

# Bitflate: A Cryptocurrency with Constant Inflation

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## Abstract

Bitcoin is a groundbreaking invention. It pioneered a new form of digital native money. It overcame the challenges that failed previous attempts. In the Bitcoin whitepaper, Satoshi Nakamoto presented Bitcoin as an electronic cash system. However, it has evolved into digital gold. The search for digital cash remains elusive. It is a contentious issue in the Bitcoin community. Bitcoin with a block size of 1MB, originally coded by Satoshi Nakamoto, is more suitable to be digital gold. The big-block hard fork, Bitcoin Cash, has not proved to be the answer for digital cash. In this paper, we present Bitflate, a cryptocurrency with constant inflation. We believe Bitflate is a component of digital cash. What humans perceive as money is a fluid concept. Money changes over time. It cannot be defined precisely. We present an elastic money system built on top of Bitcoin and Bitflate. This elasticity allows us to create hybrid currencies. These hybrid currencies can be used as digital cash.

## 1 Background

Humans discovered gold more than 40,000 years ago. The shiny metal has been used as money since at least 5,000 years ago. Paper money was invented in the 7th century. The Gold Standard continued to be the base money. Gold can bring long-term price stability. But in the short-term, it can be volatile, especially during an economic crisis [1]. Gold's supply is limited. It has a stock-to-flow ratio of 60. That means its supply doubles every 60 years. This stock-to-flow ratio translates roughly to a 1.2% inflation rate [7]. Gold served as a standard instrument to measure progress across economies. Without a standard, it is hard to assess values. As human civilization progresses, money has evolved to include three functions:

- A Store of Value: This property allows people to retain the purchasing power of their money.
- A Medium of Exchange: This property encourages people to spend. Consumption facilitates commerce and economic development.
- A Unit of Account: This property allows people to assess values across different goods and assets.

These functions are necessary to facilitate economic development. But sometimes, they are conflicting with each other. For example, if money is used as a Store of Value, people will be hoarding it. They are hesitant to use it for spending. It does not work well as a Medium of Exchange. Gold is an example of this form of money. Given its low supply inflation, people often use it as a Store of Value. Gold is scarce but ubiquitous. People and cultures are familiar with it. So it was used as a Medium of Exchange and a Unit of Account. Gold was the de facto money throughout history. The Gold Standard tried to fit three money functions into gold. This standard showed problems during economic crises like the Great Depression. Because of scarcity, governments were unable to stimulate economic development. The lack of stimulus prolongs recession.

With improved technology and communication, the world has moved to the US Dollar system. Under this system, the US Dollar is the reserve currency. It is managed by the Federal Reserve. It is the Medium of Exchange and Unit of Account for commerce. It also serves as a Store of Value for countries without stable currencies. The US Dollar has replaced gold. It performs the three functions of money. After a few decades, the US Dollar system began to show problems. Its dual functions as a Store of Value and a Medium of Exchange are conflicting. They create a trade imbalance between the US and other countries. As the world demands more dollars, economies flood the US with goods to access the reserve currency. Manufacturing has become cheaper outside the US. Outsourcing, technology, and automation increase wealth inequality and political turmoil.

In 2008, Satoshi Nakamoto, an anonymous programmer, released Bitcoin. It uses a peer-to-peer network of computers to enable decentralization. Bitcoin has no central authority. Each node can verify transactions and balances. Bitcoin's monetary policy resembles gold. It is scarce. The eventual supply of bitcoins is 21 million. After the third halving in May 2020, Bitcoin's supply increases at 1.79% per year [2]. The rate will continue to decrease until 2140. At that point, the block reward will be 0. Bitcoin's supply will stop increasing. Scarcity makes Bitcoin a deflationary and valuable asset. By early 2021, Bitcoin's market capitalization has grown to 1 trillion dollars. Bitcoin's supporters laud it as the final form of money. It will enable the Bitcoin Standard. Money will be pegged to Bitcoin. The Bitcoin Standard is similar to the Gold Standard. Bitcoin will perform the three functions of money: a Store of Value, a Medium of Exchange, and a Unit of Account. Like gold, this system has shown similar problems. Bitcoin's price has been volatile. Because Bitcoin is scarce, users prefer to hold. Its usage as payment has not gained adoption. It is probably impossible to reconcile three functions of money into one monetary system. The Gold Standard and the Dollar are examples. During an economic crisis, the functions will conflict with each other.

## 2 Motivation & Design

Bitcoin is an important breakthrough [4]. It has successfully created digital gold, a new Store of Value. But it is futile to fit other money functions into one deflationary monetary policy. The Gold Standard and the US Dollar system were not flexible to perform all three functions. Fortunately, Bitcoin is a digital system. We can expand the system to accommodate new scenarios. Teams have created forks to address the payment scenario. Bitcoin Cash is a hard fork to increase block size. A larger block size can accommodate more transactions. But volatility is an inherent property of Bitcoin's supply. More transactions do not reduce price volatility.

To prevent hoarding, another approach is demurrage [6]. Freicoin is a demurrage cur-

rency [5]. Demurrage and inflation are different. Demurrage imposes tax at the individual level. It requires individual actions. Inflation imposes tax at the group level. It requires no individual actions, but group actions. Demurrage requires people to make a choice: spending or not spending and get taxed. Demurrage makes more sense from the view of individualism. Inflation makes more sense from the view of collectivism.

We have identified inflation as the key to unlock the transaction use-case. Inflation discourages hoarding. It encourages people to spend. Some have proposed a dynamically adjusted inflation rate. Supply responds to price demand. This design relies on external information. Nodes have to query exchanges for price information. A constant inflation rate adheres to the same principles of Bitcoin. The system can be decentralized and free of monetary manipulation.

We have designed and implemented Bitflate, a cryptocurrency with 7% supply inflation. Bitflate is a software fork of Bitcoin. We want to introduce inflation and retain the decentralization properties. We picked 7% per year as the inflation rate. With a 7% inflation rate, Bitflate's supply doubles about every 10 years (Rule of 72 [3]). Bitflate's most prominent feature is inflation. If it has a low rate of 1%, it would behave like a Store of Value. If the inflation rate is too high, people don't have incentives to hold Bitflate coins. Hyperinflation can be volatile. A high rate can hinder the adoption of the system. A moderately high rate strikes the balance. It will allow us to build a more flexible monetary system.

To bootstrap Bitflate, the system gives more block rewards to early adopters. The rewards halve 3 times before 7% inflation starts. The table in Figure 1 shows block reward for the first 10 eras.

era	reward
0	50
1	25
2	12.5
3	6.25 (end of halving)
4	6.56 (7% inflation)
5	7.02
6	7.51
7	8.04
8	8.60
9	9.20
10	9.85

Figure 1: Bitflate Block Reward

At a 7% growth rate, Bitflate's supply will reach 31 million in 10 years, 122 million in 30 years, and 14 billion in 100 years. This is an exponential growth rate. Some altcoins, like Grin, Dogecoin, have unlimited supply. But they have a constant tail emission. Their supply curves are asymptotic. Growth rates decrease and approach 0. With an inflationary supply, Bitflate does not have the fair distribution problem like other altcoins. Inflation encourages people to spend their Bitflate coins.

### 3 Software

Bitflate Core is a software fork of Bitcoin Core. We intend to keep Bitflate updated with the Bitcoin technology stack. The table in Figure 2 shows the prominent differences between the Bitflate Core software and the Bitcoin Core software.

Feature	Bitflate	Bitcoin
Reward	Inflationary 7% per year	Deflationary
Supply	Unlimited	21 million
Block time	2.5 minutes	10 minutes
Reward change	Every 210,000 blocks (1 year)	Every 210,000 blocks (4 years)
Proof of Work Target	3.5 days	14 days
Port	7333	8333

Figure 2: Differences between the Bitflate and Bitcoin software

The most important code change in the Bitflate software is the block subsidy calculation. The code is below.

```
CAmount GetBlockSubsidy(int nHeight, const Consensus::Params& consensusParams)
{
    int halvings = nHeight / consensusParams.nSubsidyHalvingInterval;
    CAmount nSubsidy = 0;
    // Inflation starts at halving 4.
    // At that point, we'd have 19,687,500 (~ 19 million) coins.
    // Those are our base coins.
    // See bitcoin supply schedule
    // After halving 3, we calculate the inflate coin number.
    if (halvings > 3) {
        // calculate coin inflation for this halving
        CAmount inflateCoins =
            round(19687500 * (pow(1.07, halvings - 3) - pow(1.07, halvings - 4)));
        // subsidy is inflateCoins / 210000 * COIN
        nSubsidy = ((int)round((inflateCoins / 210000.0) * 100)) * (COIN / 100);
    } else {
        nSubsidy = 50 * COIN;
        // Subsidy is cut in half every 210,000 blocks
        // which will occur approximately every 4 years.
        nSubsidy >>= halvings;
    }
    return nSubsidy;
}
```

Bitflate has the same block size as Bitcoin with SegWit enabled. With a smaller block time of 2.5 minutes, the Bitflate network produces blocks 4 times faster than the Bitcoin network. This change increases the transaction throughput. But it is not a significant improvement. It is not exponential scaling. We expect Bitflate will need off-chain scaling for transactions.

## 4 Elastic Monetary System

A monetary system comes with tradeoffs. If it is scarce, it is more like a Store of Value. Scarcity prevents it from being a Medium of Exchange. Crypto money systems are programmable and more flexible. We can design a system to accommodate all three functions of money. We present an elastic monetary system built on top of Bitcoin and Bitflate. The base blockchains are the anchors of the system. Bitcoin is the Store of Value anchor. Bitflate is the Medium of Exchange anchor.

By mixing Bitcoin and Bitflate, we can create hybrid cryptocurrencies that have inflation rates between 0% and 7%. For example, in 2030, a financial provider wants to issue a coin that inflates at 3% per year. Let's call this coin Bit3. For simplicity, let's assume the Bitcoin supply is 21 million. It no longer inflates. Bitflate supply is 30 million. It inflates at 7% per year. In 2031, Bitflate supply will reach 33 million. At the time of this Bit3 issuance, 1 Bitcoin is equivalent to 1.4 Bitflate (30 million/21 million). If we mix ratio 1/1.4, we'd get a coin that has a supply inflation of 3.5%. To lower the inflation rate, we need to mix fewer Bitflate coins. In this case, the mix ratio is 1 Bitcoin and 1.2 Bitflate. This mixed cryptocurrency has a supply inflation of 3% per year.

If a hybrid cryptocurrency has more Bitcoin than Bitflate, it retains more value over time. It is more volatile. If a hybrid cryptocurrency has more Bitflate than Bitcoin, it devalues over time. Its value is more stable. It is more suitable for transactions. If a central bank wants to target 2% inflation, they can peg their fiat currency with a 2% hybrid cryptocurrency. The fiat currency can continue to be used as the Unit of Account. It is exchangeable for the underlying Bitcoin and Bitflate. During an economic crisis, the central bank can devalue their fiat currency by moving the peg higher. This elastic money system is flexible and transparent. It is decentralized. It allows the free market to generate and price currencies. Digital cash is not a coin. It is an amalgamation of coins with different money properties.

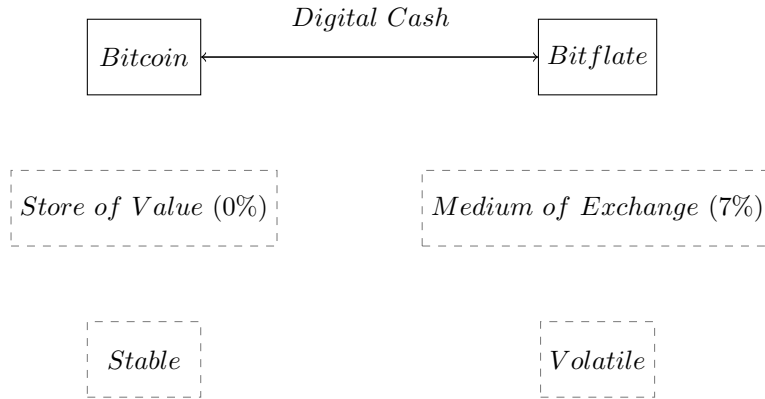


Figure 3: Elastic Monetary System

## 5 Conclusion

We discussed the history of monetary systems based on gold and the US dollar. Bitcoin creates a new form of digital money. However, its deflationary supply has the same problem with volatility as gold. Bitcoin, by itself, cannot fulfill all three functions of money: a Store of Value, a Medium of Exchange, and a Unit of Account.

We have proposed Bitflate, an inflationary cryptocurrency and an elastic monetary system. This elastic monetary system is flexible and transparent. It allows the free market to create hybrid currencies. They are redeemable into Bitcoin and Bitflate. The base coins can be remixed to serve a new function.

## References

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- [6] Demurrage (currency)  
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- [7] Gold's Stock-To-Flow Ratio And Why It Matters  
<https://seekingalpha.com/article/4357409-golds-stock-to-flow-ratio-and-why-matters>

## A Source Code

<https://github.com/bitflate/bitflate>

## B Bitflate Supply for 100 Eras (Years)

Spreadsheet: <https://docs.google.com/spreadsheets/d/1tdRWdqc0I9uMASXp-zY8TnVhoiTJUd-NIEnQrAl3Lg/edit?usp=sharing>

Era	Reward	Issued Coins	Total Coins	Supply Increase Rate
0	50	10500000	10500000	N/A
1	25	5250000	15750000	50
2	12.5	2625000	18375000	16.66666667
3	(end of halving) 6.25	1312500	19687500	7.142857143
4	(7% inflation) 6.56	1378125	21065100	6.997333333
5	7.02	1474594	22539300	6.998305254
6	7.51	1577815	24116400	6.997111712
7	8.04	1688262	25804800	7.001044932
8	8.60	1806441	27610800	6.998697917
9	9.20	1932892	29542800	6.997261941
10	9.85	2068194	31611300	7.001705999
11	10.54	2212968	33824700	7.001926526
12	11.28	2367875	36193500	7.003166325
13	12.06	2533627	38726100	6.997389034
14	12.91	2710980	41437200	7.000704951
15	13.81	2900749	44337300	6.998783702
16	14.78	3103802	47441100	7.000426278
17	15.81	3321068	50761200	6.99836218
18	16.92	3553542	54314400	6.999834519
19	18.11	3802290	58117500	7.002010517
20	19.37	4068451	62185200	6.999096658
21	20.73	4353242	66538500	7.000540321
22	22.18	4657969	71196300	7.000157803
23	23.73	4984027	76179600	6.999380586
24	25.39	5332909	81511500	6.999117874
25	27.17	5706213	87217200	6.999871184
26	29.07	6105647	93321900	6.999422132
27	31.11	6533043	99855000	7.000607574
28	33.29	6990356	106845900	7.001051525
29	35.62	7479681	114326100	7.00092376
30	38.11	8003258	122329200	7.000238791
31	40.78	8563486	130893000	7.000618005
32	43.63	9162930	140055300	6.999839564
33	46.69	9804335	149860200	7.00073471
34	49.96	10490639	160351800	7.000924862
35	53.45	11224984	171576300	6.999921423
36	57.19	12010733	183586200	6.999742971
37	61.2	12851484	196438200	7.000526183
38	65.48	13751088	210189000	7.000064142
39	70.07	14713664	224903700	7.000699371
40	74.97	15743620	240647400	7.000196084
41	80.22	16845674	257493600	7.000366511
42	85.83	18024871	275517900	6.999902133
43	91.84	19286612	294804300	7.000053354
44	98.27	20636675	315441000	7.000135344
45	105.15	22081242	337522500	7.00019972
46	112.51	23626929	361149600	7.000155545
47	120.38	25280814	386429400	6.999813928
48	128.81	27050471	413479500	7.000010869
49	137.83	28944004	442423800	7.00017776
50	147.48	30970084	473394600	7.000256315

Era	Reward	Issued Coins	Total Coins	Supply Increase Rate
51	157.8	33137990	506532600	7.000079849
52	168.85	35457649	541991100	7.000240458
53	180.67	37939685	579931800	7.0002441
54	193.31	40595463	620526900	6.999978273
55	206.84	43437145	663963300	6.999922163
56	221.32	46477745	710440500	6.999965209
57	236.82	49731187	760172700	7.000192134
58	253.39	53212370	813384600	6.999975137
59	271.13	56937236	870321900	7.000046472
60	290.11	60922843	931245000	7.000065148
61	310.42	65187442	996433200	7.000112752
62	332.15	69750563	1066184700	7.000118021
63	355.4	74633102	1140818700	7.000100452
64	380.27	79857419	1220675400	6.999946617
65	406.89	85447439	1306122300	6.999969034
66	435.38	91428760	1397552100	7.000094861
67	465.85	97828773	1495380600	6.999989482
68	498.46	104676787	1600057200	6.999997191
69	533.35	112004162	1712060700	6.999968501
70	570.69	119844453	1831905600	7.000038024
71	610.64	128233565	1960140000	7.000055025
72	653.38	137209915	2097349800	7
73	699.12	146814609	2244165000	7.000034043
74	748.06	157091631	2401257600	7.000046788
75	800.42	168088045	2569345800	7.000006996
76	856.45	179854208	2749200300	7.000011443
77	916.4	192444003	2941644300	6.999999236
78	980.55	205915083	3147559800	7.000013564
79	1049.19	220329139	3367889700	7.000022684
80	1122.63	235752179	3603642000	7.000000624
81	1201.21	252254831	3855896100	6.99997669
82	1285.3	269912670	4125809100	7.00000708
83	1375.27	288806556	4414615800	7.000001527
84	1471.54	309023015	4723639200	7.00000666
85	1574.55	330654626	5054294700	7.000016005
86	1684.76	353800450	5408094300	6.999979641
87	1802.7	378566482	5786661300	7.000007378
88	1928.89	405066136	6191728200	7.000010524
89	2063.91	433420765	6625149300	7.000002035
90	2208.38	463760219	7088909100	6.999990174
91	2362.97	496223434	7585132800	7.000000889
92	2528.38	530959074	8116092600	7.000006645
93	2705.36	568126209	8684218200	6.999989133
94	2894.74	607895044	9292113600	7.000001451
95	3097.37	650447697	9942561300	6.999997288
96	3314.19	695979036	10638541200	7.000006125
97	3546.18	744697569	11383239000	6.99999921
98	3794.41	796826398	12180065100	6.999994466
99	4060.02	852604246	13032669300	6.999997069
100	4344.22	912286543	13944955500	6.999995005
101	4648.32	976146602	14921102700	7.000002259