

Analytics and Data Products for Smart Cities and Social Services

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2° Encuentro de Ciudades Inteligentes para la Inclusión - IM



Smart Cities need Smart Social Services



Centre for Social Services Engineering

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About the Centre

Our research explores how each stage of the social services chain can benefit from engineering design, planning and delivery.



In The News

India Smart Cities Initiative

 CSSE Director Mark Fox joins U of T team in India to discuss Prime Minister Modi's 100 Smart Cities Plan

Interview: Simulating Social Service Clients



A conversation with the engineering team that is spearheading the Social Services Simulator Project at the CSSE.

Publications

Wang, Y., and Fox, M.S., (2015), "A Shelter Ontology for Global City Indicators (ISO 37120)", Working Paper, Enterprise Integration Laboratory, University of Toronto, Revised: 28 August 2015.

Projects

1. Social Needs Marketplace
 - Product, Services and Skills Ontologies
 - **Volunteer Logistics – Fleet Management**
 - Virtual, Integrated NGOs
2. Social Services Simulator
3. Ambient Activities for People with Dementia
4. Centivizer Behaviour Management
5. **Findhelp Web and Call Centre Data Analysis**
6. Design of Toilets Blocks for the Slums of Mumbai
7. Ve'ahavta Street Academy Process Map
8. Social Services Finder
9. Immigrant Skills
10. Predictive Analytics for Homelessness Prevention

Talk Overview

- **Analytics for 211 FindHelp**
 - Spark, Notebooks, Visualization
- **Data Products for Smart Fleet Management**
 - Cloud+Fog, Real-time Analytics, Visualization

FindHelp Case Study

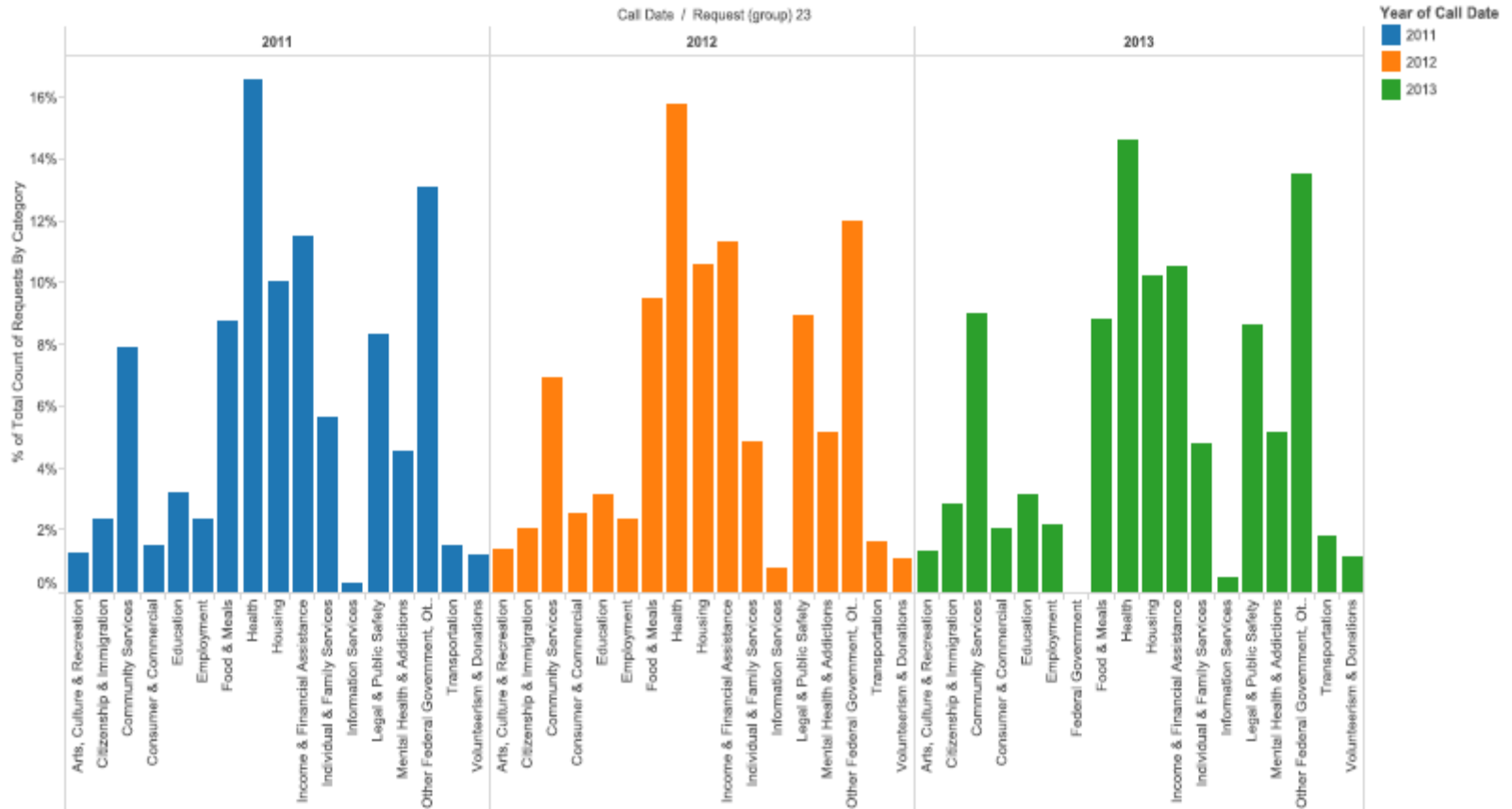
- Grads: Yuhong Liu, Mazvita Johnston
- Findhelp Information Services is a charitable non-profit organization that is a leader in Information and Referral
- Findhelp offers information on human services through a three digit (211) community telephone information line available to all those who live, work or visit the city of Toronto, York and Durham Regions, as well as a bilingual website
- Supported by diverse sources including the United Way of Toronto and municipal, provincial, and federal governments

211 Service

- Assigned by the FCC (US) and CRTC (Canada) for the purpose of providing quick and easy access to information about health and human services
- Dial 211 to speak to an Information and Referral Specialist that helps callers find the right community and social services
- Similar to 311 (same number in New York), or 1950 Intendencia de Montevideo (vs. *4141)

Analytical Insight into Toronto's Needs

Year-Year by Category

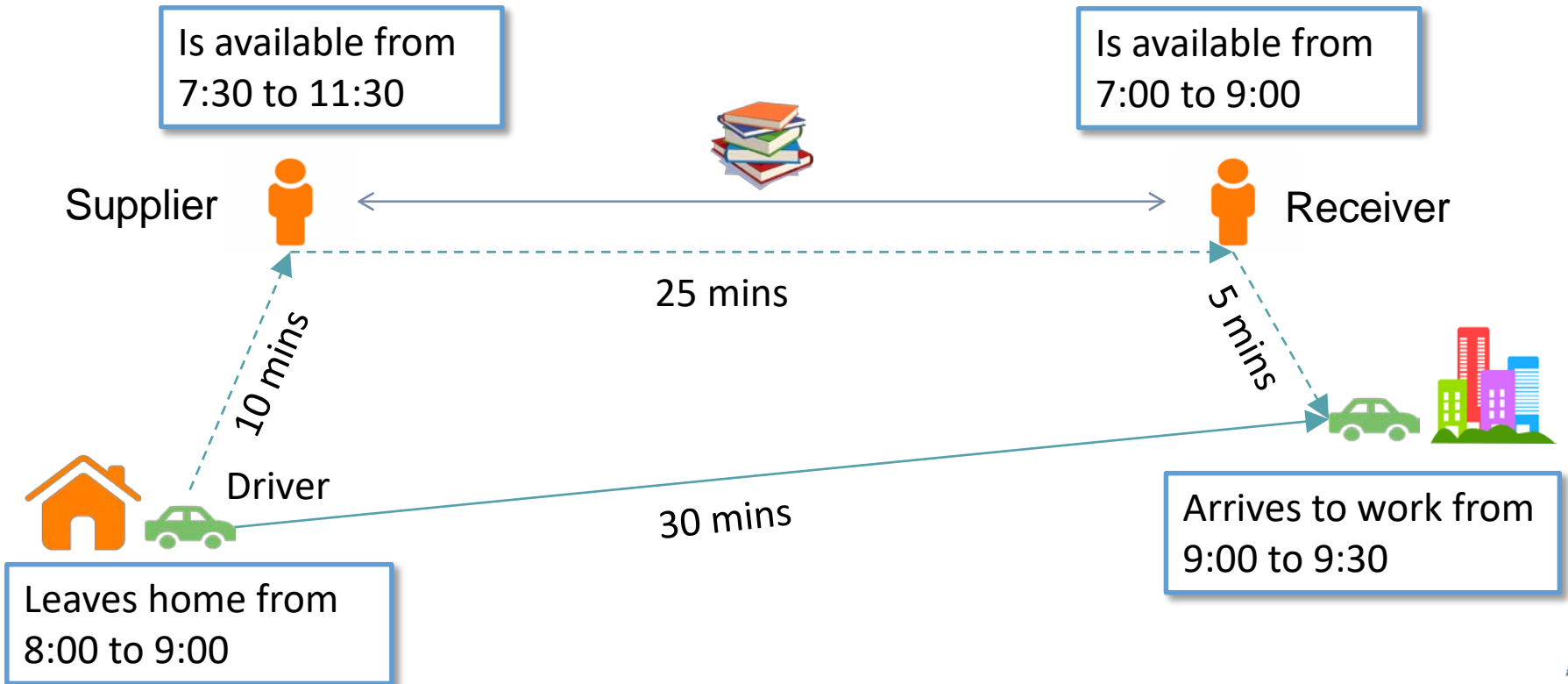


Overview

- Analytics for 211 FindHelp
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- **Data Products for Smart Fleet Management**
 - **Cloud+Fog, Real-time Analytics, Visualization**

Volunteer Logistics (Liu, Aleman, Beck)

The logistical problem of transporting goods from donors to requestors



Senior Transportation Problem

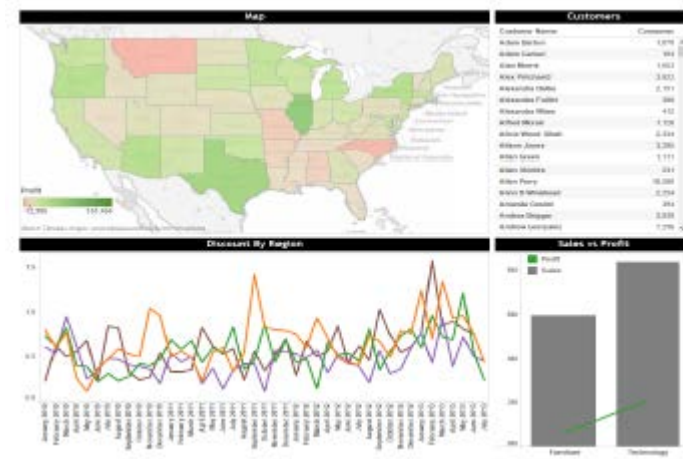
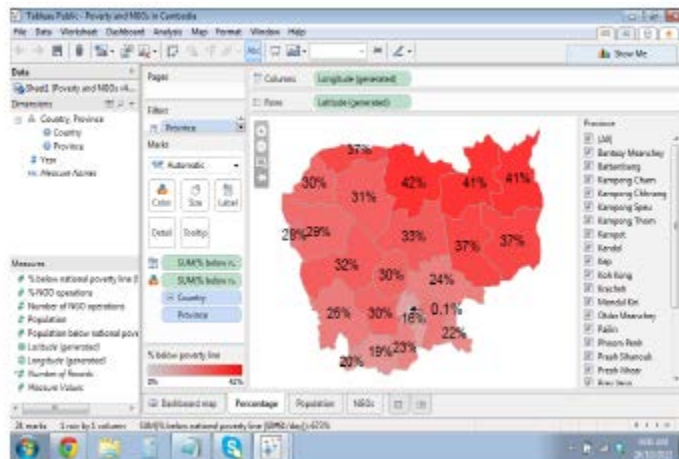
- Provided **88,000** trips to **7,300+** seniors in 2015
- **4%** of daily trips not scheduled resulting in **3,500** unmet requests yearly
- Vehicles are not used under full capacity **85%** of the time



Analytics for Fleet Management

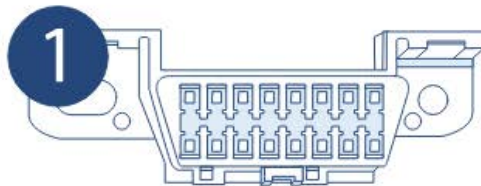
- Grads: Vandana Saini, Fiona Zhao

GEOTAB
management by measurement



Geotab Devices (Internet of Things)

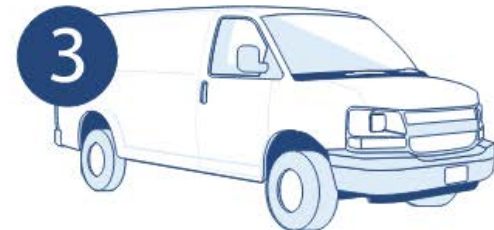
- Sensors connected to GPS, On-board diagnostics (OBDII)
- Add-ons: Driver, Cargo, Traffic, Weather



Locate your vehicle's OBDII port



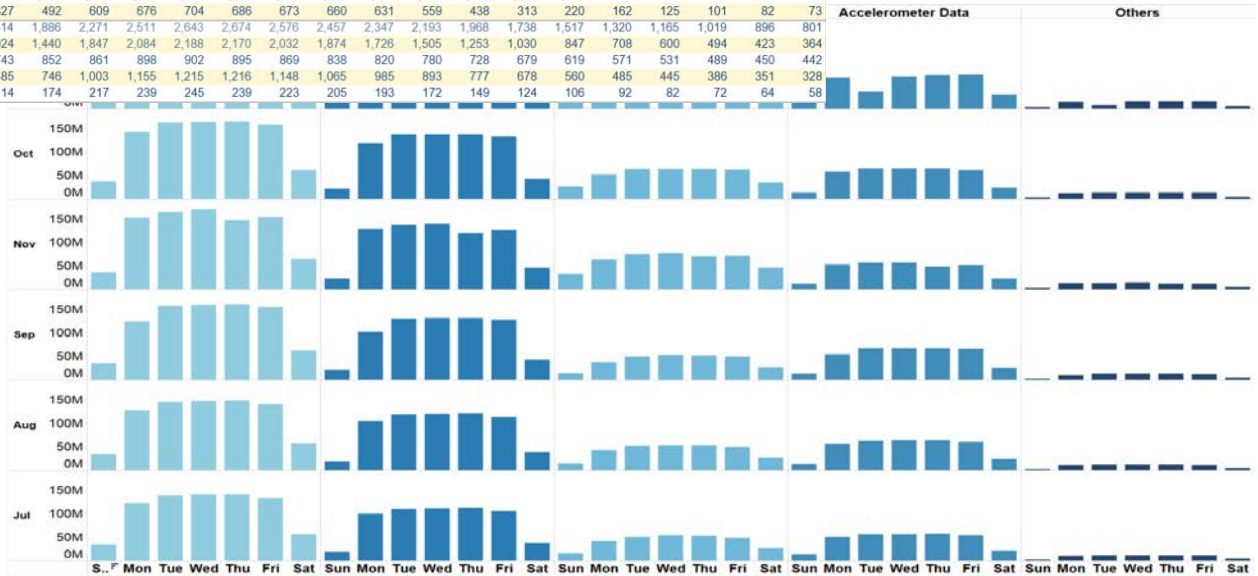
Plug your device in



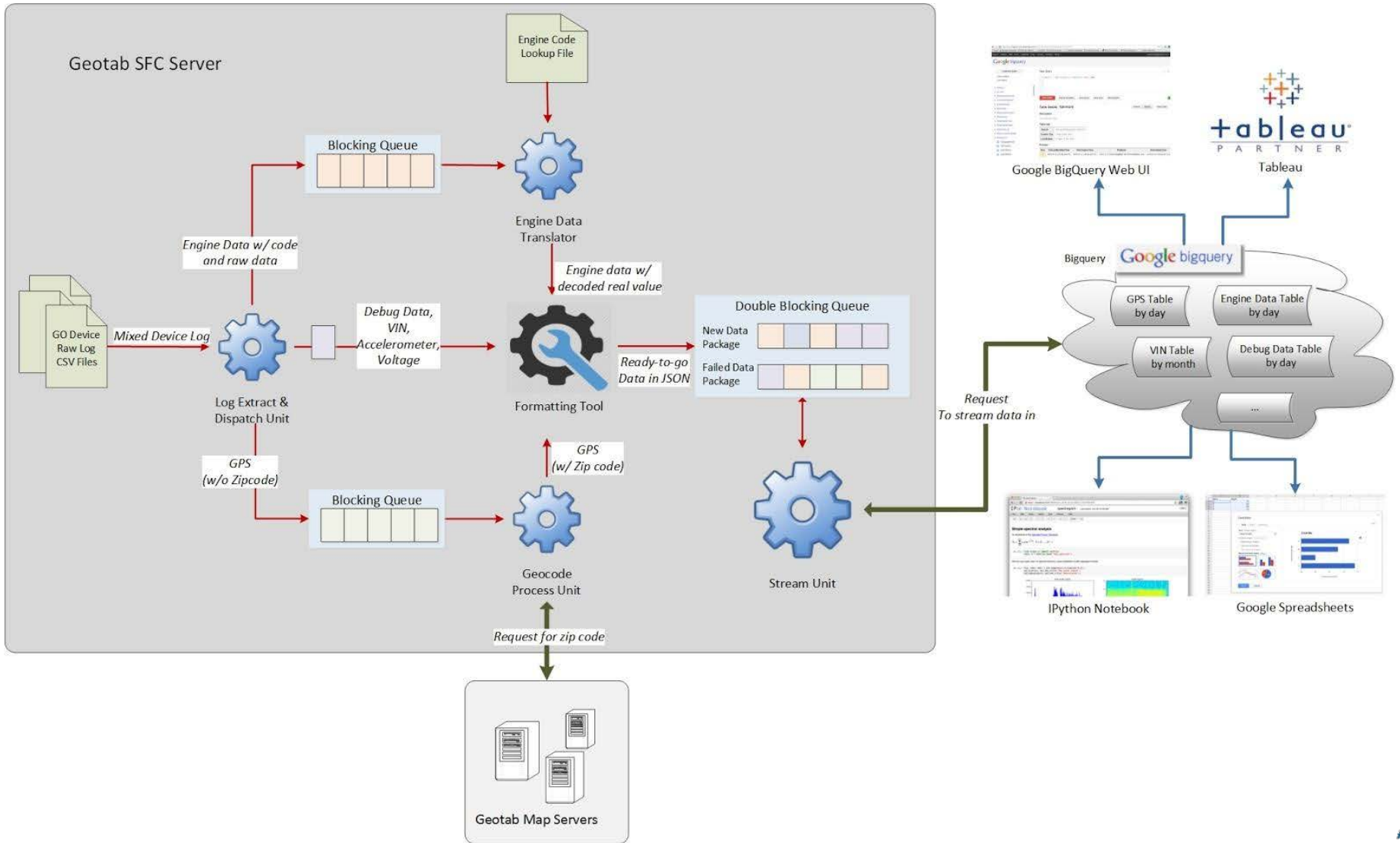
Start your vehicle, and GO!

Analytics for Fleet Management

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Sun	732	707	648	531	511	564	700	851	922	1,073	1,162	1,255	1,292	1,308	1,373	1,403	1,386	1,377	1,303	1,243	1,097	1,005	920	845
GPS	321	309	273	205	196	246	341	470	569	710	782	847	862	853	878	884	861	842	784	739	644	569	509	457
Engine Data	401	385	361	321	310	315	323	528	376	467	430	450	462	474	486	500	511	518	505	605	482	457	426	398
Debug Data	314	322	286	177	143	157	193	269	330	410	457	490	494	486	514	567	588	593	584	560	528	503	460	432
Accelerometer ..	51	50	46	38	37	42	57	68	79	94	100	106	108	113	117	116	112	110	105	104	93	86	79	73
Others	801	795	786	779	1,212	2,504	4,137	5,417	6,124	6,591	6,882	7,045	7,044	7,287	7,441	7,042	5,956	4,588	3,307	2,475	1,880	1,527	1,279	1,141
Mon	430	431	432	442	786	1,797	3,244	4,816	5,499	6,022	6,288	6,357	6,271	6,357	6,348	5,844	4,861	3,297	2,239	1,555	1,113	841	685	590
GPS	378	377	373	374	497	830	1,302	1,709	2,020	2,162	2,251	2,460	2,223	2,254	2,226	2,104	1,867	1,581	1,306	1,122	980	890	814	769
Engine Data	427	442	376	291	404	844	1,494	2,139	2,653	3,002	3,213	3,279	3,275	3,323	3,342	3,145	2,588	1,878	1,343	986	760	652	553	496
Debug Data	69	67	65	66	96	181	318	460	576	638	654	649	633	628	612	560	452	334	240	183	143	118	100	91
Accelerometer ..	1,045	998	975	951	1,398	2,853	4,809	6,079	6,842	7,272	7,564	7,602	7,716	7,989	8,114	7,894	6,522	4,844	3,589	2,667	2,031	1,628	1,362	1,194
Others	533	512	511	520	895	2,053	3,669	5,228	6,173	6,721	7,023	6,977	6,966	7,072	7,025	6,410	5,091	3,582	2,425	1,690	1,196	884	711	608
Tue	726	705	687	668	770	1,208	1,555	1,946	2,215	2,373	2,453	2,438	2,430	2,470	2,459	2,254	1,984	1,658	1,382	1,194	1,044	933	849	803
GPS	465	477	421	335	458	950	1,677	2,389	2,949	3,291	3,507	3,540	3,567	3,642	3,646	3,387	2,771	2,008	1,414	1,027	818	661	571	505
Engine Data	89	83	82	78	112	204	349	516	636	705	735	720	707	704	678	616	501	364	261	196	153	122	103	93
Debug Data	1,090	1,018	982	955	1,423	2,860	4,759	6,032	7,132	7,333	7,606	7,647	7,777	8,078	8,267	7,782	6,604	5,047	3,682	2,730	2,069	1,657	1,396	1,228
Accelerometer ..	553	528	514	508	886	2,039	3,716	5,153	6,432	6,768	7,069	7,027	7,031	7,134	7,117	6,470	5,142	3,627	2,479	1,709	1,218	911	732	622
Others	768	733	715	699	805	1,123	1,529	1,916	2,203	2,341	2,437	2,429	2,435	2,460	2,434	2,268	1,990	1,674	1,419	1,205	1,045	934	855	818
Wed	478	470	422	332	451	942	1,691	2,365	3,044	3,310	3,523	3,549	3,597	3,690	3,695	3,430	2,788	2,028	1,439	1,040	820	676	586	539
GPS	87	83	81	79	110	201	346	508	663	707	737	727	714	708	688	622	504	365	265	198	155	124	105	95
Engine Data	1,095	1,049	1,018	997	1,454	2,915	4,775	6,181	6,846	7,346	7,661	7,699	7,829	8,122	8,323	7,847	6,640	5,075	3,729	2,756	2,092	1,685	1,415	1,252
Debug Data	553	538	520	529	906	2,071	3,742	5,298	6,226	6,779	7,096	7,065	7,062	7,172	7,159	6,529	5,184	3,856	2,478	1,717	1,226	919	737	634
Accelerometer ..	826	784	782	809	836	1,122	1,551	1,960	2,212	2,369	2,469	2,581	2,498	2,511	2,533	2,256	1,974	1,656	1,374	1,188	1,037	940	861	810
Others	501	501	437	348	467	964	1,706	2,443	2,963	3,311	3,530	3,568	3,594	3,693	3,628	2,784	2,021	1,430	1,028	813	661	575	521	
Thu	90	86	82	80	112	202	348	517	640	708	741	725	717	712	689	620	505	369	264	196	153	125	106	96
GPS	1,123	1,090	1,027	996	1,398	2,674	4,356	5,718	6,436	6,970	7,313	7,448	7,596	7,788	7,806	7,161	5,868	4,392	3,261	2,423	1,889	1,512	1,227	1,057
Engine Data	564	551	519	526	865	1,900	3,405	4,908	5,862	6,464	6,791	6,792	6,796	6,849	6,722	5,971	4,591	3,165	2,143	1,467	1,048	777	605	487
Debug Data	768	763	725	695	780	1,065	1,434	1,819	2,059	2,222	2,300	2,276	2,278	2,293	2,228	2,052	1,768	1,470	1,240	1,058	935	839	762	723
Accelerometer ..	480	497	415	336	441	889	1,578	2,290	2,818	3,179	3,406	3,437	3,467	3,498	3,448	3,110	2,439	1,736	1,215	871	672	539	455	387
Others	90	87	80	79	106	188	327	492	609	676	704	686	673	660	631	559	438	313	220	162	125	101	82	73
Fri	924	862	804	702	762	1,003	1,414	1,886	2,271	2,511	2,643	2,674	2,576	2,457	2,347	2,193	1,968	1,738	1,517	1,320	1,165	1,019	896	801
GPS	413	383	351	306	357	549	924	1,440	1,847	2,084	2,188	2,170	2,032	1,874	1,726	1,505	1,253	1,030	847	708	600	494	423	364
Engine Data	677	641	617	576	573	611	743	852	861	898	902	895	869	838	820	780	728	679	619	571	531	489	450	442
Debug Data	354	358	320	224	218	303	485	746	1,003	1,155	1,215	1,216	1,148	1,065	985	893	777	678	560	485	445	386	351	328
Accelerometer ..	66	62	59	53	56	75	114	174	217	239	245	239	223	205	193	172	149	124	106	92	82	72	64	58
Others																								



Geotab Cloud+Fog Architecture



Questions?

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