



U.S. ARMY TANK AUTOMOTIVE RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

Introduction to Robotic Technology Kernel (RTK)

TARDEC Ground Vehicle Robotics







- RTK Overview
- Architecture
- Vehicle Configuration
- Development
- Useful Tools





RTK Overview

Autonomy Kit/Drive-by-Wire Kit Concept







Robotic Technology Kernel (RTK)

The Robotic Technology Kernel (RTK) is a Robot Operating System (ROS)-based modular autonomy software library for S&T development that provides a set of common robotic capabilities across a variety of platforms and efforts.



RTK Software Development Concept

The primary RTK software library is maintained in the RTK Master Branch. The Master Branch contains nearly all available RTK capabilities with the exception of specialized mission or project specific functionality.



RTK Core is a documented and distributable version of RTK. RTK Core is focused on providing reliable, general purpose autonomy software and is released on a periodic basis.

RTK Core 2019

RTK Master Branch

Specialized instantiations of RTK are maintained in project branches, which originate with the RTK Master Branch or an existing project branch.

Project X Branch

During the course of a project, new capabilities may be developed and existing capabilities may be changed to better meet project goals. Capabilities and functionality that have broad application to robotic autonomy in general get integrated back into the RTK master branch.

RDECOM[®]

Project Y Branch

RTK Past and Present









Architecture

TARDEC



Perception

This subsystem contains the sensor drivers and algorithms that detect and interpret things of interest from the environment.

- Stereo Cameras
- LIDARs
- Ultra Wideband Radios (UWBs)
- RADAR
- Output:
 - Disparity
 - Material Classification
 - Ground Point Clouds
 - Non-Ground Point Clouds



Localization

This subsystem fuses data from multiple sensors to provide both relative and absolute pose of the vehicle.

- GNSS
 - GPS
 - DRTK
 - DGPS
- Wheel Speed Encoders
- IMU
- Gyro
- RANGER
- Visual Odometry

- Output:
 - far_field -> near_field -> vehicle TF tree
 - map -> odom -> base_link in standard ROS terms
 - far field and near field odometry

World Model

This subsystem is used for storing and fusing data from multiple sources. Services are provided to request data as a costmap or list of dynamic objects and zones.

- Input:
 - Plugin-based sensor fusion from Perception & Localization
 - "No go" zones
 - Known Obstacles
- Internal operations:
 - Octree-based sparse voxel map
 - Persistent Map
- Output:
 - Voxels
 - 2D Costmaps





This subsystem configures and monitors behavior modules.

- Input:
 - Mode commands
- Output:
 - Path planner configuration

Navigation

This subsystem generates paths and speed/steering commands to guide the vehicle to its destination.

- Input:
 - Filtered 2D Costmaps
 - Vehicle Odometry
- Internal operations:
 - Behavior switch
 - Path Planning
 - A*
 - Maverick
 - Vaquero
 - Vaquerito
- Output:
 - Speed & Curvature Setpoint



RÔĔCOM

This subsystem monitors overall health and ensures commands are safe to perform.

- Input:
 - Direct teleoperation
 - Mode commands
 - Camera control and configuration
 - Speed and steering
 - Vehicle status
- Output:
 - Mode confirmation
 - Verified speed and steering

RDECOM[®]

X

This subsystem handles primitive control and status between the autonomy kit and the drive-by-wire kit.

- Input:
 - Speed & Curvature Setpoint
 - Vehicle Odometry
- Output:
 - Drive-by-Wire Commands





- Diagnostics
 - This subsystem provides a way to monitor the health of hardware in the system.
- IOP Bridge
 - This subsystem is the interface between the autonomy kit and the operator control unit.
- CAN-A-Kit Bridge
 - This subsystem handles traffic to and from the CAN bus.
- Payload System
 - This subsystem handles control, configuration, and status of pan/tilt, camera, and remote weapon systems that can be controlled by the operator.





Vehicle Configuration



- GNSS*
 - GPS
 - RTK
 - DGPS
- IMU*
- LIDAR*
- Wheel Speed Encoders**
- Gyro**
- Stereo Cameras
- Teleop Cameras
- Data Radios
- UWB Radios
- RADAR
- * Required
- ** Not required, but a really good idea

Computers





- Main
 - ROS Master
 - Navigation
 - World Model
 - Motion Execution
- Localization
 - Hardware Drivers
 - GPS
 - IMU
 - Wheel Speed
 - State Estimation

- Vision
 - Camera Drivers
 - Image Rectification
 - Disparity Segmentation
 - Material Classification
- LIDAR
 - Velodyne Drivers
 - Ground Segmentation

Networking









Development

Workflow



- Create a ROS workspace
 - Clone repositories
 - Configure the workspace
 - Install dependencies
 - Build it
- Make changes
 - Edit code
 - Deploy to a vehicle
 - Test the changes
 - Push them to a new branch
 - Create a Merge Request to request a code review

Deployment (Traditional)

- "deploy" script copies compiled binaries to /opt/rtk/indigo (or kinetic)
- Ubuntu 14.04 / ROS Indigo:
 - Upstart script in /etc/init/dsat.conf
 - sudo service dsat start/stop/restart
- Ubuntu 16.04 / ROS Kinetic:
 - Systemd unit in /etc/system/system/dsat.service
 - sudo systemctl start/stop/restart dsat

RDECOM

X

Developer Resources

- DI2E: Widely-Available Release Repository
 - RTK Core
 - WMI Core
- Dismount-Git: Primary Development Repository
 - RTK Master Branch
 - RTK Project Branches
- Developer Handbook: Environment Setup, Development Workflow, Style Guide, etc.
- RTK User Guide
 - Architecture Diagrams, Flow Charts, Use Cases
- RTK Architecture Guide
 - Low-level ROS package documentation
 - ROS node APIs





Useful Tools

Calibration

- Stereo Camera Calibration
 - Create calibration boards
 - Collect data
 - Perform calibration
 - Apply calibration files
- LIDAR Alignment
 - Necessary if using more than one LIDAR
 - Launch the calibration system
 - Run rviz to monitor progress
 - Use calibration system to manually align LIDARs
 - Save calibration values into platform launch file

- roslaunch mrzr_8803 mrzr_8803.launch playback:=true
- Runs all nodes on the local computer
- Disables hardware drivers
- Useful for playing back bag files to debug behavior
- rosbag play -clock -r 0.5 rtk_raw_test_track_playback*.bag \
 local_xy_origin:=local_xy_old

X



• Like rosconsole but better

<u>File Edit Options</u>	cencer, mage_coupler, millers_secreo_pipeline, classifier, asparity_segmenter, mage_coupler, millers_secreo_pipeline,
/magic_carpet/carpet (5) 🔺	[I 423210:34:26:467] Read parameter prefilter_cap = 13
/navigation/active_route_source (1	[I 423210:34:26:487] Read parameter correlation_window_size = 10
/navigation/comms_map (12)	[I 423210:34:26:497] Read parameter correlation_window_size = 10
/navigation/costmap_processor (1)	[I 423210:34:26:518] Read parameter min_disparity = 1
/navigation/costmap_source (1)	[I 423210:34:26:518] Read parameter min_disparity = 1
/navigation/kinodynamic_planner (2	[I 423210:34:26:548] Read parameter disparity_range = 64
/navigation/maverick_map_processor	[I 423210:34:26:548] Read parameter disparity_range = 64
/navigation/maverick_planner_drive	[I 423210: 34: 26: 568] Read parameter uniqueness_ratio = 2
/navigation/path_following_control	[I 423210:34:26:568] Read parameter uniqueness_ratio = 2
/navigation/straight_path_node (38	[I 423210:34:26:588] Read parameter texture_threshold = 5
/navigation/vaquerito_planner_node	[I 423210:34:26:588] Read parameter texture_threshold = 5
/navigation/waypoint_planner (20)	[I 423210:34:26:608] Read parameter speckle_size = 270
/navigation_nodelets (30)	[I 423210:34:26:608] Read parameter speckle_size = 270
/play_1524775268084810454 (4)	[I 423210: 34: 26: 638] Read parameter speckle_range = 14
/rear/disparity_segmenter (21)	[I 423210:34:26:638] Read parameter speckle_range = 14
/rear/stereo_heartbeat_aggregator	[I 423210:34:26:648] Read parameter normalize_rows = false
/route_interpolator (7)	[I 423210:34:26:648] Read parameter normalize_rows = false
/route_manager (6)	[I 423210:34:26:658] Read parameter uncrop_disparity = false
/route_transformer (14)	[[423210:34:26:658] Read parameter uncrop_disparity = false
/vaquero_route_recorder (18)	[I 423210:34:26:668] Read parameter check_for_errors = true
	[I 423210:34:26:668] Read parameter check_for_errors = true
	[I 423210:34:26:678] Read parameter min_intensity_range = 30.000000
Clear All Clear Messages	[I 423210:34:25:678] Block Matcher: OpenCV Block Matcher
	[1 423210:34:26:678] Read parameter min_intensity_range = 30.000000
Severity	[1 423210:34:26:678] Block Matcher: OpenCV Block Matcher
	L1 423210: 54: 26: 708] Read parameter queue_size = 5
🖸 Debug	[1 423210:34:26:708] Read parameter queue_size = 5
	[1 423210:34:26:739] Read parameter approximate_sync = true
🗵 Info	[1 423210:34:20:739] Read parameter approximate_sync = true
	[1 423210:34:20:759] Read parameter max_interval = 0.050000
🖾 Warn	[1 423210:34:20:759] Read parameter max_interval = 0.050000
	[1 423210:34:27:349] Reconfigure request received.
Error	[1 423210:34:27:359] Reconfigure request received.
	[1 423210:34:27:359] BLOCK Matcher: UpenLV BLOCK Matcher
🗵 Fatal	Include
Follow Newest Messages	Exclude
Connected to ROS Master	

• Top-down ROS visualization tool, similar to rviz



Searchable, inspectable database of bag metadata

🔄 💁 Bag Database	×					\$				(<u>3</u>) - + ×
← → C <									• 理 🛒	• A :
📄 List View 📄 Folde	r View									Navigation 👻
Full Text Search: sensor_n	nsgs/Image									🔍 Search
✓ Filename	Description	🗹 Tags		Path	Location	Vehicle	- M	lessage Types	Topic Names	
Search Results (5283 bags)									
File Name 🕇		Location	Vehicle	Duration (s)	Start Time	End Time	Size (MB)	Tags		
10_meter_data.orig.bag				26.831	10/12/2017 14:49:16	10/12/2017 14:49:43	7105.866			0 🖌 📥 🔺
151_video_2015-01-13-14-0	5-58.bag	US-90, San Antonio,		140.428	1/13/2015 14:05:48	1/13/2015 14:08:09	8204.480			0 🛛 🖯
15m_15to15_angles_2017-0	1-10-18-39-19.bag			111.549	1/10/2017 18:39:19	1/10/2017 18:41:11	15097.855			0 🛛 🖯
15m_all_angles_2017-01-10	-17-55-11.bag			213.754	1/10/2017 17:55:12	1/10/2017 17:58:45	38460.480			0 🔟 🗎
2011-05-16-cars1.bag				70.214	5/16/2011 10:25:50	5/16/2011 10:27:00	3754.655			0 🔛 🚍
2011-05-16-cars2.bag				79.150	5/16/2011 10	154	05 F0 h			0
2011-05-16-cars3.bag				83.880	5/16/2011 10	151_Video_2015-01-13-14-	uo-os.pag	CONCEPT OF PRODUCTION OF CALIFORNIA		0 1
2011-05-16-cars4.bag				7.789	5/16/2011 10					0 🛛 🖃
2011-05-16-people1.bag				137.341	5/16/2011 10	and in the second states				ONE
2011-05-1 image_raw_111	279			8	5/16/2011 10		24 (P)			ONE
2011-05-1			The second second second		5/16/2011 10		States and States	· · · · · · · · · · · · · · · · · · ·		ONE
2011-05-1	-3		-		5/16/2011 10	二 计数据器名数		A Participation		ONE
2011-06-2				and the second second	6/28/2011 08		一, 生命论			
2011-06-2					6/28/2011 08	and the state of t			AT TOTAL	
2011-06-2		-1			6/28/2011 09	The state of the strength				
2011-06-2	and the second second	Kal			6/28/2011 09	- HEAT MAN			的非正确	
2011-06-2			Station of the local division of the local d	Martin Alberta	6/28/2011 00	A REPORT OF	The state			
2011-06-2					6/28/2011 00		IT BACK		11 法正	
2011.06.2		1 IN COMPANY	A REAL PROPERTY AND INCOMENTS	Contrast Incom	6/28/2011 00			加加市场和政		
2011-00-2					6/28/2011 09:	the later and				
2012-02-1					2/14/2012 15	A CONTRACTOR	ten.			
2013-03-1		Contraction of the second			3/14/2013 15		and the second se			
2013-03-1					3/14/2013 15			「しい」と言語です。		
2013-03-1					3/14/2013 16: 001/16	2/14/0012 10:00:02	1077 700		NUMBER OF STREET, STREE	
2013-03-1					3/14/2013 16:28:15	3/14/2013 16:29:33	1077.798			
2013-03-1						3/14/2013 16:29:34	1077.439			
2013-09-1					9/13/2013 08:18:01	9/13/2013 08:18:08	47.959			
2013-09-1					9/13/2013 08:21:37	9/13/2013 08:25:05	1934.985			
2013-09-1					9/13/2013 08:25:14	9/13/2013 08:30:19	2738.199			
2120 errors 🌾 Bag Sca	inner: Scanning for new	bag files in /bags.								

rqt_runtime_monitor

- Displays diagnostic messages
- Useful on a live vehicle to tell if all the hardware is working

RDECOM

Miscellaneous Linux Utilities

htop



TARE

=_

									~/arl:	htop — Ko	nsole – ±
File	Edit	Viau	Real	na a ele	c Cott	inac L	ala				
The	Luit	VIEW	BOOK	mark	s seu	ings n	eiþ				
1	riiii			54.6							10 11 11 56.5%1 10 11 11 11 59.6%1
2	č i i i i i				5%]				8.4%		56,2%] 11 [69,5%]
3	[[]]]				≫ .]				50.8%		12 [111111 62,9%] 12 [111111 54,5%]
Mem	ţıııı								31.3G	Tasks	: 288, 208 kthr; 16 running
Swp	L									Uptim	: 07:09:29
PID	USER		PRI	NI	VIRT	RES	SHR	S CPU%	MEM%	TIME+	Command
30465	preed		20	0	4064	22296	9968	S 5.5	0.1	0:01.88	/home/preed/src/rtk_core/devel/lib/velodyne_nod/ne
30249	preed		20	8	8384	29896	19420	5 4.8	0.1	0:03.52	/nome/preed/src/rtk_core/devel/lib/sumet_perception
30218	preed		20	00	10000	201/2	7316	5 4.8	0.1	0:09.55	/usr/bin/python /opt/ros/kinetic/bin/rosmastercl
21206	preed		20	å	10000	20069	25152	5 4.0 C / 1	0.1	0.04.52	/bome/preed/erc/rtk_core/devel/lib/ion_bridge_mobil
31144	preed		20	õ	811M	18332	12596	s 4.1	0.1	0:04.53	/opt/ros/kinetic/lib/nodelet/nodelet_standalone_sw
31552	preed		20	ō	636M	22076	7264	s 4.1	0.1	0:03.51	python /home/preed/src/rtk core/src/SUMET/sumet pla
31121	preed		20	0	814M	18532	12748	s 4.1	0.1	0:04.35	/opt/ros/kinetic/lib/nodelet/nodelet standalone sw
30741	preed		20			43200	31108	S 3.4	0.1	0:04.76	/opt/ros/kinetic/lib/nodelet/nodelet standalone row
31483	preed		20	0		26952	19996	S 3.4	0.1	0:01.97	/opt/ros/kinetic/lib/image_transport/republish _image_transport/republish _
31305	preed		20	0		29176	7292	S 3.4	0.1	0:03.72	python /home/preed/src/rtk_core/src/SUMET/sumet_bel
31231	preed		20	0	1093M	43944	31664	S 3.4	0.1	0:04.62	/opt/ros/kinetic/lib/nodelet/nodelet standalone ma
30514	preed		20	0	2719M	52200	13048	5 3.4	0.2	0:04.32	python /opt/ros/kinetic/lib/swri_transform_util/in:
31099	preed		20	0	812M	18208	12468	5 3.4	0.1	0:04.32	/opt/ros/kinetic/lib/nodelet/nodelet standalone su
31310	preed		20	0	938M	23008	7490	5 3 4	0.1	0:02.73	python /home/preed/src/rtk_core/src/SUMET/sumet_nav
31336	preed		20	ă	63/M	18272	16032	5 3 4	0 1	0.03.48	/home/preed/src/rtk_core/devel/lib/vaguero_route_m
31279	preed		20	ă	10134	28296	21128	5 2.7	0.1	0:04.99	/opt/ros/kinetic/lib/nodelet/nodelet_standalone_pa
31434	preed		20	ø	634M	19208	16828	S 2.7	0.1	0:02.82	/home/preed/src/rtk core/devel/lib/dsat waypoint m
31241	preed		20	ø		44192	31904	S 2.7	0.1	0:03.01	/opt/ros/kinetic/lib/nodelet/nodelet standalone may
31419	preed		20	0	557M	13640	12312	S 2.7	0.0	0:02.68	/home/preed/src/rtk_core/devel/lib/dsat_behavior_m
31258	preed		20	0	568M	21260	16632	S 2.7	0.1	0:02.58	/home/preed/src/rtk_core/devel/lib/vaquerito_plann
FE Hel	D FZ S	etup	FE Se	arch	F4 Fil	ter FST	nee Fe	SortBy	Nice	-BNice	+F9Kill F10Quit
					~/ar	l : htop					

wireshark

	, mate	1.0	<i>.</i>						Ch - 4			(T1	Cap	turi	ng fr	om e	no1		1.1.a.las									-	+	×
Elle	Ealt	View	<u>6</u> 0	Ca	pture	e <u>A</u> r	aiyz	e :	stat	istic	5	161	sbu	ony	win	eless	100	ois .	Helb											
		٦	۲	Î		X	¢	2	٩	<	Þ	•	1	2	٠	₹			•	2	Q	Q	1							
	Apply a	displa	y filte	r	<ctri< td=""><td>-/></td><td>_</td><td>_</td><td>_</td><td>_</td><td></td><td>_</td><td>_</td><td>_</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>•</td><td>Ехр</td><td>ressi</td><td>on</td><td>1</td><td>÷</td></ctri<>	-/>	_	_	_	_		_	_	_											•	Ехр	ressi	on	1	÷
No.	1	ime		9	ouro	e				De	stin	atio	n			Proto	ocol	Ler	ngth	In	nfo									
	1 (3.0000	00000	1 1	29.1	162.1	99.4	6		23	9.25	55.2	255.	250		SSDP			175	5 M	- SEAF	CH *	HTTP	2/1.1	1					
	2 (3.1029	47395	; (cohda	wir_	L0:1	0:a	8	Bri	add	cast				ARP			66) W	ho ha	as 12	9.162	2.199	0.15	6? T	11 1	.29.1	62.3	1
	3 (3.2137	01116		isco	_d6:	ce:b	£		Bri	ado	ast				ARP			66) W	ho ha	as 12	9.162	2.199	3.15	6? T	11 1	.29.1	.62.1	1
	4 0	3.2138	20449		1500	_d6:	:e:b	T.		Bri	add	ast				ARP			60) W	ho ha	as 12	9.162	2.199	3.20	6? T	911 1	.29.1	.62.1	1
	5 0	1.3264	80692		scont	uro_	32:5	6:8		Spi	ann:	ing-	tre	28-(1		STP			60) K	ST. P	1001	= 614	14071	1/40	:01:)	16:02	:56:	84	1
Г	50	3.3368	9094/		29.1	162.1	99.3	3		12:	9.18	2.1	.99.	128		TCP				4	7982	→ 80	LSTI	1 50	:q=0	WIN	2920	e Le	n=0	-
	8 0	3 3372	76495		29.1	162.1	20 3 99.1	20		12	1 1 1	22.1	.99.	128		TCP			66	1 4	7982	- 80	Lack		20121	ack:	1 W1	n=29	312	21
	9.0	1.3373	59977		29.1	62.1	99.3	3		12	1.10	12.1	99.	128	_	HTTP			1245	P	OST	inh/	Thin	UTG	14-1	UOUS	a ir	terf	ace	
	10 0	3.3376	12377	-	29.1	162.1	99.1	28		12	9.16	32.1	.99.	33		тср			66	8 8	0 - 4	7982	[ACH	d Se	ea=1	Ack:	1180	Win	=318	8
+	11 0	.3409	96422		29.1	162.1	99.1	28		12	9.16	52.1	.99.	33		HTTP			1119	H H	TTP/1	.1 2	00 00	ć (:	text	/htm	1)			
	12 (9.3410	14976	1	29.1	162.1	99.3	3		12	9.16	52.1	.99.	128		TCP			66	5 4	7982	→ 80	[ACH	(] Śr	eq=1	180 /	Ack=1	.054	win:	=:
	13 (3.3410	23447	. 1	29.1	162.1	99.1	28		12	9.16	52.1	.99.	33		тср			66	5 8	0 - 4	7982	[FI	I, A0	ск] :	Seq=:	L054	Ack=	1180	3
	14 0	3.3414	30248	1 1	29.1	162.1	99.3	3		12	9.16	52.1	.99.	128		TCP			66	5 4	7982	→ 80	[FI	I, A0	CK]	Seq=:	180	Ack=	1055	5
	15 (3.3416	84231	. 1	.29.1	162.1	99.1	28		12	9.16	32.1	.99.	33		TCP			66	8 8	0 - 4	7982	[ACH	<] Se	aq=1	055 /	Ack=1	.181	Win:	÷
4			07747			100 4	10.0	2		1.00			4.0	1		TION					nalse									•
b 1	irone o	1245	byt		n vd	ra (0	020	hit	· e \	12	C P	wte	0 0	anti	ired	0060	hit	e) 07	n int	or	tace	0								
111	therne	t TT	src	Hen	letti	P 41	46.4	th (50.1	35.1	3.2	11.4	6.4	h)	Det.	PCSC	onnu	38.0	11.11	11	18:00	. 27 . :	h se	-113						
68	Interne	t Prot	tocol	Ver	sion	4, 5	rc:	129	.16	2.18	9.3	3.	Dst	: 12	9.16	2.199	.128	_0011												
1 k -	ransmi	ssion	Cont	rol	Prot	ocol,	Sro	PO	rt:	479	82,	Ds	t P	ort:	80,	Seq:	1, /	Ack :	1, L	en	: 117	9								
-	iyperte	xt Tra	ansfe	r Pr	otoc	01																								
-	POST	/job/	Ibin	_uT6	4a	ugus t	a_in	iter	face	e_ms	gs_	_ub	un t	u_tr	usty	ande	4b:	inary	//bui	ld⊦	isto	ry/aj	jax H	ттр/	1.1	\r\n				
	Host	: uss-	jenk:	Lns-I	nasti	er.dy	n.da	itas	ys.s	swri	.ec	lu\r	\n																	
	Conn	ectior	i: kei	∋p-a.	live	\r\n																								Ŧ
4																													•	
	0 08 0	30 27	a8 d1	11	50 6	55 f	3 41	46	4b	08	00	45	88		· 8	'e .A	FKE	Ε.												
003	0 04 0	cf 2d	1a 40	9 66	40 6	96 7	7 28	81	a2	C7	21	81	a2		0.6). v(! .													
002	0 c7 i	30 bb	6e 00	50	67 5	5c f	b af	9d	d8	b5	bз	80	18		.n.P	Ν														
003	0 00 0	95 96	a8 00	00 (01 0	01 0	8 0a	106	25	70	a0	16	3f				.%р	.?												
004	0 be i	db 50	4f 53	3 54	20 2	21 6	a 6f	62	21	49	62	69	6e		POST	/ jo	b/Ibi	in												
	0 51	75 54	36 34	51	51 6	51 7	5 67	75	73	74	61	51	69	_u	T64_	a ug	usta_	_1												
	0 66	74 65	72 66	5 61	63 6	55 5	1 60	73	67	73	51	51	75	nt	erta	:e_n	sgs_	_u												Ŧ
0	Z er	nol: <	live c	aptu	re in	prog	ress	>									Pac	kets:	663	· D	ispla	yed:	663 (100.	0%)	Pr	ofile:	Defa	ault	

File Edit View Bookmarks Settings Help Total DISK 54.79 M/s Total DISK 6.26 M/s Actual DISK FRAD: 34.79 M/s Total DISK FRAD: 5.26 M/s TID PRIO USK FRAD: DISK		-	sudo — Konsole	d/arl:	e/pr	/home							
Total DISK PEAD: 34.79 M/s Total DISK WRITE: 18.31 M/s Actual DISK PEAD: 34.79 M/s K-tual DISK WRITE: 5.26 M/s TID PRIO USER DISK PEAD DISK WRITE: 5.26 M/s TID PRIO USER DISK PEAD DISK WRITE: 5.26 M/s Se622 be/4 root 0.08 J/s 1.7.7 M /s 6.08 V 73.62 K month.ntfs /dev/sdd1 /medi=00.gid=10								Help	Settings	Bookmarks	View	Edit	File
Actual DISK FEAD: 34.79 M/s Actual DISK WHITE: 6.26 M/s TID PRC USER DISK FEAD DISK WHITE SWAPIN IOS 2602 be/4 root 8.08 H 6.06 B/s 0.26 % 73.62 % mount.ntts /dev/sdd1/medi~00,gid=1000,uhelper=ud 2602 be/4 root 8.08 H 6.06 B/s 0.26 % 26.55 % [Kworker/Ju24:8] 2833 be/4 preed 0.08 H 6.06 B/s 0.26 % 26.55 % [Kworker/Ju24:8] 2833 be/4 preed 0.08 H 6.06 B/s 0.26 % 0.00 % 0.00 % kworsolt 2823 be/4 preed 0.08 H 6.06 B/s 0.26 % 0.00 % 0.00 % kworsolt 2823 be/4 preed 0.08 H 6.06 B/s 0.26 % 0.00 % 0.00 % kworsolt 2823 be/4 preed 0.08 H 6.06 B/s 0.26 % 0.00 % 0.00 % kworsolt 2823 be/4 preed 0.08 H 6.06 B/s 0.26 % 0.00 % 0.00 % 1			18.31 M/s	1	ΤE	6K WRIT	l DIS	Tota	79 M/s	34.	READ	DISK	Total
TID PHIO Disk			6.26 M/s		RITE	SK WR	al DI	Actu	79 M/s	34	READ	lDIS	Actua
2822 DP/4 FOOT 0.00 B/5 0.00 B/2 Nonlininity Operation 2823 DP/4 FOOT 0.00 B/3 <			COMMAND	10>	PIN	SWAP1	RITE	DISK W	READ	DISK) USEF	PRI	TID
<pre>2/612 be/4 Foot</pre>	dis	medi~00,gid=1000,uhelper=u	mount.ntfs /dev/sdd1	3.82 %	1%	0.00	M/s	17.76	0 B/S	0.0	root	be/4	28622
2835 DDF/A DF48 DF74	000		[kworker/u24:8]	3.5/%	1%	0.00	B/S	0.00	0 B/S	17.0	root	be/4	2/612
3356 De/A preed 0.00 B/S 0.00 No	901	bads~dia/preed//610680013C	rsyncprogress Dowr	0.19 %	1 16	0.00	D/S	10.00	9 11/5	1/.4	preed	be/4	28837
3750 bb/4 presd 0.00 bf/s 0.100 bf/s 0.00 bf/			konso Le	000 %	1 10	0.00	K/S	10.49	0 0/5	0.0	preed	be/4	3360
3235 007 9 0.00 9 0.00 105001 <td></td> <td>los 0-EREEf 241464b (pocout</td> <td>chrome</td> <td>00.00 %</td> <td>1 16</td> <td>0.00</td> <td>K/S</td> <td>400.01</td> <td>0 0/5</td> <td>0.0</td> <td>preed</td> <td>be/4</td> <td>3/09</td>		los 0-EREEf 241464b (pocout	chrome	00.00 %	1 16	0.00	K/S	400.01	0 0/5	0.0	preed	be/4	3/09
26260 be/7 ptest 0.000 b/2 b/2 <td>12</td> <td></td> <td>track</td> <td>00 0</td> <td>2</td> <td>0.00</td> <td>K/S</td> <td>499.01</td> <td>0 0/5</td> <td>0.0</td> <td>preed</td> <td>be/4</td> <td>20231</td>	12		track	00 0	2	0.00	K/S	499.01	0 0/5	0.0	preed	be/4	20231
G52 be/4 preed viol	69	-jaus 1/6/b / jaus discovers	ipus discovery pame	00 0	2	0.00	K/s	2 50	10 B/e	0.0	preed	be/4	6610
0655 bb// priced 17.00 M/s 0.00 B/s	69	-jaus1464b/jaus_discovery	jaus discovery	00 0		0.00	K/e	3 50	10 B/e	0.0	preed	be//	6612
6574 be/4 pred 0.00 b/s 0.00 solution 6575 be/4 pred 0.00 b/s 0.00 solution pred/pred b/s0 b/s 0.00 b/s b/s0 solution pred/pred b/s0 b/s 0.00 solution pred/pred b/s0 b/s b/s0 b/s b/s0 b/s b/s0 b/s b/s0 b/	x v	guocal xy origin:=local	play clock bz 100	1.00 %	1 %	0.00	B/s	0.00	10 M/s	17.3	preed	he/4	6629
c575 br/4 pread 0.08 b/s 3.50 k/s 0.08 s 0.08 s <th0.08 s<="" th=""> 0.08 s <th0.08 s<="" th=""></th0.08></th0.08>	69.	pame~/iop bridge mobility=	ion bridge mobility	1.00 %	1.96	0.00	K/s	3.50	10 B/s	0.0	preed	he/4	6574
31323 be/4 pred 0.00 B/s 3.50 K/s 0.00 % 0.00 % outer tracker node cropped-coarse route tracker- 32347 be/4 pred 0.00 B/s 3.50 K/s 0.00 % 0.00 % nodelet standalone path_fo~following_controller-5 32665 be/4 pred 0.00 B/s 0.00 B/s 0.00 % 0.00 % nodelet standalone path_fo~following_controller-5 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % nut splash 2 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % nut splash 4 be/0 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % nut splash 6 be/0 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1.00 % 0.00 % 7 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 0.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1.00 % 1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 1.00 % 1.00	69.	name~/iop_bridge_mobility=	ion bridge mobility	1.00 %	1.96	0.00	K/s	3.50	10 B/s	<u>.</u>	preed	he/4	6575
22247 be/4 0.00 h/s 13.98 k/s 0.00 % 0.00 % 100 %<	63.	pped~coarse route tracker-	route tracker node cr	0.00 %	96	0.00	K/s	3.50	10 B/s	ø.e	preed	be/4	31323
32665 be/4 pred 0.00 b/5 0.00 % % 0.00 % % 0.00 % % 0.00 % % 0.00 % % 0.00 % % 0.00 % % 0.00 % % % % % % % % % % % % % %	69.	name~/iop bridge mobility-	iop bridge mobility	0.00 %	96	0.00	K/s	13.98	0 B/s	0.0	preed	be/4	32347
1 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 0.00 % init splash 2 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % kkbreadj 4 be/8 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % kkbreadj 6 be/8 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % kkortrad/01 8 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % kcortrad/01 9 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % rcu_sched] 9 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % inigration/0] 10 tt/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % inigration/0] 11 tt/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % inigration/0] 12 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % inigration/0] 13 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % inigration/0] 13 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % inigration/0] 15 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % inigration/0] 15 be/4 root 0.00 B/s 0.00 B/s 0.00 B/s 0.00 % 0.00 % inigration/0] 15 be/4 root 0.00 B/s 0.00 B/s 0.00 B/s 0.00 % 0.00 % inigration/1] 16 be/4 root 0.00 B/s 0.00 B/s 0.00 B/s 0.00 % 0.00 % koot % inigration/1] 16 be/4 root 0.00 B/s 0.00 B/s 0.00 B/s 0.00 % 0.00 % koot % inigration/1] 16 be/4 root 0.00 B/s 0.00 B/s 0.00 B/s 0.00 % 0.00 % koot % inigration/1]	57.	h fo~following controller-	nodelet standalone pa	0.00 %	96	0.00	K/s	6.99	0 B/s	0.0	preed	be/4	32665
2 bc/4 root 0.08 h/s 0.08 b/s 0.08 % 0.08 % 0.08 % (kthreadd] 4 bc/0 root 0.08 h/s 0.08 b/s 0.08 % 0.08 % 0.08 % (kthreadd] 6 bc/0 root 0.08 h/s 0.08 b/s 0.08 % 0.08 % (ksoftraf0/0] 7 bc/4 root 0.08 h/s 0.08 b/s 0.08 % 0.08 % (ksoftraf0/0] 8 bc/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % (rcu_sched] 9 bc/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % (rcu_sched] 10 rt/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % (migration/0] 11 rt/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % (ksoftraf0/0] 12 bc/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % (rcu_sched) 13 bc/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % (ksoftraf0/0] 13 bc/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % (rcu_sched) 15 bc/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % 0.08 % (rcu_sched) 15 rt/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % 0.08 % (rcu_sched) 15 bc/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % 0.08 % (migration/1] 16 bc/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % (ksoftraf0/1] 16 bc/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % (ksoftraf0/1] 16 bc/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % (ksoftraf0/1]			init splash	.00 %	98	0.00	B/s	0.00	0 B/s	0.0	root	be/4	1
4 be/9 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % 0.08 % [kworker/8:04] 6 be/9 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % [kworker/8:04] 7 be/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % [kworker/8:04] 8 be/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % [kworker/0] 9 be/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % [rcu_sched] 10 tr/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % [rcu_sched] 11 tr/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % [watchdog/0] 12 be/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % 0.08 % [watchdog/1] 13 be/4 root 0.08 b/s 0.08 b/s 0.08 b/s 0.08 % 0.08 % 0.08 % [watchdog/1] 14 tr/4 root 0.08 b/s 0.08 b/s 0.08 % 0.08 % 0.08 % 0.08 % 0.08 % 0.08 % 0.08 % 0.08 % 0.08 % 0.08 b/s 0.08 b/s 0.08 b/s 0.08 b/s 0.08 % 0.08 % 0.08 % 0.08 % 0.08 % 0.08 b/s 0.08 b/s 0.08 b/s 0.08 % 0.08 % 0.08 % 0.08 % 0.08 b/s 0.08 b/			[kthreadd]	0.00 %	9%	0.00	B/s	0.00	0 B/s	0.0	root	be/4	2
6 bc/0 root 0.00 H/s 0.00 H/s 0.00 % 0.00 % 0.00 % [mu.percpu.wq] 7 bc/4 root 0.00 H/s 0.00 B/s 0.00 % 0.00 % [ksoftirq0/0] 8 bc/4 root 0.00 H/s 0.00 B/s 0.00 % 0.00 % [rcu_sched] 9 bc/4 root 0.00 H/s 0.00 B/s 0.00 % 0.00 % [rcu_sh] 10 rt/4 root 0.00 H/s 0.00 B/s 0.00 % 0.00 % [migration/0] 11 rt/4 root 0.00 H/s 0.00 B/s 0.00 % 0.00 % [watchdag/0] 12 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [watchdag/0] 13 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [watchdag/1] 14 rt/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [watchdag/1] 15 rt/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [migration/1] 16 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ksoftirqd/1] 16 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ksoftirqd/1]			[kworker/0:0H]	0.00 %	%	0.00	B/s	0.00	0 B/s	0.0	root	be/0	
7 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 0.00 % [ksoftirqd/0] 8 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [rcu_shed] 9 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [rcu_shed] 10 tr/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [rcu_sh] 11 tr/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ruphp/0] 12 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ruphp/0] 13 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ruphp/0] 13 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ruphp/0] 15 tr/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ruphp/0] 15 tr/4 root 0.00 B/s 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ruphp/0] 15 tr/4 root 0.00 B/s 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ruphp/0] 15 tr/4 root 0.00 B/s 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ruphp/0] 15 tr/4 root 0.00 B/s 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ksoftirqd/1] 16 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ksoftirqd/1]			[mm_percpu_wq]	0.00 %	%	0.00	B/s	0.00	0 B/s	0.0	root	be/0	6
B bc/4 root 0.08 B/s			[ksoftirgd/0]	0.00 %	%	0.00	B/s	0.00	0 B/s	0.0	root	be/4	
9 bc/4 root 0.00 H/s 0.00 B/s 0.00 % 0.00 % 0.00 % [rcu_bh] 10 rt/4 root 0.00 H/s 0.00 B/s 0.00 % 0.00 % [migration/0] 11 rt/4 root 0.00 H/s 0.00 B/s 0.00 % 0.00 % [rcuho/0] 12 bc/4 root 0.00 H/s 0.00 B/s 0.00 % 0.00 % [rcuho/1] 14 rt/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [rcuho/1] 15 rt/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [migration/1] 16 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ksoftirqd/1] 16 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ksoftirqd/1]			[rcu_sched]	0.00 %	%	0.00	B/s	0.00	0 B/s	0.0	root	be/4	8
10 rt/4 root 0.00 H/s 0.00 B/s 0.00 % 0.00 % 0.00 % [migration/0] 11 rt/4 root 0.00 H/s 0.00 B/s 0.00 % 0.00 % [watchdog/0] 12 be/4 root 0.00 H/s 0.00 B/s 0.00 % 0.00 % [cpuhp/0] 13 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [cpuhp/1] 14 rt/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [watchdog/1] 15 rt/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [migration/1] 16 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ksoftirqd/1]			[rcu_bh]	0.00 %	%	0.00	B/s	0.00	0 B/s	0.0	root	be/4	9
11 rt/4 root 0.08 B/s 0.08 B/s 0.08 % 0.08 % 0.08 % (watchdog/0] 12 be/4 root 0.08 B/s 0.08 B/s 0.08 % 0.08 % (cpuhp/0] 13 be/4 root 0.08 B/s 0.08 B/s 0.08 % 0.08 % 0.08 % (cpuhp/1] 14 rt/4 root 0.08 B/s 0.08 B/s 0.08 % 0.08 % 0.08 % (watchdog/1] 15 rt/4 root 0.08 B/s 0.08 B/s 0.08 % 0.08 % 0.08 % (watchdog/1] 16 be/4 root 0.08 B/s 0.08 B/s 0.08 % 0.08 % 0.08 % (ksoftirqd/1] 16 be/4 root 0.08 B/s 0.08 B/s 0.08 % 0.08 % 0.08 % (ksoftirqd/1]			[migration/0]	0.00 %	\$	0.00	B/s	0.00	0 B/s	0.0	root	rt/4	10
12 be/4 root 0.00 K/s 0.00 K/s 0.00 % 0.00 % 0.00 % [cpuhp/0] 13 be/4 root 0.00 K/s 0.00 K/s 0.00 % 0.00 % [cpuhp/1] 14 rt/4 root 0.00 K/s 0.00 K/s 0.00 % 0.00 % [watchdog/1] 15 rt/4 root 0.00 K/s 0.00 K/s 0.00 % 0.00 % [migration/1] 16 be/4 root 0.00 K/s 0.00 K/s 0.00 % 0.00 % [ksoftirqd/1]			[watchdog/0]	0.00 %	\$	0.00	B/s	0.00	0 B/s	0.0	root	rt/4	
13 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % 0.00 % [cpuhp/1] 14 rt/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [watchdog/1] 15 rt/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [migration/1] 16 bc/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ksoftirqd/1]			[cpuhp/0]	0.00 %	\$	0.00	B/s	0.00	0 B/s	0.0	root	be/4	12
14 rt/4 root 0.00 H/s 0.00 B/s 0.00 % 0.00 % [watchdog/1] 15 rt/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [migration/1] 16 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ksoftirqd/1]			[cpuhp/1]	0.00 %	\$	0.00	B/s	0.00	0 B/s	0.0	root	be/4	13
15 rt/4 root			[watchdog/1]	0.00 %	\$	0.00	B/s	0.00	0 B/s	0.0	root	rt/4	14
16 be/4 root 0.00 B/s 0.00 B/s 0.00 % 0.00 % [ksoftirqd/1]			[migration/1]	0.00 %	\$	0.00	B/s	0.00	0 B/s	0.0	root	rt/4	15
			[ksoftirqd/1]	0.00 %	\$	0.00	B/s	0.00	0 B/s	0.0	root	be/4	16
/home/preed/arl:sudo								arl : sudo	e/preed/	/hom			

iftop

File Edit View Bookmarks Settings Help 12.5 Kb 25.0 Kb 37.5 Kb 50.0 Kb 50.0 Kb 3.0 Kb <th></th> <th></th> <th></th> <th></th> <th></th> <th>/ho</th> <th>me/preed/arl</th> <th>: sudo — Konsol</th> <th>le</th> <th></th> <th></th> <th></th> <th>- + 3</th>						/ho	me/preed/arl	: sudo — Konsol	le				- + 3
12.5kb 25.8kb 37.5kb 50.8kb 62.8kb 13.107.6.121 => 129.162.199.111 0b 5.08kb 3.107 129.162.199.128 0b 1.09kb 1.12 129.162.199.128 0b 1.09kb 1.12 129.162.199.128 0b 2.07kb 1.42 129.162.199.33 => 129.162.199.35 0b 2.07kb 1.42 129.162.199.55 => 129.162.199.73 2.01kb 1.11kb 1.08 129.162.199.255 => 129.162.199.73 2.01kb 1.11kb 1.08 255.255.255 => 129.162.199.42 0b	File Edit	View	Bookmarks	Setting	s Help								
13.127.6.151 => 129.162.199.111 0 b 5.66kb 3.66kb 1.1 129.162.199.33 => 129.162.199.128 0 b 1.9kb 1.1 129.162.199.33 => 129.162.199.128 0 b 2.9kb 1.1 129.162.199.33 => 129.162.119.128 0.1 2.7kb 1.2kb 1.2kb 129.162.199.33 => 129.162.119.35 2.7kb 1.2kb 3.2kb 630 129.162.199.255 => 129.162.199.73 0 0 0.0kb 0.0kb 0.0kb 129.162.199.255 => 129.162.199.73 0 0 0.0kb	L		12.	5Kb		25	.0Kb	37.	5Kb		50.0Kb		62.5Kb
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	13.107.6.	151					129.162.199	.111			0b	5.86Kb	3.66КЬ
$\begin{array}{c c c c c c c c c c c c c c c c c c c $											Øb	1.90Kb	1.19Kb
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	129.162.1	99.33					129.162.199	.128			Øb	2.26Kb	2.12Kb
129.162.199.33 => 129.162.112.158 2.77kb 2.22kb 1.73 129.162.199.255 => 129.162.199.35 0 0 0 0 129.162.199.255 => 129.162.199.35 0 <td></td> <td>Øb</td> <td>2.07Kb</td> <td>1.94Kb</td>											Øb	2.07Kb	1.94Kb
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	129.1 <mark>62.1</mark>	99.33					129.162.112	.158			2.77Kb	2.22Kb	1.73Kb
$\begin{array}{c c c c c c c c c c c c c c c c c c c $											1.02Kb	832b	650b
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	129.162.1	99.255					129.162.199	. 35			Øb	Øb	Øb
129.162.199.255 => 129.162.199.73 0b 0b 0b 255.255.255.255 => 129.162.199.42 0b 0b 0b 239.255.255.255 => 129.162.199.42 0b 0b 0b 239.255.255.250 => 129.162.199.101 0b 0b 0b 239.255.255.250 => 129.162.199.101 0b 0b 0b 239.255.255.250 => 129.162.199.125 6Adb 30bb 32bb 239.255.255.250 => 129.162.199.125 0b 0b 0b 224.0.0.251 => 129.162.199.125 0b 0b 0b 224.0.0.251 => 129.162.199.126 0b 22b 22b 129.162.199.33 => 129.162.199.125 0b 22b 22b 129.162.199.33 => 129.162.199.152 0b 22b 12b 129.162.199.255 => 129.162.199.152 0b 12b 12b 129.162.199.255 => 129.162.199.152 0b 12b 12b 12b 129.162.199.55 => 129.55 => 129.162.199.152 0b 12b 12b 121 cum: 8.546 peak 9.56b 141.18b 15.68b 49.58b 121.102.1199.55 => 129.58b 58.86b 117.18b </td <td></td> <td>2.01Kb</td> <td>1.10Kb</td> <td>1.00Kb</td>											2.01Kb	1.10Kb	1.00Kb
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	129.162.1	99.255					129.162.199	.73			0b	Øb	ØЬ
Z55, Z55, Z55, Z55 => 129, 162, 199, 42 0b											2.00Kb	930b	907b
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	255.255.2	55.255					129.162.199	. 42			Øb	Øb	Øb
Z39, 255, 250 => 129, 162, 199, 101 0b											3.16Kb	648b	405b
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	239.255.2	55.250					129.162.199	.101			Øb	Øb	Øb
239, 255, 255 => 129, 162, 199, 99 0b 0b 0b 239, 255, 255, 250 => 129, 162, 199, 125 0b 0c 329, 255, 255, 250 => 129, 162, 199, 125 0b 0b 0b 0b 0b 0b 0c 3224, 40, 40, 251 => 129, 162, 199, 116 0b 0c 323, 232, 404 40 323, 232, 404 40 323, 232, 404 40 323, 404 40 323, 404 40 <td></td> <td>2.33Kb</td> <td>477b</td> <td>596b</td>											2.33Kb	477b	596b
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	239.255.2	55.250					129.162.199	. 99			Øb	Øb	Øb
239.255.255.250 => 129.162.199.125 0b 0b 0b 224.0.0.251 => 129.162.199.116 0b 323.420 224.0.0.251 => 129.162.199.116 0b 323.420 129.162.199.33 => 192.168.53.129 232.52 200 140 129.162.199.33 => 192.168.53.129 232.52 200 140 129.162.199.33 => 104.189.75.50 0b 78.50 0b 78.50 129.162.199.33 => 129.162.199.152 0b 78.50 0b 78.50 0b 78.50 129.162.199.33 => 129.162.199.152 0b 78.50 0b 78.50 0b 78.50 129.162.199.152 => 129.162.199.152 0b 78.50											644b	386b	322b
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	239.255.2	55.250					129.162.199	125			Øb	Øb	Øb
224.0.0.251 => 129,162,199,116 0b 0b 0c - - 129,162,199,133 - - 129,162,199,33 232b 209b 143 129,162,199,33 - >> 102,168,53,129 232b 209b 140 129,162,199,33 - >> 104,189,75,50 0b 0b 0b 0b 129,162,199,33 - >> 104,189,75,50 0b 76b 96 129,162,199,35 - >> 129,162,199,152 0b 76b 96 129,162,199,255 - >> 129,162,199,152 0b 76b 96 7X: cum: 8,54KB peak: 9,26Kb rates: 3,06Kb 4,96Kb 4,97Kb 707.4L; 33,9KB 58,5Kb 17,1kb 15,9kb 16,9kb 17,1kb 16,9kb 16,9kb 16,7kb 16,7kb 16,8kb 15,9kb 16,8kb											Øb	323b	404b
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	224.0.0.2	51					129,162,199	.116			0b	Øb	Øb
129.162.199.33 => 192.168.53.129 232b 209b 14 129.162.199.33 => 104.189.75.50 0b 0b 0 129.162.199.33 => 104.189.75.50 0b 120b 150 129.162.199.33 => 104.189.75.50 0b 70b 90b 129.162.199.255 => 129.162.199.152 0b 70b 90b 7X: cum: 8.54KB peak: 9.26Kb rates: 3.08kb 4.96kb 4.96kb 7X: 25.4KB peak: 49.5kb 14.1kb 15.8kb 15.7kb 707.4L; 33.9kB 58.5kb 17.1kb 15.9kb 17.1kb 14.1kb 15.9kb 15.7kb											Øb	283b	177b
<	129.162.1	99.33					192.168.53.	129			232b	209b	145b
129.162.199.33 => 104.189.75.50 0b 120b 150b </td <td></td> <td>0b</td> <td>Øb</td> <td>Øb</td>											0b	Øb	Øb
129,162,199,255 < % <	129.162.1	99.33					104.189.75.	50			Øb	120b	150b
129.162.199.152 0b 0b 0b 0b 0b 0b 0b 0b 0b 107 TX: cum: 8.54KB peak: 9.26Kb rates: 3.08Kb 4.96Kb 4.27 FX: 25.4KB yeak: 49.5Kb 14.1kb 15.6kb 15.7kb TOTAL: 33.9KB 58.5kb 17.1kb 26.9kb 16.24											0b	78b	98b
< ℓb 187b 117 TX: cum: 8,54KB peak: 9,26Kb rates: 3,08Kb 4,96Kb 4,27 FX: 25,4KB 49,5Kb 14,1Kb 15,9Kb 15,9Kb 16,9 TOTAL: 33,8KB 58,8Kb 17,1kb 28,9kb 16,9	129.162.1	99.255					129.162.199	152			Øb	Øb	Øb
Cum: 8,54KB peak: 9,26Kb rates: 3,00Kb 4,96Kb 4,27 RV: 25,4KB 49,5Kb 14,1kb 15,9Kb 14,1kb 15,9Kb 15,9Kb 17,1kb 28,9Kb 17,1kb 28,9Kb 17,1kb 28,9Kb 17,1kb 28,9Kb 17,1kb 28,9Kb 15,9Kb											Øb	187b	117b
RX: 25.4KB 49.5Kb 14.1Kb 15.9Kb 12.7 TOTAL: 33.9KB 58.8Kb 17.1Kb 20.9Kb 16.9	TX:		cum: 8.	54KB	peak:	9.26Kb				rates:	з.00кb	4.96Kb	4.27Kb
TOTAL: 33.9KB 58.8Kb 17.1Kb 20.9Kb 16.9	RX:		25	,4KB		49.5Kb					14.1Kb	15.9Kb	12.7Kb
	TOTAL:		33	9KB		58.8Kb					17.1Kb	20.9Kb	16.9Kb
/home/preed/arl:sudo			/hor	ne/preed/	/arl : sudo								



Questions?