

2016
INSIGHTS

Allocating to “Liquid Alternatives”

The Importance of Correlation

HIGHLIGHTS

“An investor should not expect to be compensated for taking on diversifiable risk, only for systematic or market risk.

A useful analogy is that of a fire-fighter who willingly leaves his protective gear behind to enter a burning house and then expects to be paid more because he took on greater risk. But the risk he took was unnecessary and avoidable”

Definitions of Terms and Indices can be found on pages 8-9.

Let us assume you are an investor who owns a “traditional 60/40” stock-bond portfolio. An allocation of 60% to stocks and 40% to bonds has long been viewed as a useful benchmark, albeit naive, by many investors. The recent turmoil in financial markets has led to fairly violent day-to-day fluctuations in the value of your portfolio and is causing you some concern.

You decide to consult your financial advisor about possibly taking some remedial steps. The advisor might agree in principle that your portfolio could benefit from diversification, and she might suggest that one possible way to diversify a traditional portfolio like yours is to allocate a part of it to **alternative strategies**, which have potentially **low correlations** to stocks and bonds. She suggests that a solution might be **liquid alternatives** such as a managed futures mutual fund. Let us explore these ideas at greater length.

PAST PERFORMANCE DATA QUOTED HERE REPRESENTS PAST PERFORMANCE. CURRENT PERFORMANCE MAY BE LOWER OR HIGHER THAN THE PERFORMANCE QUOTED ABOVE. PAST PERFORMANCE DOES NOT GUARANTEE FUTURE RESULTS.

DIVERSIFICATION DOES NOT ENSURE PROFIT OR PREVENT LOSSES. AN INVESTMENT IN MANAGED FUTURES IS SPECULATIVE AND INVOLVES A HIGH DEGREE OF RISK. YOU CAN LOSE MONEY IN A MANAGED FUTURES PROGRAM. THERE IS NO GUARANTEE THAT AN INVESTMENT IN MANAGED FUTURES WILL ACHIEVE ITS OBJECTIVES, GOALS, GENERATE POSITIVE RETURNS, OR AVOID LOSSES.

MODERN PORTFOLIO THEORY AND DIVERSIFICATION

The concept of diversification is grounded in Modern Portfolio Theory (“MPT”), pioneered by Nobel Laureate Harry Markowitz during the 1950s. Some of the **major results of MPT, relevant to this discussion, can be paraphrased as follows:**

- In evaluating investments, it is important to consider not just return but also **risk**.
- **The “risk” of a portfolio can be measured by the standard deviation of its returns.**¹ Often termed volatility, this measure describes the deviation of returns around their average value. If a portfolio’s historical monthly returns vary between –10% and +10%, for example, it is more risky than another portfolio whose returns range from –5% to +5%.²
- The expected return on a portfolio is positively related to its risk. In other words, **higher returns can generally be earned only by taking on higher risk**. MPT defines the “risk-free rate,” which is usually represented by the rate on very short-term Treasury bills. Riskier assets are generally expected to yield higher returns than this risk-free rate.³
- The risk of any individual stock⁴ can be bifurcated into **idiosyncratic or diversifiable risk and systematic or non-diversifiable risk**. Idiosyncratic risk is specific to that stock, and may be diversified away by holding a portfolio of stocks. We can think of the idiosyncratic risks of stocks in a portfolio “as potentially cancelling each other out,” so to speak. Systematic risk is that which is attributable to the stock market as a whole, and which cannot be diversified away.⁵
- **An investor should not expect to be compensated for taking on diversifiable risk, only for systematic or market risk.** A useful analogy is that of a fire-fighter who willingly leaves his protective gear behind and enters a burning house then expects to be paid more because he took on greater risk. But the risk he took was unnecessary and avoidable; in the same way, idiosyncratic risk may be diversified away through portfolio construction.
- It is possible, in principle, to construct an **efficient portfolio**, one in which idiosyncratic risk has been diversified away to the greatest extent possible. An efficient portfolio, therefore, has the lowest possible risk for any given level of expected return, or, equivalently, the highest possible expected return for a given level of risk.⁶
- An efficient portfolio may be constructed by seeking to reduce its overall risk without sacrificing return. This may be achieved, in principle, by combining assets whose returns are less than perfectly correlated. In other words,

*...by adding to an existing portfolio an asset whose returns do not move exactly in lock-step, **the risk of the original portfolio may generally be reduced.***

¹Technically, we need to make the assumption that returns follow a normal distribution. For monthly returns, this is a reasonable approximation for stocks and bonds.

²The maximum drawdown, which we introduce later, is another widely used measure of risk.

³Although, of course, realized returns may be lower; for example, there are months and years when stocks experience low, and even negative, returns. However, over time and on average, this concept tends to be valid. This should be viewed as an “expected” or ex-ante concept, whereas actually experienced returns are a “realized” or ex-post occurrence.

⁴For now, we consider stocks, although the point can be generalized to other assets.

⁵Clearly, this is a simplification that ignores other factors such as industry risk, interest-rate risk, currency risk, etc. However, the basic point is still valid: if you hold a portfolio that contains almost every stock in the market, appropriately weighted, you will be taking on the risk of the market as a whole, almost by definition.

⁶Readers may be familiar with the concept of the Markowitz frontier. Portfolios on the frontier are said to be efficient portfolios in the sense described here.

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- The risk of any asset that is being added to a portfolio, therefore, turns out to be a function of three variables. First, and most obvious, is the size of the position: the bigger the holding, the greater the risk. The second is the overall volatility of the asset being added: the higher this risk, the greater its contribution to the portfolio's risk. However, **the third and in our opinion, most important variable is the correlation between the returns on the asset and the portfolio.** All else equal, the incremental amount of risk added is highly dependent on this correlation.⁷

We now try to answer the question: Why might your financial advisor suggest that you consider allocating to “liquid alternatives” in seeking to diversify your 60/40 stock-bond portfolio?

MODERN PORTFOLIO THEORY AND DIVERSIFICATION

Alternative strategies can tautologically be defined as those that are not stocks or bonds. They are usually considered to include illiquid assets such as real estate, venture capital, commodities, and collectibles, as well as other more liquid “hedge fund” strategies such as event-driven, distressed, global macro, and managed futures. Until a few years ago, many of these alternative strategies were only available to high-net-worth individuals and institutions in the form of private funds or partnerships. Often, this had to do with the relative illiquidity of the instruments employed, the utilization of leverage, and the use of short-selling.

*Over the years, however, some of the more liquid among these strategies have been offered to investors in the form of mutual funds. These have typically come to be known as alternative mutual funds or **liquid alts.***

Through such mutual funds, investors now have convenient access to potentially diversifying strategies at relatively reasonable costs, with low minimum investments, daily liquidity, and with considerable regulatory protection for investors.

In terms of the concepts of MPT outlined above, alternative strategies can be defined more specifically as those that have low correlations with stocks and bonds. The addition of such strategies to a portfolio (such as a 60/40 stock-bond portfolio) potentially lowers its volatility. If carefully constructed, the diversified portfolio may potentially offer a better return-to-risk tradeoff than the original portfolio.

What do we mean by “carefully constructed?” The answer should provide some guidance about the choice of alternative investments and the size of the allocation to them. It may be helpful to look at some simple numerical examples that seek to address these issues.

⁷For more on correlation, please refer to our Insight, “**Speaking of Correlation.**”

Definitions of Terms and Indices can be found on pages 8-9.

For more on managed futures, please see our Insight, "Harnessing the Potential Benefits of Managed Futures."

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ALLOCATING TO LIQUID ALTS: AN ILLUSTRATION USING MANAGED FUTURES


We use historical data for the period 2007–2015 to show some examples of diversification using managed futures.

These are provided purely for illustrative purposes, and are not intended in any way to provide investment advice. Further, past returns and market behavior are not indicative of what may happen in the future.

We start our analysis with a traditional stock-bond portfolio, using the following Exchange Traded Funds (ETFs) as investable proxies for stocks and bonds:

- 

iShares Core S&P 500 ETF
TICKER: **IVV**

This ETF offers investors diversified exposure to US large-cap stocks. It employs full replication to track the S&P 500 Index, resulting in relatively low tracking error.
- 

iShares Core US Aggregate Bond ETF
TICKER: **AGG**

This ETF seeks to track the performance of the Barclays US Aggregate Bond Index, a widely-accepted benchmark for the US investment-grade bond market; it includes mortgage-backed securities, Treasuries, and corporate bonds.

Our starting portfolio is allocated 60% and 40% to IVV and AGG, respectively, and is rebalanced monthly. The period for our analysis is January 2007 through December 2015, which we believe is fairly "representative," as it includes an entire equity market cycle. It is also the period during which historical returns are available for the CTA programs that we use in our illustrations below.

1/2007 - 12/2015 ● **TABLE 1**

US Stocks, US Bonds, and 60/40 Portfolio

Summary Statistics (using monthly returns)

	US Stocks	US Bonds	60/40 Portfolio
Annualized Rate of Return	6.3%	4.4%	5.9%
Standard Deviation	15.7%	3.9%	9.7%
Sharpe Ratio	0.35	0.91	0.53
Max Drawdown	-50.8%	-4.3%	-32.3%

The Sharpe ratio was calculated using the Annualize Rate of Return on 3-month T-Bills, which was 0.78%.

In the table above, we show some summary statistics for monthly returns on US stocks, US bonds, and a 60/40 stock-bond portfolio for the nine-year period, 2007-2015. Looking at just stocks, we see that this asset class has been quite risky historically: it returned 6.3% annualized return, but the risk, as measured by the annualized standard deviation of returns, was 15.7%. Its reward-to-risk, as measured by the Sharpe ratio, was 0.35, while its maximum peak-to-trough drawdown was almost –51%. This last

statistic is quite an eye-opener: it shows that there was a period (Dec. '07 - March '09) during which investors in US stocks lost half the value of their investment before the market turned around.

The last column of Table 1 shows the results for the 60/40 stock-bond portfolio, and illustrates the potential value of diversification. By shifting 40% of the allocation to bonds, the stock-bond portfolio turns out to have a better Sharpe ratio than 100% in stocks; adding bonds results in a proportionately greater decrease in risk than in return. The drawdown is also much shallower, only -32% versus -51%. These potential benefits of diversification are driven by the fact that bonds had a correlation of only 0.06 with stocks over the period under investigation.

Let us now examine how the inclusion of alternative investments can potentially provide even further diversification benefits to a stock-bond portfolio. As discussed earlier, alternative investments can be defined as strategies that have low correlations to stocks and bonds. Here, we focus our attention on managed futures, a particular subset of alternative strategies. **Among the reasons for doing so are:**⁸

- Managed futures strategies have been employed for almost 40 years
- The asset class has historically exhibited good risk-adjusted performance over multiple market cycles, and has earned positive returns during periods of market turmoil⁹
- Returns tend to have low correlations with almost all other asset classes
- The instruments traded by CTAs tend to be very liquid

For illustrative purposes, we select nine CTA programs, with relatively long track records, which represent a range of trading styles and are distributed broadly across the risk spectrum. The summary statistics for these programs are displayed in Table 2, along with a brief description of their trading strategies. The qualitative conclusions of our analysis would not change significantly if other CTA programs were used. **We emphasize yet again that this is purely an illustration based on historical data, which is not intended to provide investment advice; nor do we intend to suggest that these results may repeat in the future, using these or other CTA programs or other alternative strategies.**

TABLE 2

1/2007 - 12/2015

CTA Programs

Summary Statistics (using monthly returns)

	Campbell	Chesapeake	Crabel	EvE	FORT	JEM	QIM	IPM	Aspect
Annualized Rate of Return	3.6%	5.3%	6.8%	16.2%	8.9%	3.6%	6.8%	9.4%	6.5%
Annualized Standard Deviation	13.2%	20.7%	8.5%	25.9%	11.0%	4.0%	9.7%	10.5%	15.3%
Sharpe Ratio	0.21	0.22	0.71	0.59	0.74	0.72	0.62	0.83	0.38
Max Drawdown	-21.17%	-32.48%	-14.25%	-36.21%	-17.42%	-5.93%	-16.80%	-12.22%	-22.21%
Correlation to 60/40	0.13	0.24	-0.06	-0.09	0.21	-0.06	-0.04	-0.12	-0.09

⁸For more details, please see our Insight, "Harnessing the Potential Benefits of Managed Futures."

⁹See our Insight, "Managed Futures During Equity "Crises"—An Update."

Definitions of Terms and Indices can be found on pages 8-9.

CTA	Program	Description
Campbell & Co.	Managed Futures Portfolio	Diversified trend plus non-trend
Chesapeake Capital	Diversified Program	Long-term trend
Crabel Capital	Multi-Product	Short-term multi-strategy
Emil van Essen	Spread Trading Program	Discretionary spread trading
FORT	Global Contrarian	Trend anticipation
JE Moody	Commodity Relative Value	Commodity-focused relative value trading
QIM	Global Program	Short-term pattern recognition
IPM	Systematic Macro	Systematic global macro
Aspect Capital	Diversified Programme	Diversified intermediate-term trend

The volatilities of the CTA programs shown in Table 2 range from a low of 4% for J E Moody to a high of almost 26% for Emil van Essen, followed by Chesapeake at 20%. The rest of the programs are bunched between about 9% and 15%. Table 1 shows that the volatility of US stocks over this same period was 15.7%; thus, our selected programs have volatilities that lie on both sides of this level. However, their volatilities are mainly higher than that of the 60/40 portfolio shown in Table 1, which was 9.7%.

The correlations of all the programs with the 60/40 portfolio are quite low, ranging from -0.09 for Aspect and Emil van Essen, to 0.24 for Chesapeake. Even a correlation of 0.24 is, for practical purposes, a very low value, and such a program has the potential to provide diversification benefits. We illustrate this in Table 3 below.

Starting with our 60/40 portfolio, we investigate how an allocation of 20% to a CTA program would have affected returns. We reduce the stock and bond allocations by 20% pro-rata, so that the new portfolios have allocations of 48% to stocks, 32% to bonds, and 20% to a CTA program. We believe that 20% is a “reasonable” allocation to the diversifying alternative asset class; however, results using a range from 5% to 30% are qualitatively quite similar.¹⁰

¹⁰Results for other allocations can be provided upon request. We also encourage readers to run their own tests with other diversifying asset classes and to verify our findings.

Definitions of Terms and Indices can be found on pages 8-9.

1/2007 - 12/2015

TABLE 3

Stock-Bond-Managed Futures Portfolios

Summary Statistics (using monthly returns)

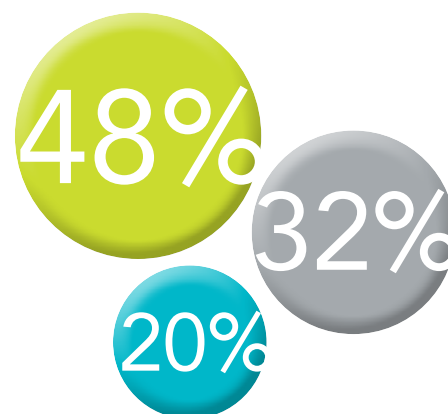
	60/40	48% Stocks, 32% Bonds, 20% Managed Futures								
		Campbell	Chesapeake	Crabel	EvE	FORT	JEM	QIM	IPM	Aspect
Annualized Rate of Return	5.9%	5.6%	6.1%	6.2%	8.5%	6.6%	5.5%	6.2%	6.8%	6.3%
Annualized Standard Deviation	9.7%	8.5%	9.6%	7.8%	8.9%	8.5%	7.7%	7.9%	7.8%	8.1%
Sharpe Ratio	0.53	0.57	0.56	0.69	0.87	0.69	0.61	0.69	0.77	0.68
Max Drawdown	-32.3%	-26.7%	-24.2%	-25.1%	-18.9%	-26.9%	-24.2%	-23.3%	-21.8%	-22.6%
Correlation to 60/40	1.00	0.13	0.24	-0.06	-0.09	0.21	-0.06	-0.04	-0.12	-0.09

Table 3 shows how each of the nine new portfolios compares to the original 60/40 portfolio. Even with a 20% allocation to what is often viewed as a “risky asset class,” based on the fact that the stand-alone volatilities of some of these programs are significantly higher than that of the stock market, we see that the volatilities of the new portfolios range from a low of 7.7% when JE Moody is added, to a high of 9.6% for the Chesapeake program. However, even this volatility of 9.6% is lower than the volatility of the initial 60/40 portfolio. **Adding as much as 20% of a CTA program with a volatility that is more than twice as high as that of the original portfolio still results in a lower volatility for the new portfolio. Clearly, this can be attributed to the low correlation.** This is illustrated even more dramatically by the Emil van Essen program: this program has an even higher stand-alone volatility than Chesapeake—26% versus 21%—but its lower correlation of -0.09 results in a portfolio volatility as low as 8.9% relative to the original value of 9.7% for the 60/40 portfolio.

It is also worth pointing out the improvement in the maximum drawdown. While the original portfolio had a peak-to-trough value of -32% , the drawdown for the new portfolios ranges from about -19% for Emil van Essen to -27% for FORT. Again, perhaps surprisingly, we see that maximum drawdowns are not always dependent on volatility alone! Adding the most volatile program, Emil van Essen, results in a much lower drawdown than adding JE Moody, the least volatile program.

The illustration on page six serves to show that correlation can be very important in determining the volatility of the new portfolio: a low correlation has the potential to compensate for higher stand-alone volatility.

This is the lesson MPT tries to emphasize: risk may be less important than correlation when seeking to construct a diversified portfolio.



CONCLUSION

We have tried to illustrate some MPT tenets regarding diversification using the historical returns on a 60/40 stock-bond portfolio. We show that the addition of an alternative strategy that has a low correlation to the starting portfolio has the potential to provide diversification benefits: lower volatility and shallower drawdowns. Although we do not focus on the portfolio's average return, because historically realized average returns are notoriously difficult to extrapolate into the future, our illustrative examples do show the potential improvement in the Sharpe ratio that may result from diversification. We see that the choice of the exact CTA program and its stand-alone volatility, while important, may perhaps be of less importance than the correlation.

In other words, the key finding here is that correlation is perhaps the most important variable that drives potential diversification benefits. The stand-alone volatility of diversifying assets (in our illustration, CTA programs) turns out to be less of a factor than one might have expected. Clearly, the potential reduction in overall risk does depend on the size of the allocation to the strategy, and on its volatility. We have shown that even an allocation as high as 20% to an alternative strategy with a relatively high “stand-alone” risk has the potential to reduce overall portfolio volatility.

Definitions of Terms and Indices can be found on pages 8-9.

But the importance of correlation cannot be overstated: all else equal, the lower the correlation, the greater the potential diversification benefits.

In seeking to diversify a portfolio by evaluating which “liquid alt” to add and how much, an investor should of course evaluate its volatility, but should do so in conjunction with its correlation to the existing portfolio.

APPENDIX

DEFINITIONS

Annualized rate of return is the geometric average return for a period greater than or equal to one year, expressed on an annual basis or as a return per year.

Beta is a measure of the volatility, or systematic risk, of a security or a portfolio in comparison to the markets as a whole.

Commodity trading advisors (“CTAs”) are traders who may invest in more than 150 global futures markets. They seek to generate profit in both bull or bear markets, due to their ability to go long (buy) futures positions, in anticipation of rising markets, or go short (sell) futures positions, in anticipation of falling markets.

Correlation is measured on a scale from 1.00 to -1.00. [1.00] Investments with high correlation tend to rise and fall together. [0.00] Non-correlated investments tend to move up and down with no relation to one another. [-1.00] Investments with negative correlation tend to move in opposite directions.

Discretionary spread trading is a trading approach that uses fundamental analysis of underlying economic factors. A spread tracks the difference between a long and short position. In spread trading, risks move beyond price fluctuation to risks that involve the difference between two or more sides of a spread.

Diversified trend is a strategy that encompasses all three horizons – short, medium, and long-term.

A **drawdown** is the peak-to-trough decline during a specific record period of an investment, fund or commodity. A drawdown is usually quoted as the percentage between the peak and the trough. Max drawdown refers to the greatest drawdown in the programs history.

An **Exchange-Traded Fund (ETF)** is an investment fund that tracks an index, specific asset or basket of assets to which it is pegged. ETFs are bought and sold throughout the day like securities on the stock exchange.

Global macro is a strategy that trades equity, bond, currency and commodity markets based generally on global macroeconomic developments. Within the global macro category, systematic macro strategies use mathematical or computer models to identify trends and select investments, in contrast to discretionary macro strategies, which use primarily fundamental analysis.

Idiosyncratic risk is risk specific to an asset or a small group of assets. Idiosyncratic risk has little or no correlation with market risk, and can therefore be substantially mitigated or eliminated from a portfolio by using adequate diversification.

Intermediate-term focuses on the average time period between short-term and long-term (approximately two to four months).

Long-term trend is a strategy that uses long-term indicators and averages, general five months or longer.

Managed futures is an alternative investment strategy in which professional portfolio managers use futures contracts as part of their overall investment strategy. Managed futures provide portfolio diversification among various types of investment styles and asset classes to help mitigate portfolio risk in a way that may not be possible in direct equity investments.

APPENDIX CONTINUED

Modern Portfolio Theory (MPT) is a theory on how risk-averse investors can construct portfolios to optimize or maximize expected return based on a given level of market risk, emphasizing that risk is an inherent part of higher reward.

Pattern recognition is defined as the categorization of input data into identifiable classes via the extraction of significant features or attributes of the data from a background of irrelevant detail.

Relative value trading is a method of determining an asset's value that takes into account the value of similar assets. Calculations used to measure the relative value of stocks include the enterprise ratio and the price-to-earnings ratio.

Risk-adjusted performance is a concept that refines an investment's return by measuring how much risk is involved in producing that return, which is generally expressed as a number or rating. Risk-adjusted returns are applied to individual securities and investment funds and portfolios.

Sharpe ratio is a risk-adjusted measure developed by William F. Sharpe, calculated using annualized standard deviation and excess return to determine reward per unit of risk. The higher the Sharpe ratio, the better the funds historical risk-adjusted performance (assumed risk-free rate is 0%).

Short-term multi-strategy refers to a futures trading methodology that generally holds its positions for less than three months. Trading decisions are based on multiple trading strategies that may include a trend-following methodology as well as pattern recognition, spread trading, discretionary, contrarian and/or other approaches.

Short-term pattern recognition refers to the identification of price trends that occur over short periods of time, typically anywhere from a day, to a week, to months in time.

Short-selling is the sale of a security that is not owned by the seller, or that the seller has borrowed. Short selling is motivated by the belief that a security's price will decline, enabling it to be bought back at a lower price to make a profit.

Standard deviation is a statistical measure that sheds light on historical volatility. A volatile stock will have a higher standard deviation, while the more stable "blue chip" stock will have a lower standard deviation.

Systematic (also known as Quantitative) employs computer-driven, mathematical models to identify when to buy or sell an instrument according to rules determined before a trade is made, generally with little or no human intervention once a mathematical formula has been entered.

A **treasury bill (T-Bill)** is a short-term debt obligation backed by the US government with a maturity of less than one year.

Trend anticipation is the act of investors choosing investments that have performed well within another portfolio in anticipation that the trend will continue.

A **Trend-Following Strategy** seeks to capitalize on momentum or price trends across global asset classes by taking either long or short positions as a trend is underway. Price trends are created when investors are slow to act on new information or sell prematurely and hold on to losing investments to long. Price trends continue when investors continue to buy and investment that is going up in price or sell an investment that is going down in price.

Volatility is a measure of fluctuation in the value of an asset or investment. Lower volatility improves the stability and lowers the risk of an investment portfolio.

INDEX DESCRIPTIONS

Investors cannot directly invest in an index and unmanaged index returns do not reflect any fees, expenses or sales charges.

The **Barclays Capital US Aggregate Bond Index®** covers the USD denominated, investment-grade, fixed-rate, taxable bond market of SEC-registered securities. The index includes bonds from the Treasury, Government-Related, Corporate, MBS, ABS, and CMBS sectors.

The **S&P 500® Total Return Index** is widely regarded as the best single gauge of the US equities market. This world-renowned Index includes 500 leading companies in leading industries of the US economy.

A WORD ABOUT RISK

The purchase of a managed futures investment involves a high degree of risk.

Specifically, you should be aware that, in addition to normal investment risks, managed futures investments entail certain risks, including, in all or some cases:

- Managed futures often engage in leveraging and other speculative investment practices that may increase the risk of investment loss.
- Managed futures can be highly illiquid.
- Managed futures are not required to provide periodic pricing or valuation information to investors.
- Managed futures may involve complex tax structures and delays in distributing important tax information.
- Managed futures are not subject to the same regulatory requirements as mutual funds.
- Managed futures often charge high fees.

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