

Getting real

During the Hackathon week we developed a prototype of an end to end idea.

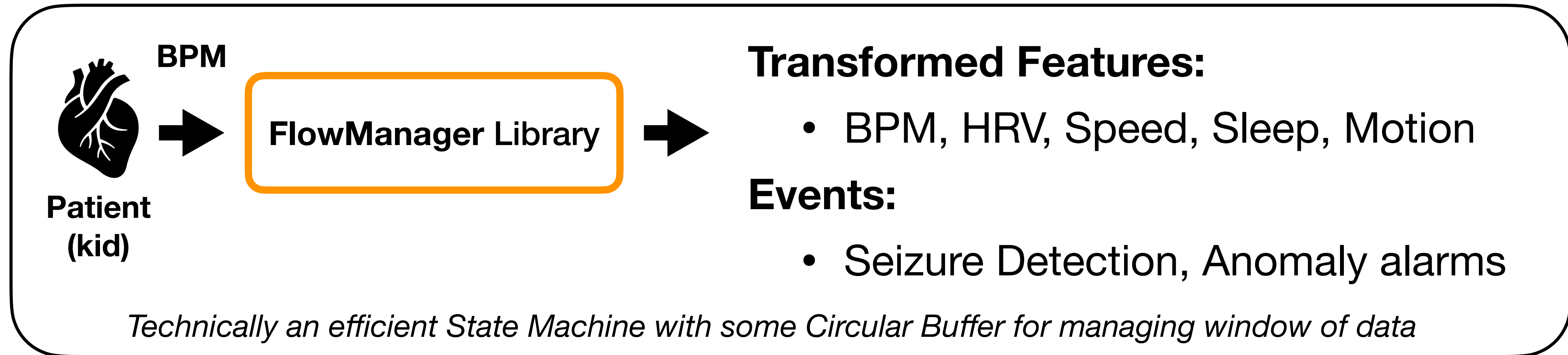
Now we want to seriously ship several real MVP experiences targeting real users on real channels.

Starting from the basic

**Develop first a shared, multi-platform, core library
to manage biometric data flow analysis
and Seizure Detection for both
Real-time and Batch scenarios**

FlowManager

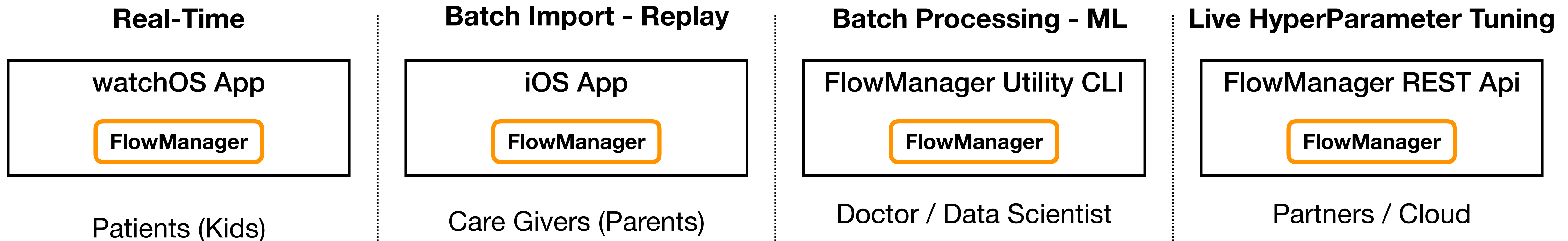
Transform RAW data in features and implement Seizure Detection logic and other anomalies detection



A core library deployed as standalone fully tested package

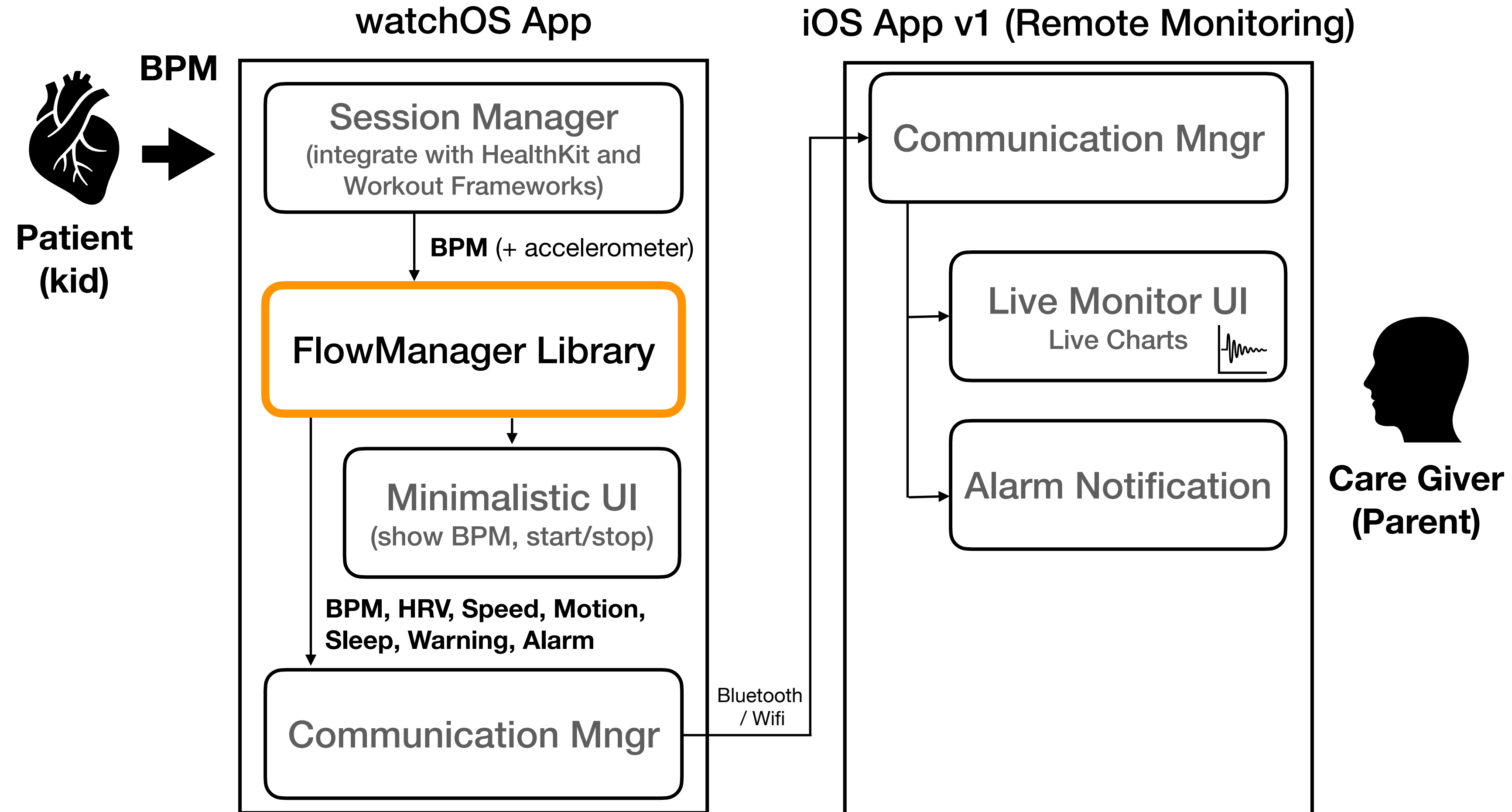
(GitHub Actions CI Pipeline + GitHub Pages for Documentation)

Reused on many platforms and different context (exactly same codebase in all scenarios):

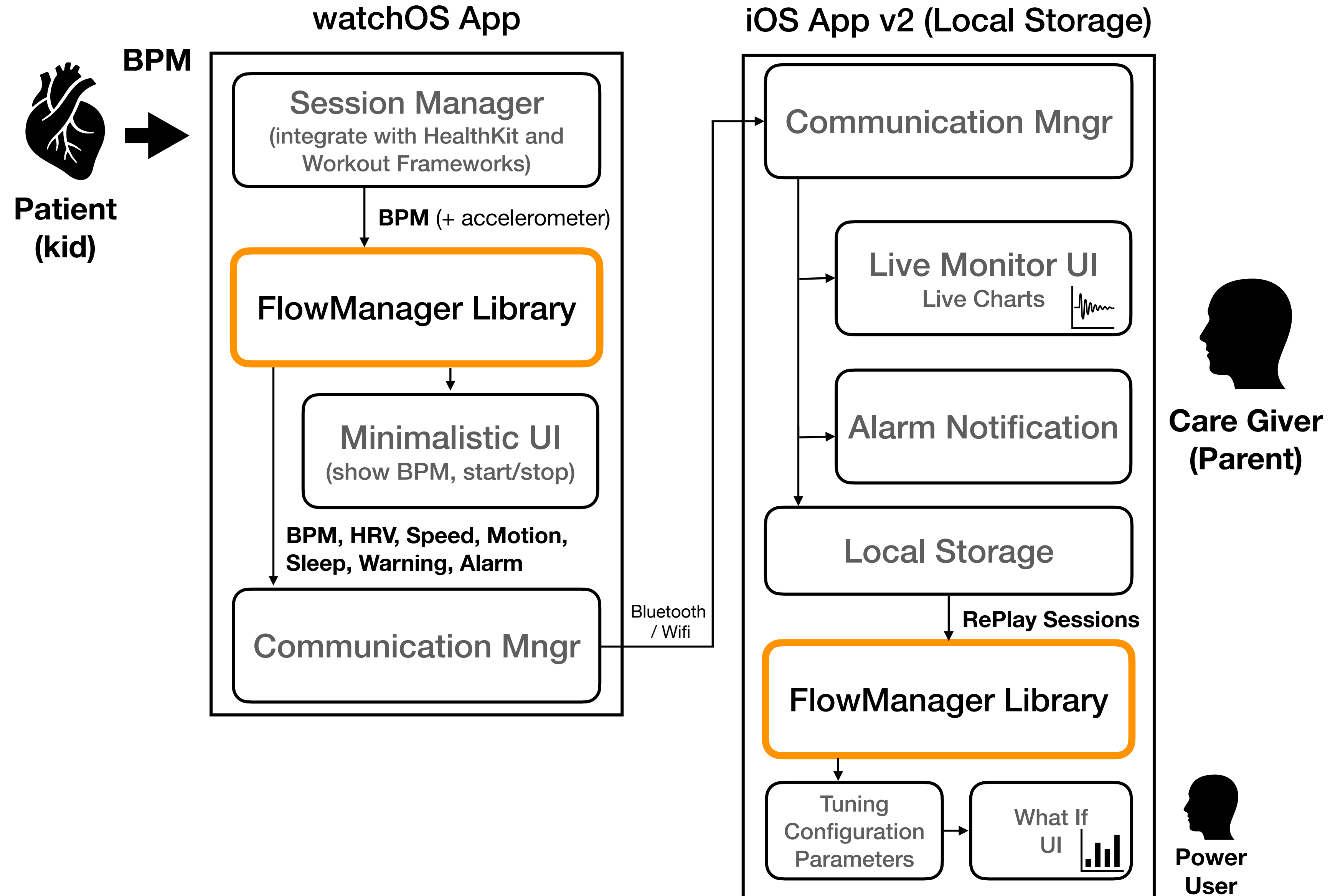


How FlowManager enable different MVP scenarios

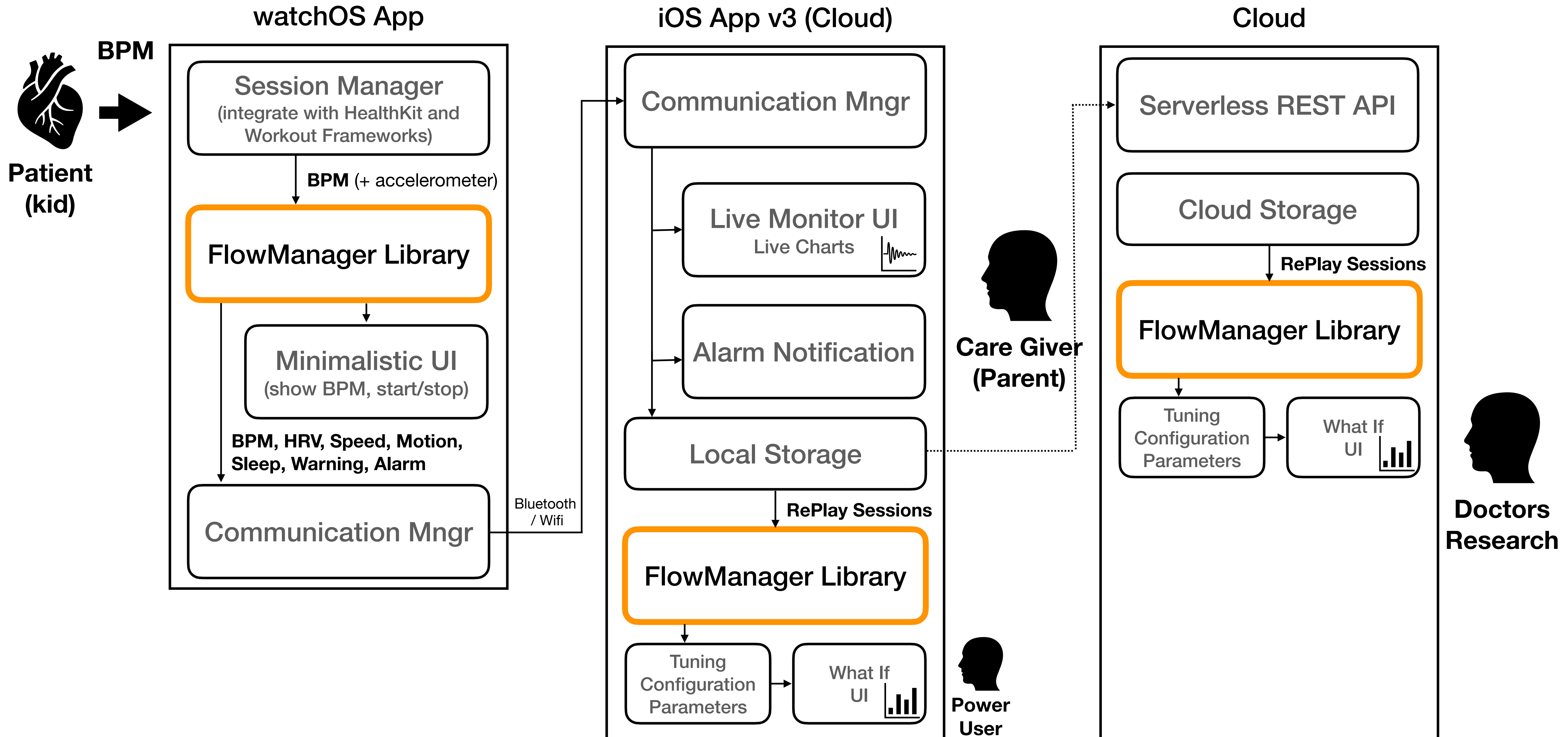
Real-Time scenario MVP 1



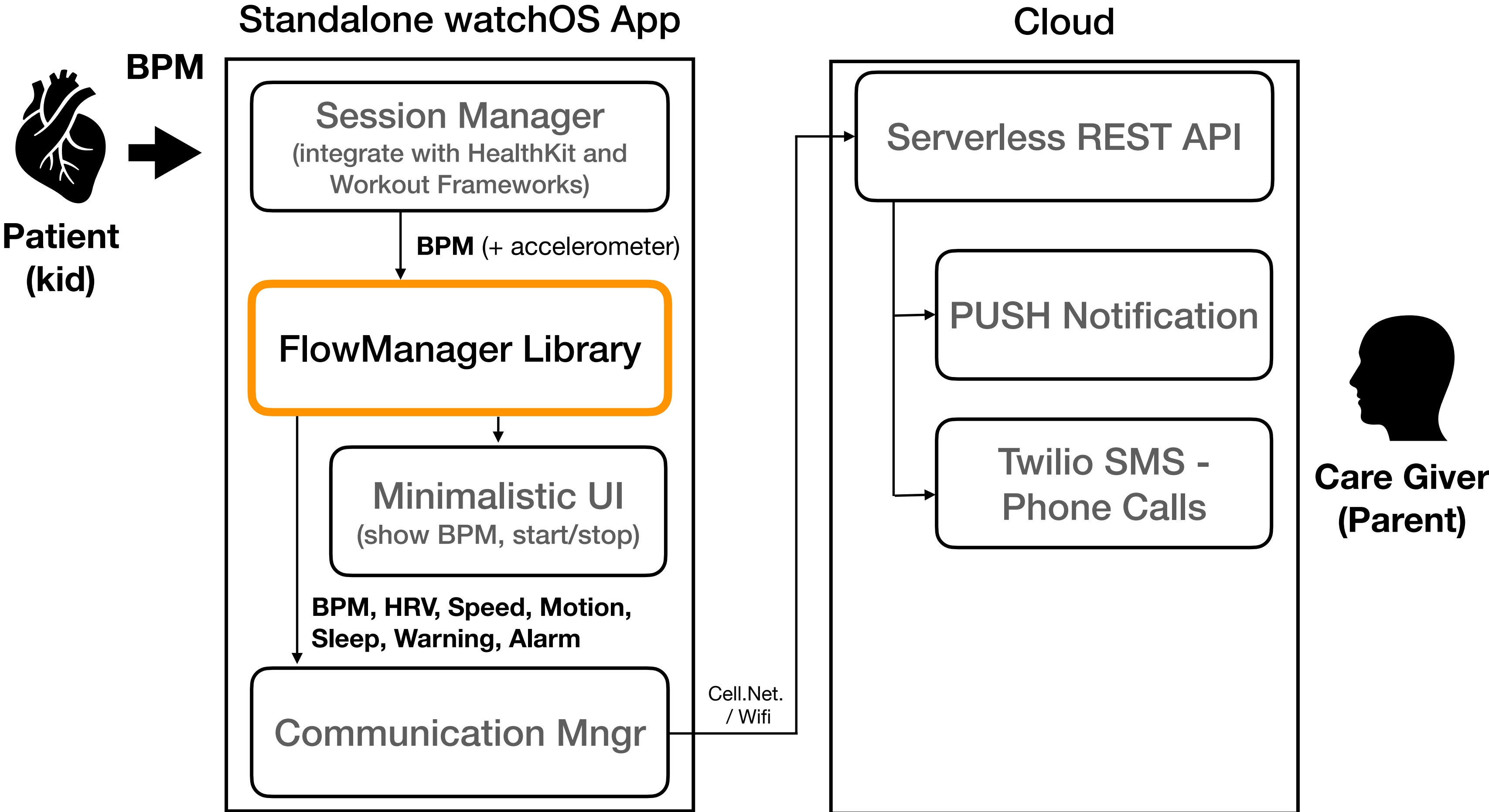
Real-Time + Batch scenario (other possible MVPs)



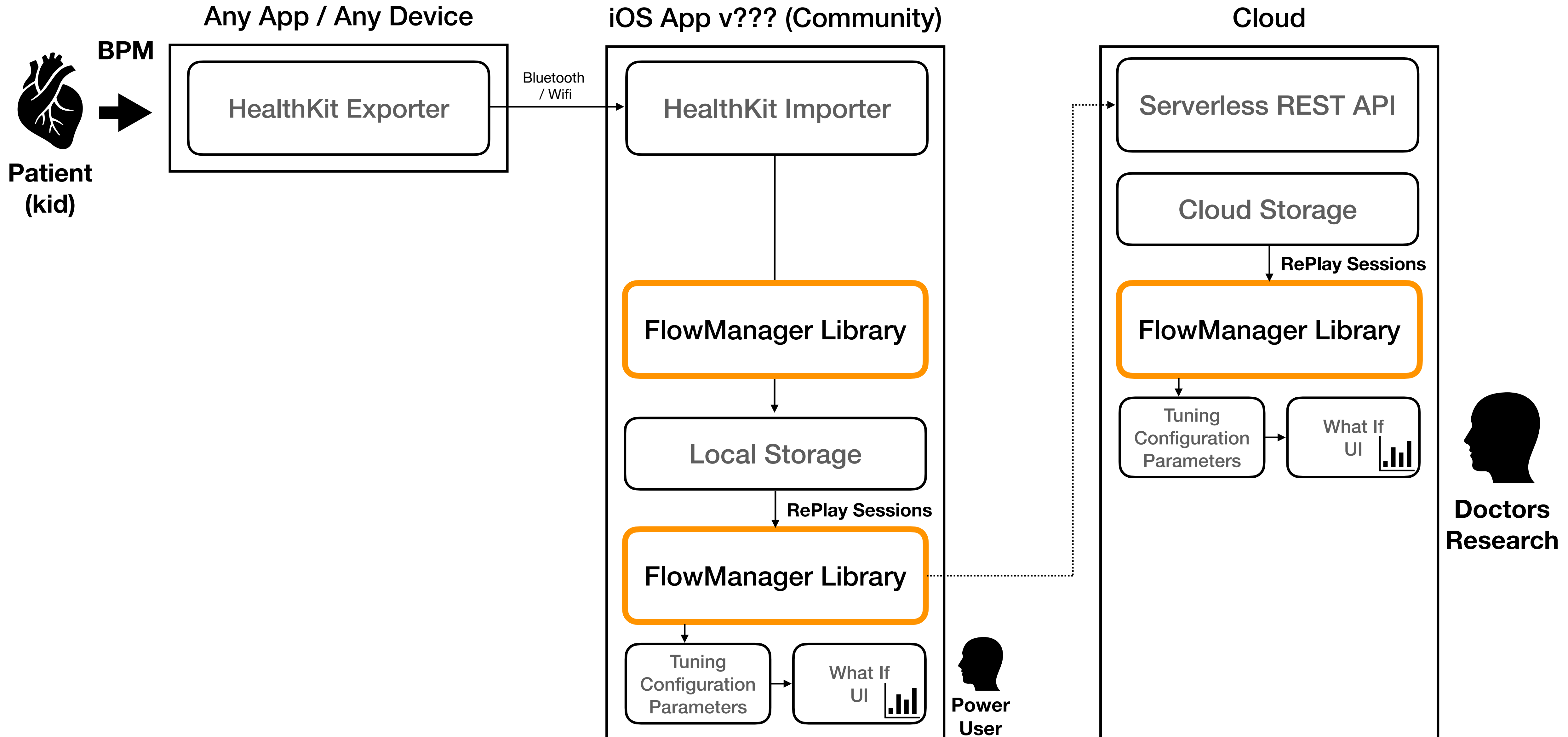
Real-Time + Batch scenario (other possible MVPs)



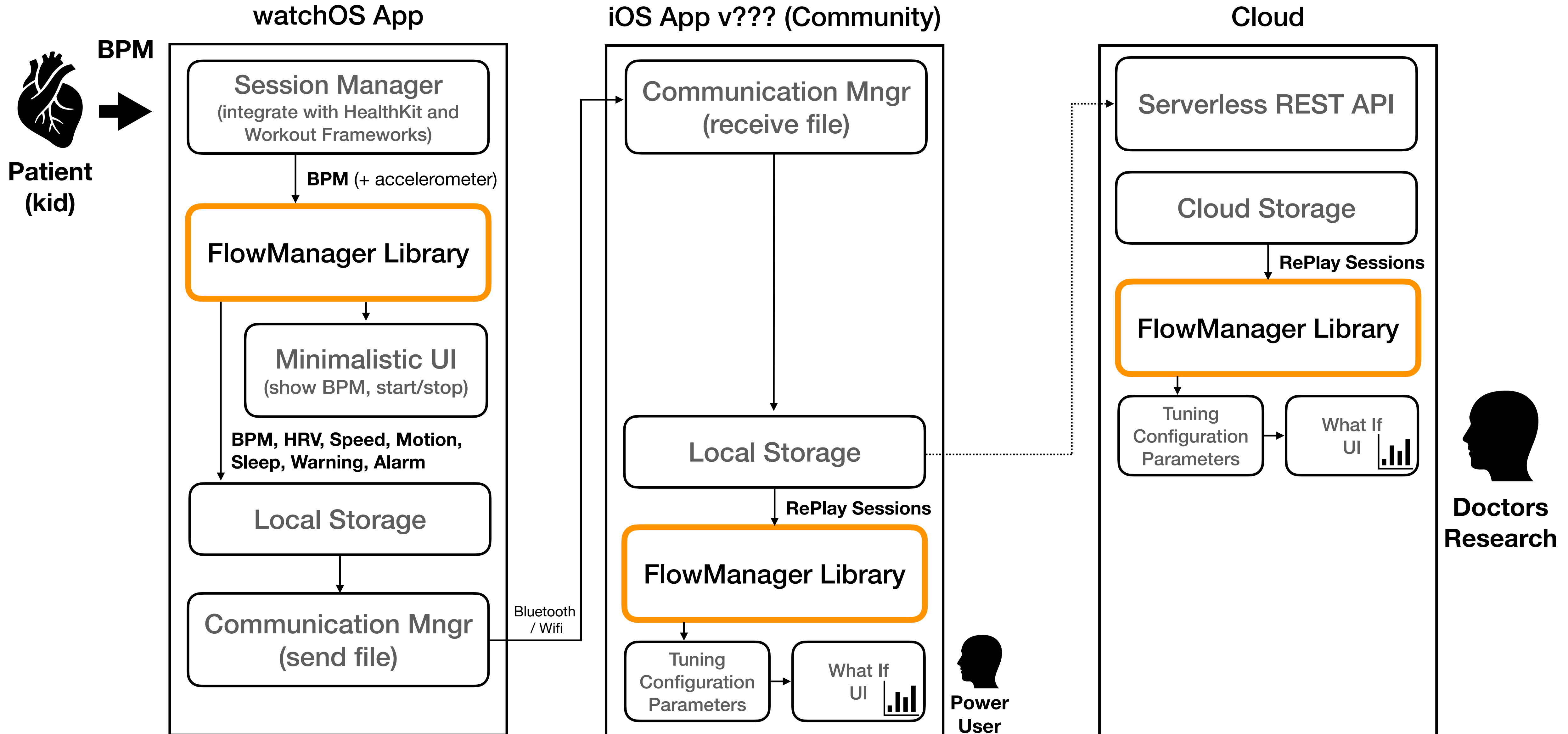
Other Real-Time scenario (other possible MVPs)



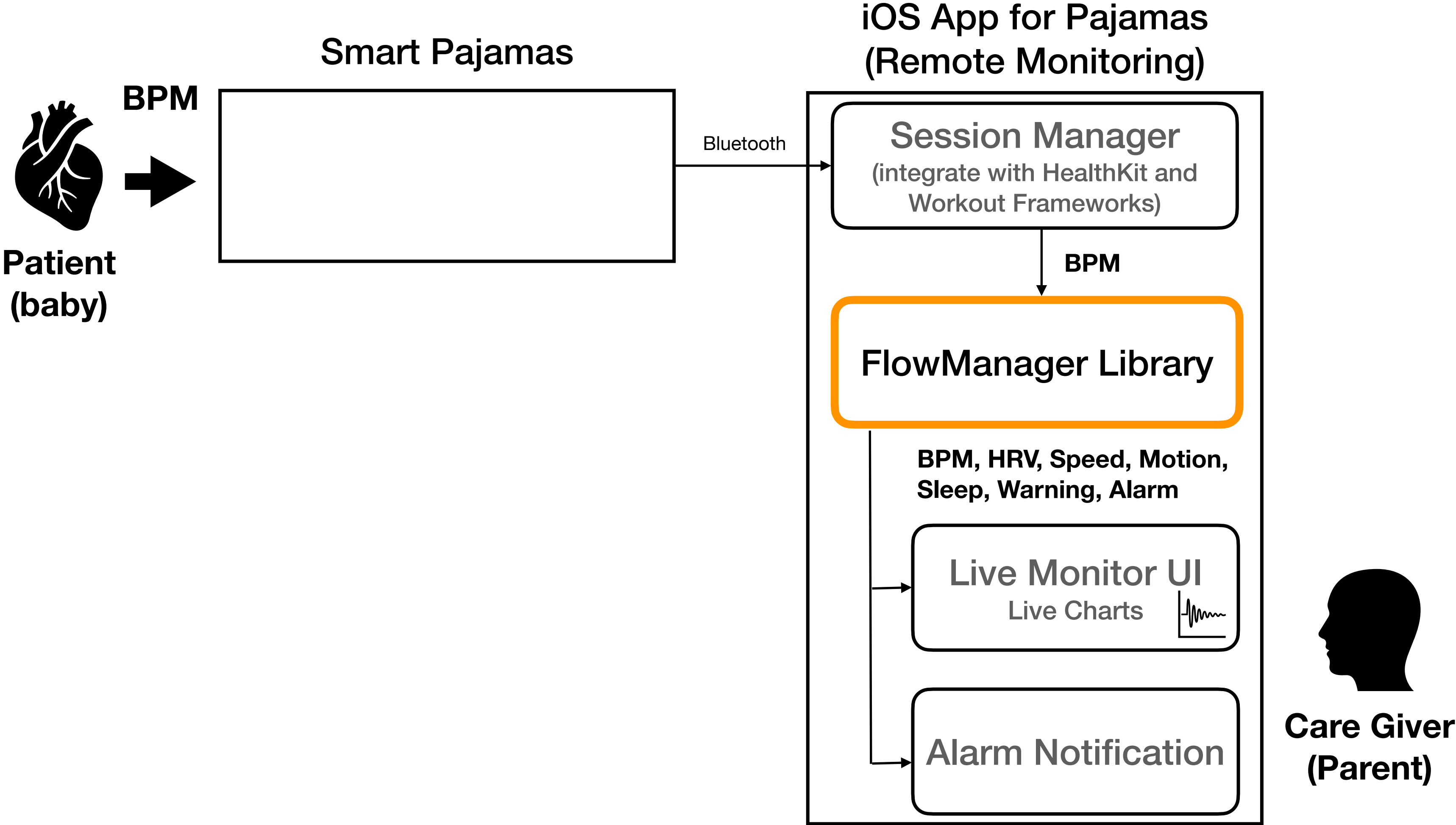
Real-Time + Batch scenario (other possible MVPs)



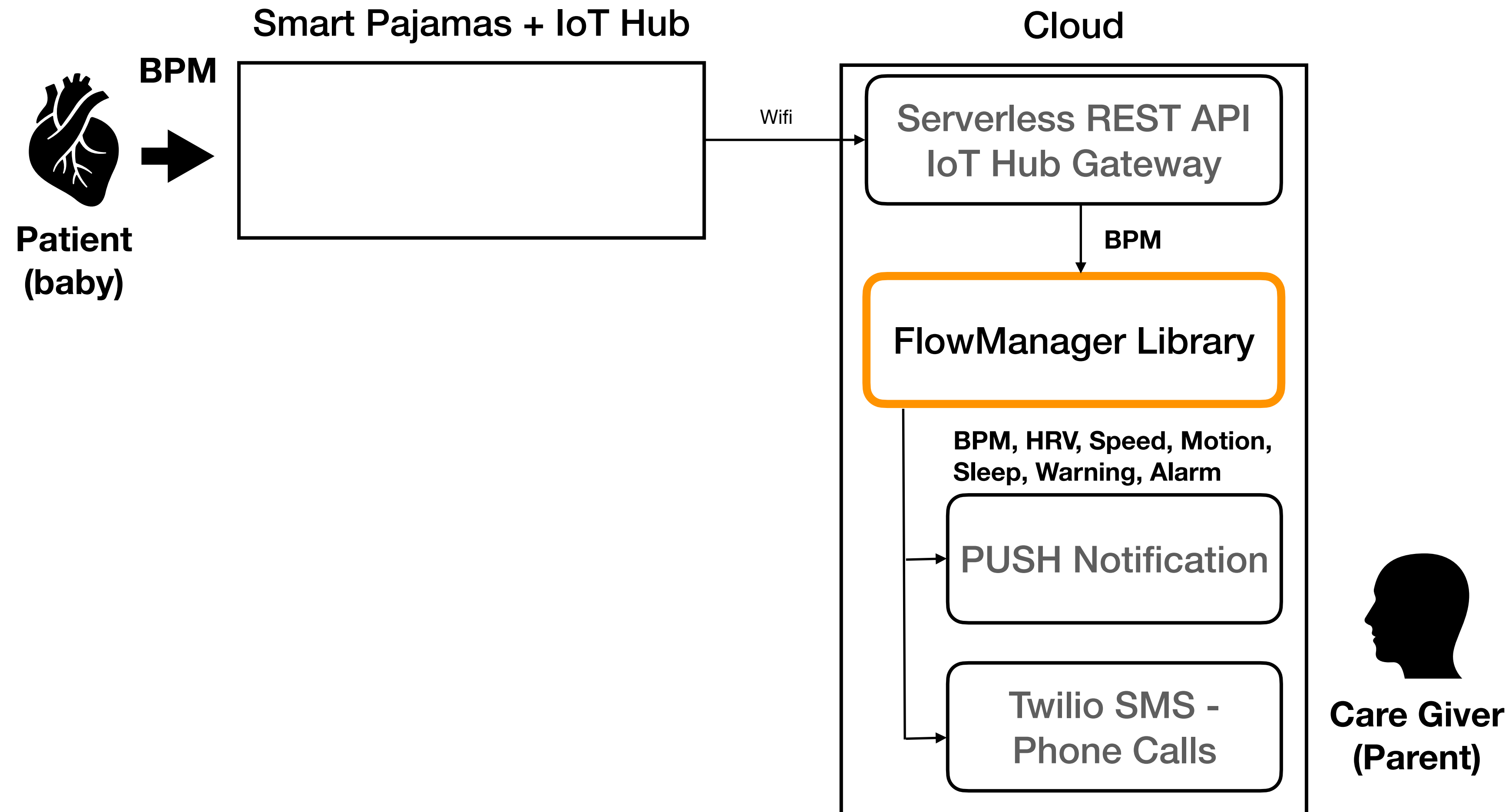
Real-Time + Batch scenario (other possible MVPs)



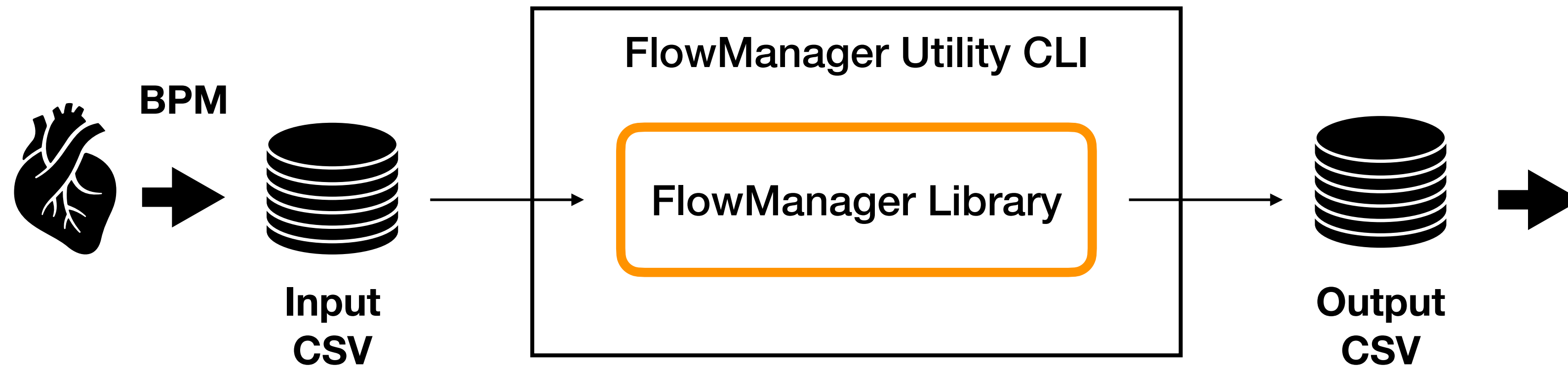
Other Real-Time scenario (other possible MVPs)



Other Real-Time scenario (other possible MVPs)



Batch scenario (Data Analysis, Preliminary ML)



Linux, Windows, macOS shell or Jupiter Notebook

Numerical Features:

- BPM
- HRV
- Speed
- Motion

Categorical Features:

- Sleep
- Seizure Detection
- Anomaly alarms

Preliminary Data Analysis via FlowManager Tool CLI

Counter	TimeSince0	TimeSince19 UTC	BPM	BPMspeed	BPMspeedA/B	BPMLog	HRV	MovementIn	Awake	LigthSleep	DeepSleep	MissingData	Alarm	Warning	BackTook
1	4	1588356922	2020-05-01T	103	-0.0283019	-0.0141509	4.63472899	2.12132034	-1	1	0	0	0	0	0
2	8	1588356926	2020-05-01T	101	-0.0194175	-0.0159065	4.61512052	2.51661148	-1	1	0	0	0	0	0
3	12	1588356930	2020-05-01T	100	-0.009901	-0.0144051	4.60517019	2.64575131	-1	1	0	0	0	0	0
4	16	1588356934	2020-05-01T	100	0	-0.0115241	4.60517019	2.54950976	-1	1	0	0	0	0	0
5	20	1588356938	2020-05-01T	101	0.01	-0.0095241	4.61512052	2.31660671	-1	1	0	0	0	0	0
6	24	1588356942	2020-05-01T	101	0	-0.0038637	4.61512052	2.13808994	-1	1	0	0	0	0	0
7	28	1588356946	2020-05-01T	101	0	1.98E-05	4.61512052	1.99553072	-1	1	0	0	0	0	0
8	32	1588356950	2020-05-01T	102	0.00990099	0.0039802	4.62497281	1.87082869	-1	1	0	0	0	0	0
9	36	1588356954	2020-05-01T	103	0.00980392	0.00594098	4.63472899	1.8135294	-1	1	0	0	0	0	0
10	40	1588356958	2020-05-01T	100	-0.0291262	-0.0018843	4.60517019	1.80403588	-1	1	0	0	0	0	0
11	44	1588356962	2020-05-01T	100	0	-0.0018843	4.60517019	1.78376517	-1	1	0	0	0	0	0
12	48	1588356966	2020-05-01T	101	0.01	0.00011574	4.61512052	1.71344607	-1	1	0	0	0	0	0
13	52	1588356970	2020-05-01T	101	0	-0.0018645	4.61512052	1.65084061	-1	1	0	0	0	0	0
14	56	1588356974	2020-05-01T	99	-0.019802	-0.0077856	4.59511985	1.70991506	-1	1	0	0	0	0	0
15	60	1588356978	2020-05-01T	101	0.02020202	0.00208001	4.61512052	1.65327957	-1	1	0	0	0	0	0
16	64	1588356982	2020-05-01T	102	0.00990099	0.00406021	4.62497281	1.61108294	-1	1	0	0	0	0	0
17	68	1588356986	2020-05-01T	102	0	0.00206021	4.62497281	1.5718105	-1	1	0	0	0	0	0
18	72	1588356990	2020-05-01T	102	0	0.00206021	4.62497281	1.53516291	-1	1	0	0	0	0	0
19	76	1588356994	2020-05-01T	102	0	0.0060206	4.62497281	1.50087694	-1	1	0	0	0	0	0
20	80	1588356998	2020-05-01T	105	0.02941176	0.00786255	4.65396035	1.66046465	-1	1	0	0	0	0	0
21	84	1588357002	2020-05-01T	103	-0.0190476	0.00207283	4.63472899	1.64882222	-1	1	0	0	0	0	0
22	88	1588357006	2020-05-01T	101	-0.0194175	-0.0018107	4.61512052	1.61636884	-1	1	0	0	0	0	0
23	92	1588357010	2020-05-01T	99	-0.019802	-0.0057711	4.59511985	1.66811531	-1	1	0	0	0	0	0
24	96	1588357014	2020-05-01T	99	0	-0.0057711	4.59511985	1.70782513	-1	1	0	0	0	0	0
25	100	1588357018	2020-05-01T	98	-0.010101	-0.0136736	4.58496748	1.8012816	-1	1	0	0	0	0	0
26	104	1588357022	2020-05-01T	97	-0.0102041	-0.0119049	4.57471098	1.94804307	-1	1	0	0	0	0	0
27	108	1588357026	2020-05-01T	98	0.01030928	-0.0059596	4.58496748	2	-1	1	0	0	0	0	0
28	112	1588357030	2020-05-01T	101	0.03061224	0.00412329	4.61512052	1.96396101	-1	1	0	0	0	0	0
29	116	1588357034	2020-05-01T	99	-0.019802	0.00016289	4.59511985	1.96404462	-1	1	0	0	0	0	0
30	120	1588357038	2020-05-01T	101	0.02020202	0.0062235	4.61512052	1.93107024	-1	1	0	0	0	0	0
31	124	1588357042	2020-05-01T	101	0	0.00826431	4.61512052	1.89970286	-1	1	0	0	0	0	0
32	128	1588357046	2020-05-01T	102	0.00990099	0.00818266	4.62497281	1.87891006	-1	1	0	0	0	0	0
33	132	1588357050	2020-05-01T	107	0.04901961	0.01186413	4.67282883	2.11963909	-1	1	0	0	0	0	0
34	136	1588357054	2020-05-01T	100	-0.0654206	0.00274041	4.60517019	2.09721704	-1	1	0	0	0	0	0
35	140	1588357058	2020-05-01T	97	-0.03	-0.0073	4.57471098	2.17781017	-1	1	0	0	0	0	0
36	144	1588357062	2020-05-01T	98	0.01030928	-0.0052381	4.58496748	2.20325994	-1	1	0	0	0	0	0
37	148	1588357066	2020-05-01T	96	-0.0204082	-0.0113	4.56434819	2.3151428	-1	1	0	0	0	0	0
38	152	1588357070	2020-05-01T	98	0.02083333	-0.0169372	4.58496748	2.32773572	-1	1	0	0	0	0	0
39	156	1588357074	2020-05-01T	98	0	-0.0038531	4.58496748	2.33754199	-1	1	0	0	0	0	0
40	160	1588357078	2020-05-01T	101	0.03061224	0.00826934	4.61512052	2.30878492	-1	1	0	0	0	0	0
41	164	1588357082	2020-05-01T	102	0.00990099	0.00818768	4.62497281	2.28983006	-1	1	0	0	0	0	0
42	168	1588357086	2020-05-01T	101	-0.0098039	0.01030853	4.61512052	2.26289831	-1	1	0	0	0	0	0
43	172	1588357090	2020-05-01T	98	-0.029703	0.00020127	4.58496748	2.27310779	-1	1	0	0	0	0	0
44	176	1588357094	2020-05-01T	97	-0.0102041	-0.0018395	4.57471098	2.31158698	-1	1	0	0	0	0	0
45	180	1588357098	2020-05-01T	105	0.08247423	0.00853285	4.65396035	2.37783647	-1	1	0	0	0	0	0
46	184	1588357102	2020-05-01T	106	0.00952381	0.00845741	4.66343909	2.47783887	-1	1	0	0	0	0	0
47	188	1588357106	2020-05-01T	115	0.08490566	0.02739933	4.74493213	3.19844543	-1	0	0	0	1	0	0
48	192	1588357110	2020-05-01T	114	-0.0086957	0.03160079	4.73619845	3.6650816	-1	0	0	0	0	0	0
49	196	1588357114	2020-05-01T	114	0	0.03364161	4.73619845	4.04611176	-1	0	0	0	0	0	0
50	200	1588357118	2020-05-01T	107	-0.0614035	0.00486606	4.67282883	4.07080196	-1	0	0	0	0	0	0
51	204	1588357122	2020-05-01T	113	0.05607477	0.01417625	4.72738782	4.37525509	-1	0	0	0	0	0	1
52	208	1588357126	2020-05-01T	112	-0.0088496	-0.0045748	4.71849887	4.60474467	-1	0	0	0	0	0	0
53	212	1588357130	2020-05-01T	111	-0.0089286	-0.0046214	4.7095302	4.76620758	-1	0	0	0	0	0	0
54	216	1588357134	2020-05-01T	107	-0.036036	-0.0118286	4.67282883	4.80174288	-1	0	0	0	0	0	0
55	220	1588357138	2020-05-01T	104	-0.0280374	-0.0051554	4.6443909	4.80289029	-1	1	0	0	0	0	0
56	224	1588357142	2020-05-01T	104	0	-0.0163703	4.6443909	4.80327269	-1	1	0	0	0	0	0
57	228	1588357146	2020-05-01T	115	0.10576923	0.00655345	4.74493213	5.11217035	-1	1	0	0	0	1	0
58	232	1588357150	2020-05-01T	115	0	0.00833916	4.74493213	5.39447942	-1	1	0	0	0	0	0
59	236	1588357154	2020-05-01T	114	-0.0086957	0.01380724	4.73619845	5.61270425	-1	0	0	0	0	0	0
60	240	1588357158	2020-05-01T	112	-0.0175439	0.01590594	4.71849887	5.72588109	-1	0	0	0	0	0	0
61	244	1588357162	2020-05-01T	112	0	0.01590594	4.71849887	5.82768544	-1	0	0	0	0	0	0
62	248	1588357166	2020-05-01T	115	0.02678571	0.00010924	4.74493213	6.02542233	-1	0	0	0	0	0	0
63	252	1588357170	2020-05-01T	115	0	0.00010924	4.74493213	6.20483682	-1	0	0	0	0	1	0
64	256	1588357174	2020-05-01T	115	0	0.00184837	4.74493213	6.33709519	-1	0	0	0	0	1	0
65	260	1588357178	2020-05-01T	111	-0.0347826	-0.0015994	4.7095302	6.37818348	-1	0	0	0	0	1	0
66	264	1588357182	2020-05-01T	114	0.02702703	0.00380603	4.73619845	6.49461315	-1	0	0	0	0	1	0
67	268	1588357186	2020-05-01T	108	-0.0526316	-0.0120774	4.68213123	6.49235029	-1	0	0	0	0	0	0
68	272	1588357190	2020-05-01T	107	-0.0092593	-0.0139293	4.67282883	6.48086666	-1	1	0	0	0	0	0
69	276	1588357194	2020-05-01T	108	0.00934579	-0.0120601	4.68213123	6.47443954	-1	1	0	0	0	0	0
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71	284	1588357202	2020-05-01T	114	0.00884956	0.00052016	4.73619845	6.65870613	-1	0	0	0	0	0	0
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74	296	1588357214	2020-05-01T	111	-0.0089286	0.00573468	4.7095302	6.60318414	-1	0	0	0	0	0	0
75	300	1588357218	2020-05-01T	105	-0.0540541	-0.0143354	4.65396035	6.49257032	-1	0	0	0	0	0	0
76	304	1588357222	2020-05-01T	104	-0.0095238	-0.0180101	4.6443909	6.35446171	-1	1	0	0	0	0	0
77	308	1588357226	2020-05-01T	101	-0.0288462	-0.0202705	4.61512052	6.28363602	-1	1	0	0	0	0	0
78	312	1588357230	2020-05-01T	104	0.02970297	0.0143299	4.6443909	6.24091176	-1	1	0	0	0	0	0
79	316	1588357234	2020-0												

FlowManager

A Pure Swift Package Manager Library (with no Apple dependencies)

Why Swift ?

- Fully open source
- Very Efficient (LLVM)
- Very Modern (functional programming)
- Multi platforms (iOS, watchOS, Cloud, Machine Learning)
- We started on iOS and watchOS where we're also using other Swift frameworks

Swift Package Manager

- Like NPM for Javascript or NuGet for .Net

Fully Tested

- Unit testing covering several edge cases
- Fully automated CI Pipeline (GitHub Actions) with gates

DEMO

Fully Documented

- Swift Doc (very similar to JavaDoc)
- Expose Web Page for Documentation (GitHub Pages)
- Fully automated CI Pipeline (GitHub Actions)

DEMO