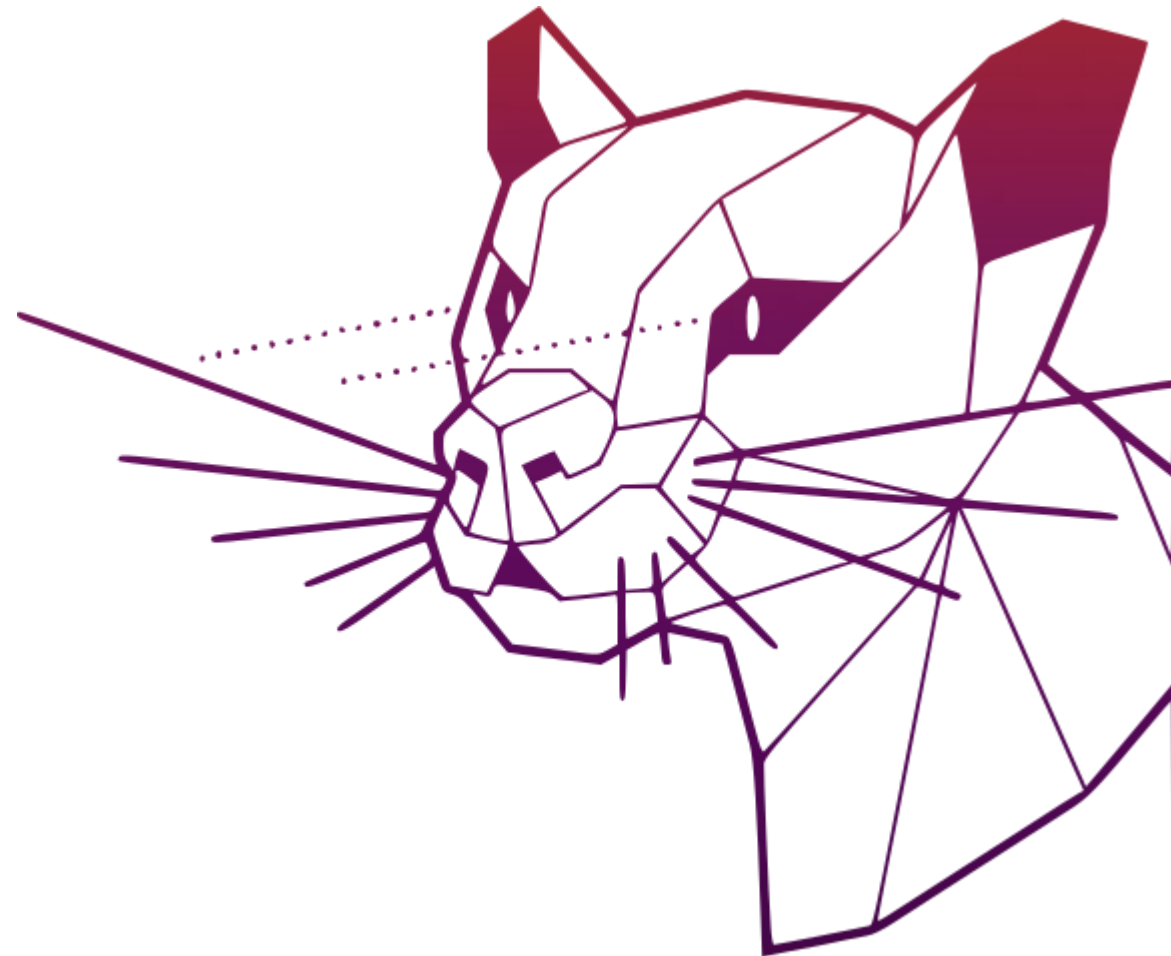
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Linux distribucija

Ubuntu 20.04 LTS Focal Fossa

<https://releases.ubuntu.com/focal/>



ROS Noetic Ninjemys

<http://wiki.ros.org/noetic>



Robotics Operating System

Kaj je skupnega?





Martin Cooper, Motorola (1983)





olab

Steve Wozniak in Steve Jobs



olab

Popularizirani produkti



STROJNA OPREMA



Popularizirani produkti



STROJNA OPREMA

OPERACIJSKI SISTEM



Popularizirani produkti



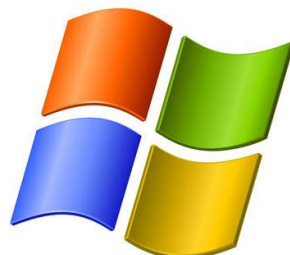
STROJNA OPREMA

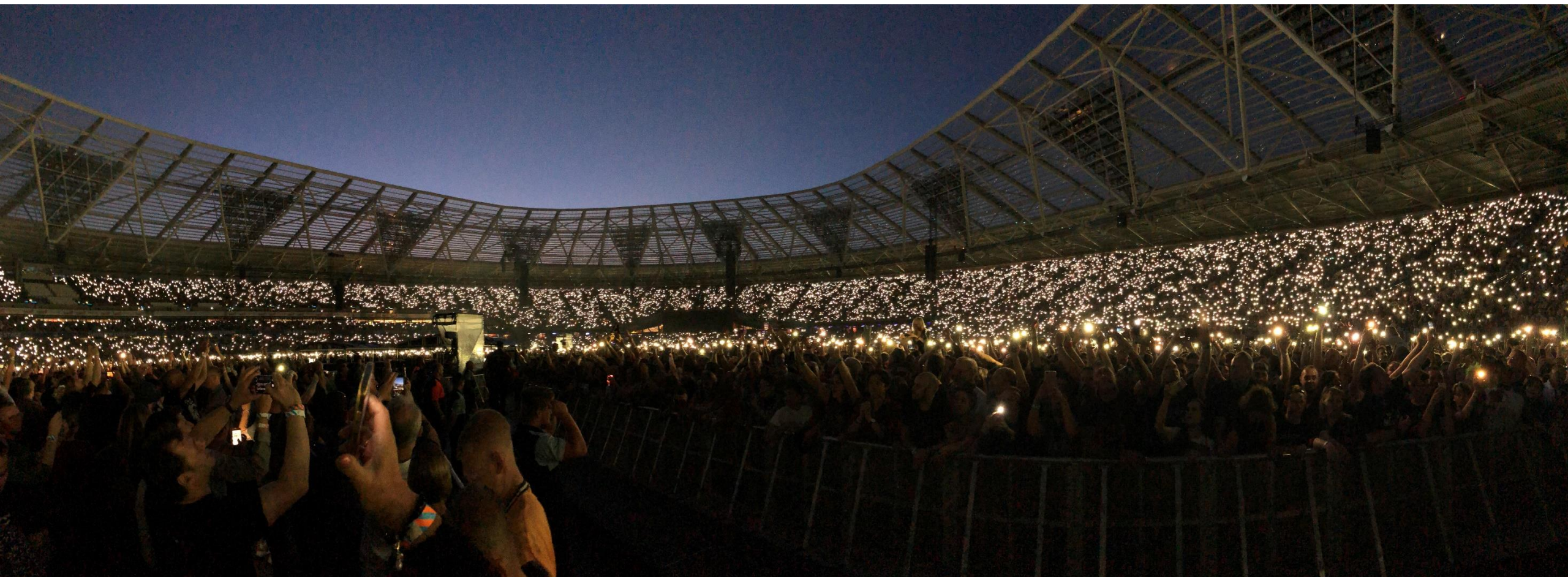


OPERACIJSKI SISTEM



APLIKACIJE



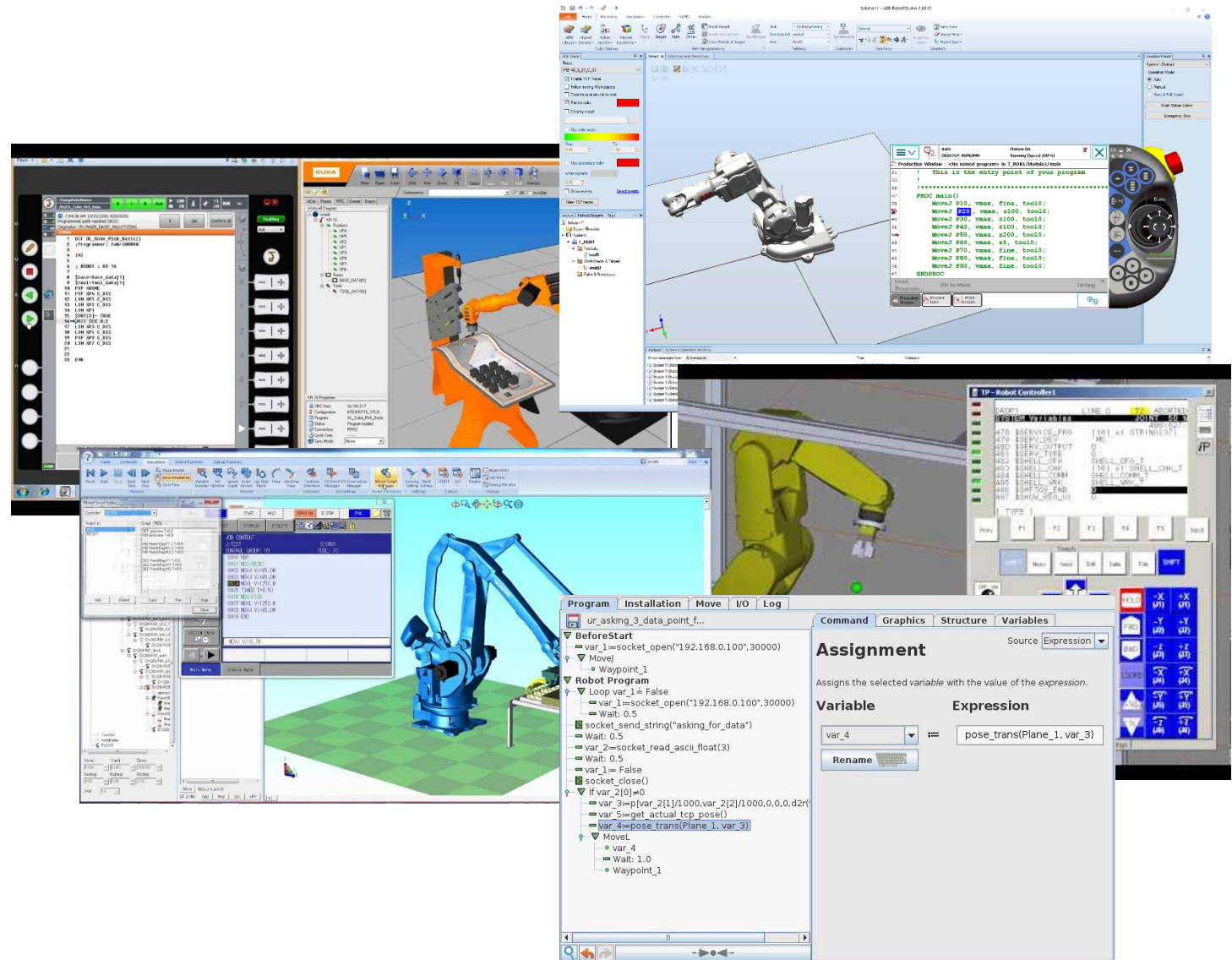


Ustrezna programska oprema

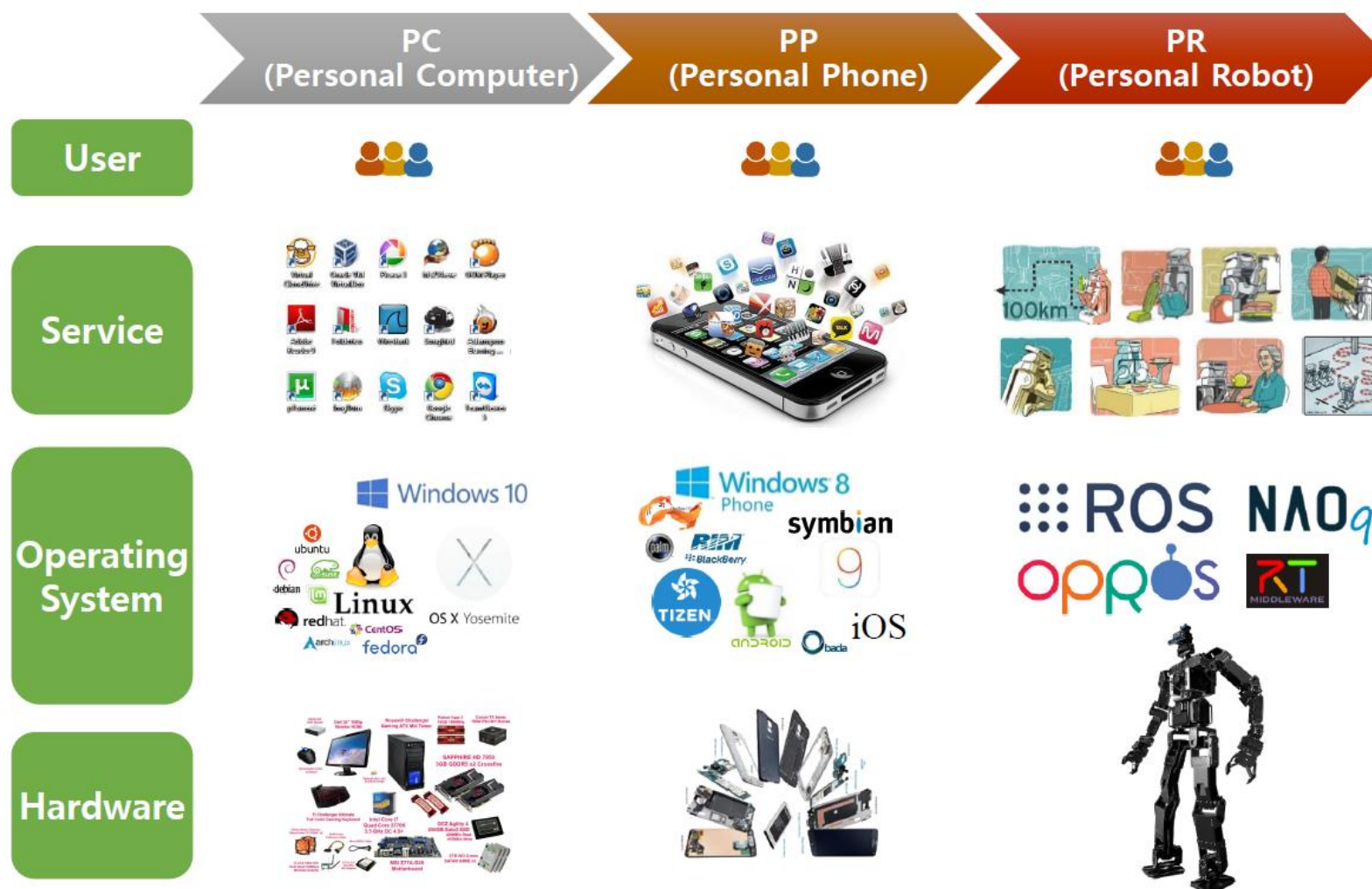
- Integracija s strojno opremo
- Standardizacija in modularnost strojne opreme
- Padec cene, dvig zmogljivosti
- Ločitev strojne opreme, operacijskega sistema in aplikacij
- Individualizacija potreb uporabnika
- Več uporabnikov (svoj ekosistem)

Kaj pa robotika?

- RAPID (ABB)
- INFORM (Yaskawa)
- KRL (Kuka)
- KAREL (Fanuc)
- PDL2 (Comau)
- AS (Kawasaki)
- VAL3 (Staubli)
- URScript (Universal Robots)
- ...



Ponavljanje zgodovine?



● ● ● R O S
● ● ●
● ● ●

Kaj je ROS?

The Robot Operating System (ROS) is a set of software libraries and tools that help you build robot applications. From drivers to state-of-the-art algorithms, and with powerful developer tools, ROS has what you need for your next robotics project. And it's all open source.



ROS = Meta-operating system; a system that performs scheduling, loading, monitoring, error handling and utilizing distributed computing resources as a virtualization layer between applications and distributed computing resources

ROS zasnova

Client Layer	roscpp	rospy	roslisp	rojava	roslibjs		
Robotics Application	MoveIt!	navigation	executive smach	descartes	rospieex		
	teleop pkgs	rocon	mapviz	people	ar track		
Robotics Application Framework	dynamic reconfigure	robot localization	robot pose ekf	Industrial core	robot web tools	ros realtime	mavros
	tf	robot state publisher	robot model	ros control	calibration	octomap mapping	
	vision opencv	image pipeline	laser pipeline	perception pcl	laser filters	ecto	
Communication Layer	common msgs	rosvag	actionlib	pluginlib	rostopic	rosservice	
	rosvode	rosvaunch	rosvaram	rosvaster	rosvout	ros console	
Hardware Interface Layer	camera drivers	GPS/IMU drivers	joystick drivers	range finder drivers	3d sensor drivers	diagnostics	
	audio common	force/torque sensor drivers	power supply drivers	rosverial	ethernet drivers	ros canopen	
Software Development Tools	RViz	rqt	wstool	rosvack	catkin	rosdep	
Simulation	gazebo ros pkgs	stage ros					

F1: Komunikacijska podpora

- Zagotavlja komunikacijo med posameznimi deli
- Komunikacijski vmesnik med strojno opremo in aplikacijo (middleware)
- Sinteza in analiza sporočil
- Snemanje in predvajanje sporočil
- Uporaba različnih programskih jezikov za posamezne dele
 - roscpp, rospy, roslisp, rosjava, roslua, roscs, roseus, PhaROS, rosR

F2: Robotsko podprte funkcionalnosti

- Definicija standardnega sporočila za robote
- Izračun robotskih parametrov (transformacije)
- Jezik za opis robota
- Diagnostika
- Senzorika in zaznavanje
- Navigacija
- Manipulacija (DK, IK)

F3: Razvojna orodja

- Zagotavlja orodja za hiter in učinkovit razvoj aplikacij
- Konzolni ukazi
- RVIZ
 - 3D vizualizacija
- RQT
 - UI, shranjevanje/predvajanje sporočil, vizualizacija povezav
- Gazebo
 - 3D simulacija z vključeno fiziko