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The Next Bitcoin Halving

Evaluating a Potential Repricing

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The Takeaway

For investors with a multi-year investment horizon and a high-risk tolerance, the confluence of discounted prices, improving network fundamentals, strong relative investment activity and the upcoming halving may offer an attractive entry point into Bitcoin. This is especially relevant for larger investors building core strategic positions in Bitcoin over time.

A Brief Introduction to the Bitcoin Halving

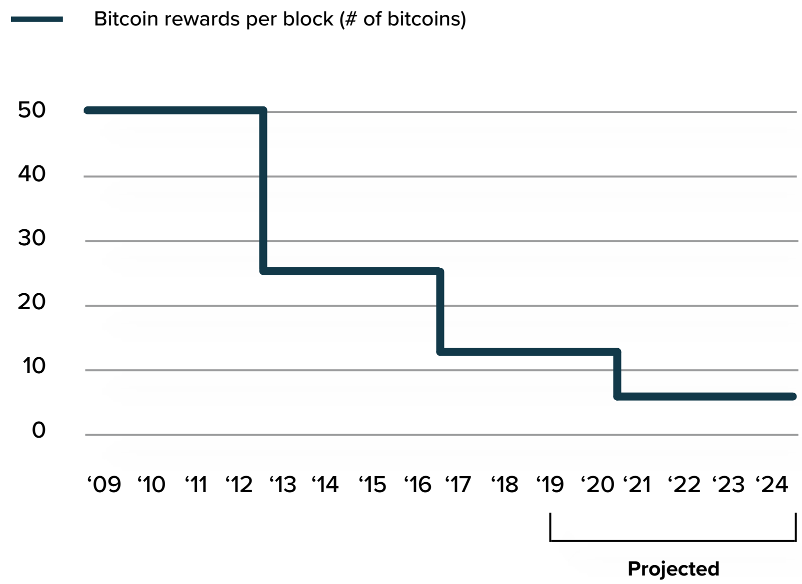
The countdown is on.[1] As recently discussed in our February webinar on *The State of Digital Currencies*, Bitcoin's "block-reward halving" is just a little more than a year away, expected to take place on May 24, 2020. At that time, the block reward for miners on the Bitcoin network will decrease from 12.5 to 6.25 bitcoins, the third such "halving" event in the network's history. As of March 15, 2019, 17.6 million bitcoins have been created, representing approximately 84% of the total supply.

The significance of the Bitcoin halving is multifaceted and rooted in economic theory. As a refresher, miners contribute computational capacity to the Bitcoin network to validate transactions and record them on the blockchain – a decentralized global transaction ledger. For every block of transactions that a miner adds, they receive newly issued (or "mined") bitcoins. The reward for a miner gets reduced by 50% every 210,000 blocks, which occurs roughly every four years.

1. Source: Bitcoin Block Reward Halving Countdown. https://www.bitcoinblockhalf.com/.

FIGURE 1: **BITCOIN'S CONTROLLED SUPPLY**[2]

The amount of bitcoins added to the network in each block of transactions is cut in half every 210,000 blocks (roughly every four years)



The block reward halving is an explicit and calculated design element of Bitcoin, programmed into the protocol since inception. As a core characteristic of Bitcoin's economic model, the halving:

1. Ensures the transparent and fair distribution of bitcoins through open competition over time.
2. Incentivizes miners to validate transactions, bolstering the computational capacity that secures Bitcoin's distributed financial network.
3. Preserves the economic principle of scarcity for the network's exclusively native currency (*i.e.*, bitcoin), which together with a peer-to-peer financial network reinforces investability.

2. Source: American Banker. For the Curious But Perplexed, the Bitcoin 'Halving' Explained. Tanaya Macheel, July 8, 2016.

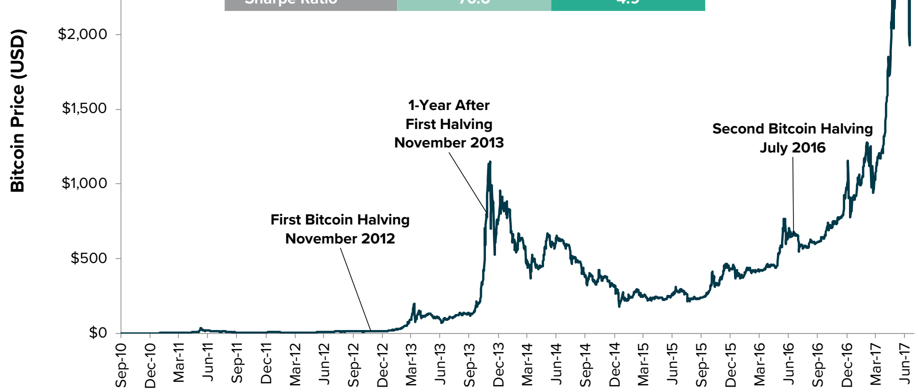
Is the Halving Priced In?

The halving is close enough that it's time to start talking about it more seriously, but far enough out in the future that it's unclear whether it's priced into the market efficiently. In fact, based on anecdotal conversations with market participants, we were surprised to learn that many of them were not even aware of this event. Moreover, according to Unchained Capital, less than 32% of the bitcoins in circulation have remained in the same wallet addresses since July 2016.[3] This is consistent with our own determination that a large number of existing bitcoin holders are investors who have entered the market in the last three years. For many of them, this is uncharted territory and could very well be their first halving event.

While some investors in the digital asset ecosystem appear to have a short-term bias, strategies with a multi-year investment horizon and the discipline to hold strategic positions in Bitcoin through these events have historically generated outsized returns. For example, in the one-year periods following the first and second halvings, bitcoin's price rose by roughly 81x and 3x, respectively.

FIGURE 2: **HISTORICAL BITCOIN HALVING PERFORMANCE (USD)**[4]

Bitcoin	1-Year After First Halving	1-Year After Second Halving
Start Price (USD)	$13	$651
End Price (USD)	$1,032	$2,518
Price Multiple	82.1X	3.9X
Return %	8113%	287%
Risk % (Std Dev)	115%	58%
Sharpe Ratio	70.6	4.9



3. Source: Bitcoin Data Science (Pt. 1): HODL Waves. Dhruv Bansal, April 17, 2018. https://blog.unchained-capital.com/bitcoindata-science-pt-1-hodl-waves-7f3501d53f63. As of March 15, 2019.
4. Source: Blockchain.info. PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RETURNS.

Following the upcoming halving, the number of new bitcoins entering circulation[5] each day will change as follows:

- **Daily Minted Bitcoins (As of March 15, 2019)**: 144 blocks per day * 12.5 bitcoins per block = 1,800 bitcoins per day
- **Daily Minted Bitcoins (After 3rd Halving)**: 144 blocks per day * 6.25 bitcoins per block = 900 bitcoins per day

Based on the March 15, 2019 bitcoin closing price[6] of $3,876, this means that the reduction in daily dollar-denominated bitcoin issuance would be:

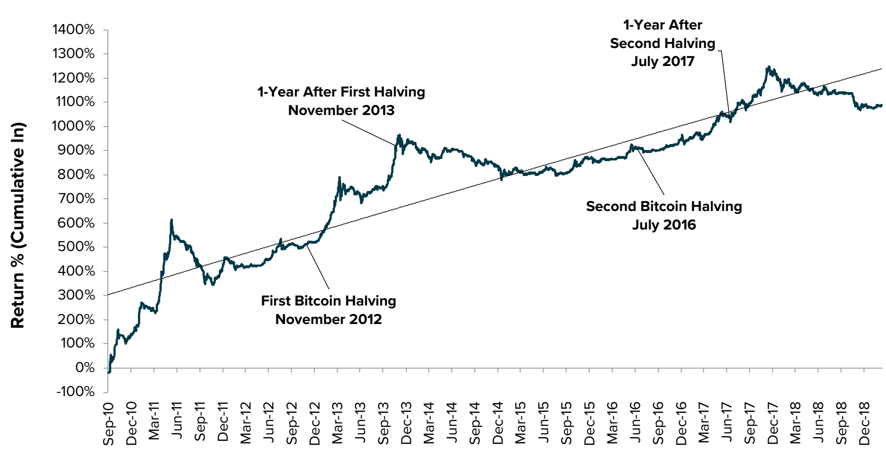
- **Daily Minted Bitcoins in USD (As of March 15, 2019)**: $7M per day
- **Daily Minted Bitcoins in USD (After 3rd Halving):** $3.5M per day

For a scarce asset such as bitcoin, any constraint on supply will have important implications for its price. However, what is equally, if not more interesting is the number of similarities between the Bitcoin backdrop today and that of the twelve-to-eighteen-month periods preceding the previous halvings. Let's briefly explore some of these similarities which may have contributed to such extreme movements in bitcoin's price.

Price Action

Today, we find ourselves in the middle of an ~80% drawdown in bitcoin's price, similar to what we experienced in the periods leading up to the November 2012 halving (e.g., >90% decline) and the July 2016 halving (e.g., >80% decline). The latest selloff appears to be driven by cyclical macro forces and changes in investors' appetite for risk, rather than network fundamentals, which we'll briefly touch on in the next section.

FIGURE 3: **HISTORICAL BITCOIN HALVING PERFORMANCE % (CUMULATIVE LN)**[7]

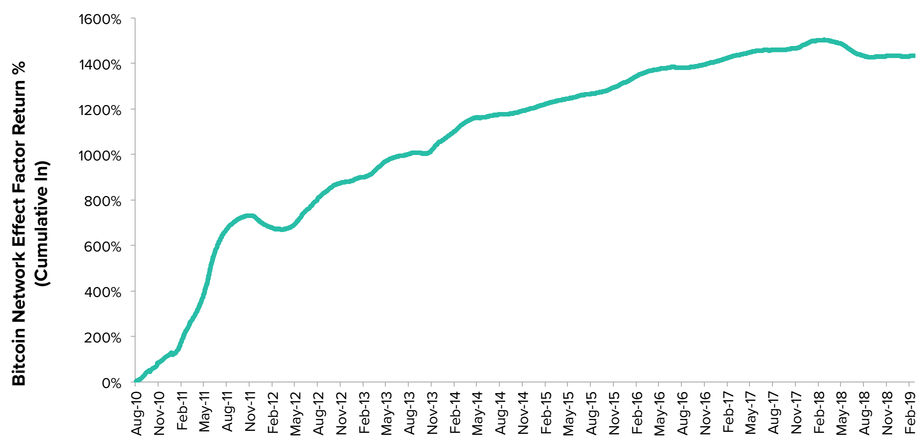


5. Source: Blockchain.info.
6. Source: TradeBlock, Inc. The term "VWAP" is an acronym for a volume-weighted average price.
7. Source: Blockchain.info. PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RETURNS.

Network Fundamentals

We have developed a proprietary factor model to measure the Bitcoin network's health based on various activity metrics. As you can see in Figure 4, improving fundamentals have generally been the trend, though temporary declines are typical. After taking a brief dip in the first half of 2018, Bitcoin network activity has stabilized and is starting to show modest increases over the last few months. Notably in the twelve-to-eighteen-month periods preceding the past two Bitcoin halvings, a similar decline and subsequent rise occurred.

FIGURE 4: **BITCOIN NETWORK ACTIVITY FACTOR RETURN % (CUMULATIVE LN)**[8]



Investment Activity

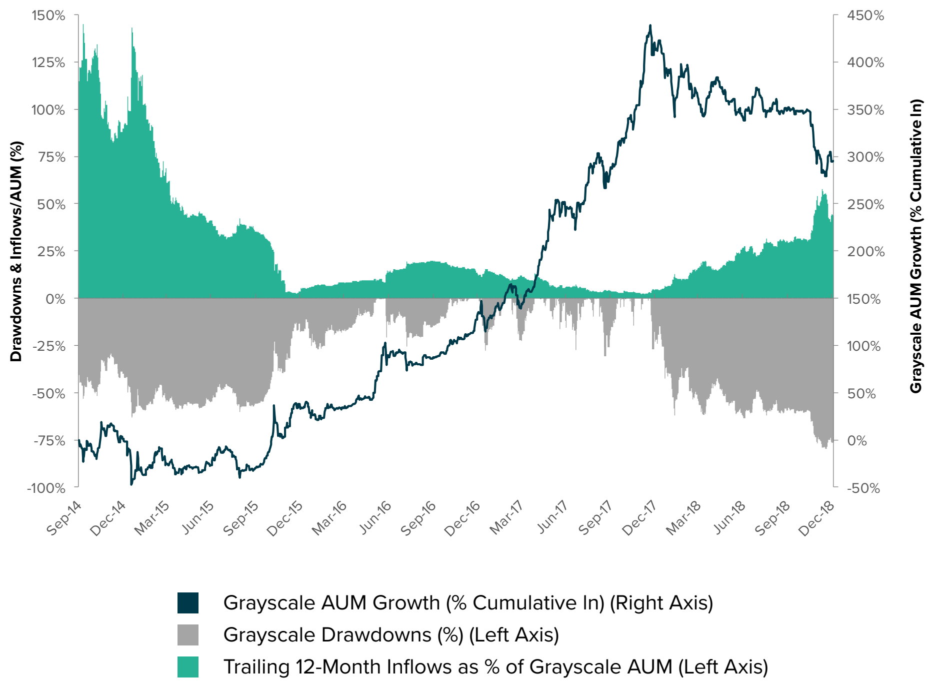
There are also similarities between the investment activity leading up to the July 2016 halving and what we're experiencing today. Figure 5 shows the trailing twelve-month dollar inflows to the Grayscale family of investment products as a percentage of our total assets under management ("AUM") through December 2018. For context, this metric may serve as a proxy for broad-based investment activity occurring across the digital asset ecosystem, which could have important implications for future price action. Many investors view large capital inflows relative to asset prices as a fundamental sign of perceived value and potential future price momentum.

In December, this metric reached its highest level since the second quarter of 2015, the bottom of the last bear market and approximately fourteen months prior to the July 2016 halving.

8. Source: Grayscale. PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RETURNS.

FIGURE 5: **GRAYSCALE TRAILING 12-MONTH INFLOWS AS % OF TOTAL AUM SINCE INCEPTION**[9]

Grayscale Investments September 25, 2013 through December 31, 2018	
Index	Grayscale
Max Trailing 12-Month Inflows (% of AUM)	144.9%
Average Trailing 12-Month Inflows (% of AUM)	27.9%
Median Trailing 12-Month Inflows (% of AUM)	16.3%
Current Trailing 12-Month Inflows (% of AUM)	43.6%



Conclusion

Large drawdowns are not unique to digital assets and occur across all asset classes and markets, typically following periods of excessive risk-taking. These "re-pricings" can create compelling investment opportunities and in many cases offer above-average risk-adjusted returns in the years that follow.[10] For investors with a multi-year investment horizon and a high-risk tolerance, the confluence of discounted prices, improving network fundamentals, strong relative investment activity and the upcoming halving may offer an attractive entry point into Bitcoin. This is especially relevant for investors building core strategic positions in Bitcoin over time.

9. Source: Grayscale. PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RETURNS.
10. Source: Bloomberg. Performance was evaluated between June 30, 1994 and March 15, 2018 for the Nasdaq Composite, MSCI Emerging Markets Small Cap, and S&P GSCI Global Commodity Indexes as this is the earliest available index level history for all three indexes from Bloomberg. We use the Sharpe ratio to measure the risk-adjusted returns of markets. The Sharpe ratio is calculated by taking the annualized return earned on an investment in excess of the risk-free rate (often measured as the return of U.S. T-bills) divided by annualized volatility or total risk. The Sharpe ratio has become one of the most widely used methods for calculating risk-adjusted returns of portfolios. Generally, the greater the value of the Sharpe ratio, the more attractive the risk-adjusted return. Source: Investopedia. PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RETURNS.

About Grayscale Investments

Grayscale Investments, LLC ("Grayscale") is the world's largest digital currency asset manager, with a proven track record and unrivaled experience. We give investors the tools to make informed investing decisions in a burgeoning asset class. As part of Digital Currency Group, Grayscale accesses the world's biggest network of digital currency intelligence to build better investment products. We have removed the barrier to entry so that institutions and investors can benefit from exposure to digital currencies. Now, forward-thinking investors can embrace a digital future within an institutional grade investment.

Grayscale is headquartered in New York City. For more information on Grayscale, please visit, please visit www.grayscale.co or follow us on Twitter @GrayscaleInvest.

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HYPOTHETICAL SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. There is no guarantee that the market conditions during the past period will be present in the future. Rather, it is most likely that the future market conditions will differ significantly from those of this past period, which could have a materially adverse impact on future returns. Unlike an actual performance record, simulated results do not represent actual trading or the costs of managing the portfolio. Also, since the trades have not actually been executed, the results may have under or over compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RESULTS.

The hypothetical simulated performance results are based on a model that used inputs that are based on assumptions about a variety of conditions and events and provides hypothetical not actual results. As with all mathematical models, results may vary significantly depending upon the value of the inputs given, so that a relatively minor modification of any assumption may have a significant impact on the result. Among other things, the hypothetical simulated performance calculations do not take into account all aspects of the applicable asset's characteristics under certain conditions, including characteristics that can have a significant impact on the results. Further, in evaluating the hypothetical simulated performance results herein, each prospective investor should understand that not all of the hypothetical assumptions used in the model are described herein, and conditions and events that are not accounted for by the model may have a significant adverse effect on the performance of the assets described herein. Prospective investors should consider whether the behavior of these assets should be tested based on different and/or additional assumptions from those included in the information herein.

IN ADDITION TO OTHER DIFFERENCES, PROSPECTIVE INVESTORS IN A VEHICLE SHOULD NOTE THE FOLLOWING POTENTIALLY SIGNIFICANT DIFFERENCES BETWEEN THE ASSUMPTIONS MADE IN THE HYPOTHETICAL SIMULATED PERFORMANCE RESULTS INCLUDED HEREIN AND THE CONDITIONS UNDER WHICH A VEHICLE WILL PERFORM, WHICH COULD CAUSE THE ACTUAL RETURN OF SUCH VEHICLE TO DIFFER CONSIDERABLY FROM RETURNS SET FORTH BY THE HYPOTHETICAL SIMULATED PERFORMANCE, TO BE MATERIALLY LOWER THAN THE RETURNS AND TO RESULT IN LOSSES OF SOME OR ALL OF THE INVESTMENT BY PROSPECTIVE INVESTORS:

FOR EXAMPLE, EACH TRUST WILL HOLD ONLY ONE DIGITAL ASSET, WHEREAS THE HYPOTHETICAL SIMULATED PERFORMANCE RESULTS ARE INTENDED TO SHOW HYPOTHETICAL PERFORMANCE OF AN INVESTMENT MULTIPLE DIGITAL ASSETS. IN ADDITION, THE GENERAL MARKET DATA USED IN THE HYPOTHETICAL SIMULATED PERFORMANCE RESULTS DO NOT REFLECT ACTUAL TRADING ACTIVITY AND COULD NOT BE REPLICATED BY A VEHICLE IN ITS ACTUAL TRANSACTIONS. If actual trading activity was executed at levels that differed significantly from the general market data used in the hypothetical simulated performance, the actual returns achieved would have varied considerably from the results of the hypothetical simulated performances and could have been substantially lower and could result in significant losses.

IN ADDITION, THE HYPOTHETICAL SIMULATED PERFORMANCE RESULTS DO NOT ASSUME ANY GAINS OR LOSSES FROM TRADING AND THEREFORE DO NOT REFLECT THE POTENTIAL LOSSES, COSTS AND RISKS POSED BY TRADING AND HOLDING ACTUAL ASSETS.

The hypothetical simulated performance results do not reflect the impact the market conditions may have had upon a Vehicle were it in existence during the historical period selected. The hypothetical simulated performance results do not reflect any fees incurred by a Vehicle. If such amounts had been included in the hypothetical simulated performance, the results would have been lowered.

AS A RESULT OF THESE AND OTHER DIFFERENCES, THE ACTUAL RETURNS OF A VEHICLE MAY BE HIGHER OR LOWER THAN THE RETURNS SET FORTH IN THE HYPOTHETICAL SIMULATED PERFORMANCE RESULTS, WHICH ARE HYPOTHETICAL AND MAY NEVER BE ACHIEVED. Reasons for a deviation may also include, but are by no means limited to, changes in regulatory and/or tax law, generally unfavorable market conditions and the Risk Factors set forth below.

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- **PRICE VOLATILITY**
  Digital assets have historically experienced significant intraday and long-term price swings. In addition, none of the Vehicles currently operates a redemption program and may halt creations from time to time. There can be no assurance that the value of the common units of fractional undivided beneficial interest ("Shares") of any Vehicle will approximate the value of the digital assets held by such Vehicle and such Shares may trade at a substantial premium over or discount to the value of the digital assets held by such Vehicle. At this time, none of the Vehicles is operating a redemption program and therefore Shares are not redeemable by any Vehicle. Subject to receipt of regulatory approval from the SEC and approval by the Sponsor or Manager, as applicable, in its sole discretion, any Vehicle may in the future operate a redemption program. Because none of the Vehicles believes that the SEC would, at this time, entertain an application for the waiver of rules needed in order to operate an ongoing redemption program, none of the Vehicles currently has any intention of seeking regulatory approval from the SEC to operate an ongoing redemption program.

- **MARKET ADOPTION**
  It is possible that digital assets generally or any digital asset in particular will never be broadly adopted by either the retail or commercial marketplace, in which case, one or more digital assets may lose most, if not all, of its value.

- **GOVERNMENT REGULATION**
  The regulatory framework of digital assets remains unclear and application of existing regulations and/or future restrictions by federal and state authorities may have a significant impact on the value of digital assets.

- **SECURITY**
  While each Vehicle has implemented security measures for the safe storage of its digital assets, there have been significant incidents of digital asset theft and digital assets remains a potential target for hackers. Digital assets that are lost or stolen cannot be replaced, as transactions are irrevocable.

- **TAX TREATMENT OF VIRTUAL CURRENCY**
  *For U.S. federal income tax purposes, Digital Large Cap Fund will be a passive foreign investment company (a "PFIC") and, in certain circumstances, may be a controlled foreign corporation (a "CFC"). Digital Large Cap Fund will make available a PFIC Annual Information Statement that will include information required to permit each eligible shareholder to make a "qualified electing fund" election (a "QEF Election") with respect to Digital Large Cap Fund. Each of the other Vehicles intends to take the position that it is a grantor trust for U.S. federal income tax purposes. Assuming that a Vehicle is properly treated as a grantor trust, Shareholders of that Vehicle generally will be treated as if they directly owned their respective pro rata shares of the underlying assets held in the Vehicle, directly received their respective pro rata shares of the Vehicle's income and directly incurred their respective pro rata shares of the Vehicle's expenses. Most state and local tax authorities follow U.S. income tax rules in this regard. Prospective investors should discuss the tax consequences of an investment in a Vehicle with their tax advisors.

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  Grayscale, as sponsor of each Trust and the manager of the Fund, has total authority over the Trusts and the Fund and shareholders' rights are extremely limited.

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  An investment in a Vehicle will be illiquid and there will be significant restrictions on transferring interests in such Vehicle. The Vehicles are not registered with the SEC, any state securities laws, or the U.S. Investment Company Act of 1940, as amended, and the Shares of each Vehicle are being offered in a private placement pursuant to Rule 506(c) under Regulation D of the Securities Act of 1933, as amended (the "Securities Act"). As a result,

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- **FEES AND EXPENSES**
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