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Department of Information
Systems

Blockchain Center of Excellence

Authenticating real news with ANSAcheck,
a blockchain-enabled solution developed by ANSA and EY
(BCoE 2020-02)
by Mary Lacity and Dan Conway

Authenticating real news with ANSAcheck,
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Mary Lacity

Walton College professor and director of the Blockchain Center of Excellence (BCoE)

Dan Conway

Clinical professor of information systems and associate director of the BCoE

Abstract: *Digital platforms like social media have amplified the creation and distribution of fake news. Fake news threatens not only our trust in the press, but has wide-ranging negative effects on politics, business, health, and society. We present an example of authenticating real news with a solution called ANSAcheck, developed by Agenzia Nazionale Stampa Associata (ANSA)—Italy's top news wire service—and Ernst & Young (EY)—one of the world's largest professional services firms. ANSAcheck's underlying blockchain technology provides verifiable authentication as to source, updates, and reposting of legitimate news stories. This Blockchain Center of Excellence (BCoE) case study provides an overview of fake news, covers the development of the ANSAcheck solution thus far, and offers general lessons for this and other types of ecosystem solutions.*

Introduction

Fake news is the deliberate spread of verifiably false information under the disguise of being an authentic news story.

There are many types of fake news, including news satires and parodies designed to entertain.[1] This paper focuses on fake news fabrication where there is no implicit understanding between the author and the audience that the story is concocted.

We first cover the extent of fake news fabrication, why they are created, how they propagate, why some people believe them, and traditional solutions to combat the problem. Then we present a case study on how Agenzia Nazionale Stampa Associata (ANSA)—Italy's top Italian news wire service—and Ernst & Young (EY) prevent imposters*,* a type of fake news story that appears to be from a legitimate news agency.[2]

According to an article in *Science*, imposters are "particularly pernicious in that it is parasitic on standard news outlets, simultaneously benefiting from and undermining their credibility."[3] The solution, called

ANSAcheck, verifies that ANSA created the news story so that publishers and readers are guaranteed that what they are reading came from ANSA. The solution uses blockchain technologies to create tamper-resistant proofs of authenticity as to the news source and any updates.

Before describing ANSAcheck, we first briefly cover the purposes of, proliferation of, susceptibility to, and consequences of fake news fabrication. This background information will help readers assess the efficacy of potential interventions, including ANSAcheck.

Fabricating the news

Why is news fabricated? In short, the answer is to purposely misinform, often with a motive of financial or political gain. The most common fabrications are *political,* aiming to spread false information about politicians and public policies; *scientific*, aiming to spread false information on such subjects as vaccines, diseases, cures, and nutrition; and *economic,* aiming to manipulate markets, stock prices, and to sell fraudulent products. [4]

The problem of fake news is not new. In the first century, Octavian became Emperor of the Roman Empire, in part because he created fake news about his rival, Mark Anthony. Octavian portrayed Anthony as Cleopatra's puppet and published a false document that claimed Anthony's last will requested that he be buried with the Ptolemaic pharaohs.[5] In Ancient Rome, the dissemination of fake news would require handmade copies of documents and the use of "praecones" (town criers).

How is fake news disseminated? In today's digital world, humans quickly propagate fake news via Internet searches, comments on posed content, and clicks on "likes" and "shares." Additionally, AI-based software automatically creates content (including fake news) and reposts content on social media based on machine learning algorithms.[6]

Consider the massive dissemination of fake news stories during the 2016 US presidential election. The preponderance of these bogus stories were pro-Donald Trump and anti-Hillary Clinton.[7] In one study by economic professors at New York University and Stanford University, 115 pro-Trump fake stories were shared on Facebook 30 million times and 41 pro-Clinton fake stories were shared 7.6 million times.[8] Among the top fake stories were claims that Pope Frances endorsed Trump, which was shared or commented on 960,000 times, and that WikiLeaks confirmed that Hillary Clinton sold weapons to ICIS, with 789,000 shares.[9] Both stories have since been removed.

BuzzFeed News reported that there were more fake news story engagements (8.7 million) on Facebook than legitimate news story engagements (7.3 million) in the months leading to the 2016 US election.[10] Another academic study found that 25 percent of the 171 million tweets on Twitter in the five months prior to the 2016 election were fake or seriously erroneous news.[11]

According to testimony presented to a US Senate Judiciary Committee, Russia successfully inserted fake news on Facebook and Twitter during the 2016 U.S. election.[12] Academic scholars have done post-election surveys to determine whether voters were swayed by fake news, but a direct causal link from fake news exposure to voting behavior is difficult to ascertain.**[13]**

Why do people believe fake news? According to a 2019 global survey of over 25,000 Internet users, 86 percent of people admitted to believing at least one fake news story.[14] A number of academic studies have sought to rigorously uncover the scope of the problem and reasons why some people believe the content of fake news to be true. Stanford University researchers conducted field experiments and surveys with 7,804 US students from middle school, high school, and universities. The researchers found that across the board, the majority of students were not able to tell the difference between real and fake news. Most high schoolers, for example, simply accepted the picture in Figure 1 as fact. More than 80 percent of middle schoolers believed that "sponsored content" was a real news story.[15]

Figure 1: Can you spot the fake news?
Many high school students in a Stanford University study could not.
Source: Wineburg, S., McGrew, S., Breakstone, J. and Ortega, T. (2016) [16]

Why do so many people believe what they see? While our coverage of the research here is far from exhaustive, it highlights that human beings are generally poor at identifying false information and that some personality traits and demographic factors affect this propensity.

- **Human biases.** Over 50 years of research on human decision-making shows that human behavior systematically deviates from what rational choice models predict.[17] Instead, humans are highly influenced by a number of cognitive biases. According to an article in *Science*, "research demonstrates that people prefer information that confirms their preexisting attitudes (selective exposure), view information consistent with their preexisting beliefs as more persuasive than dissonant information (confirmation bias), and are inclined to accept information that pleases them (desirability bias)."[18] With so many news sites, such biases may prompt individuals to select "echo chambers," that is, news sites that merely echo their ideologies.

  One interesting twist on human biases is that many people recognize these biases in others but underestimate their influences on themselves. Based on an academic survey of 1,299 people in the US, researchers investigated individuals' perceptions about the effect of fake news on others. As predicted, individuals in this study thought that fake news had greater effects on out-group members (those from a different political party) than in-group members.[19]

- **Repetition.** Another academic study shows that individuals are more likely to accept familiar information as true, suggesting that the more a person is exposed to a fake news story, the more he or she will believe its contents.[20] This makes the proliferation of fake news even more worrying.

- **Personality traits.** While common vernacular would suggest that some people are more gullible than others, some academics call this trait "reflexive open-mindedness." Reflexive open-mindedness is defined as "a tendance to unthinkingly accept incoming information as being valid and true."[21] In three studies with 1,606 participants, professors from the University of Regina and MIT examined the associations of an individual's psychological profile with their perceptions of the accuracy of fake news. Across the studies, individuals who had a general tendency of reflexive open-mindedness tended to believe fake news regardless of the familiarity of the news source or the presence or absence of the headline's source.[22]

- **Demographic factors.** These studies illuminate the demographic factors of people who are better or worse at identifying fake news. For example, a study by New York University and Stanford professors presented both real and fake news stories about the 2016 US presidential election to people after the election. Respondents were asked to judge whether the stories were true or false. Respondents who spent more time consuming media, those with higher education, and older people were better at discerning real and fake news.[23]

What are the consequences of fabricated fake news? Fake news stories undermine the public's confidence in the free press, and moreover, when fake news is believed, it results in a misinformed citizenry.[24] According to a 2019 global survey of over 25,000 Internet users, 44 percent of people said that their trust in media has declined as a consequence of fake news.[25]

It's not just the trust of the press that is at stake; fake news inflames social conflict, results in poor health outcomes (like swallowing bleach in an attempt to avoid COVID19), gives rise to radicalism, undermines the integrity of elections, manipulates markets, and so much more.[26] In short, fake news threatens the social trust we have in our institutions and in each other.

Fake news solutions

No single solution can eradicate fake news.[27] All parties in the ecosystem, including governments, journalists, publishers, social media platforms, and citizens have roles to play. The commonly used solutions today are deployed after-the-fact—they aim to detect fakes news that has already been created. These include:

- **Fact-checking websites.** According to Duke University, there are over 100 non-partisan groups worldwide that provide fact-checking services.[28] These include professional sites such as FactCheck.org, Scopes.com, and BBC's Reality Check.

- **Artificial Intelligence.** Social media platform providers argue that artificial intelligence tools can identify and prevent the spread of fake news. Mark Zuckerberg, Facebook's founder and CEO, for example, mentioned AI as a solution to fake news more than 30 times during his testimony to the US Congress after the 2016 presidential election.[29] So far, AI-driven solutions such as Facebook's Deeptext and Google's Perspective software are better at tagging hate speech than they are at detecting fake news.[30]

- **Legal liability.** The first amendment to the US Constitution guarantees freedom of the press in America.[31] A free press is a hallmark of any democracy, so government regulation to prevent fake news is not generally welcome as a solution. Today, a defamation lawsuit by someone hurt by the story is the main legal recourse against fake news. Defamation liability also extends to anyone who republishes it.[32] It is quite clear, however, that the threat of litigation is an inadequate deterrent.

- **Education.** As suggested by the demographic factors that contribute to a person's propensity to believe fake news, an educated citizenry is a powerful tool to combat fake news. Teachers have created countless examples of lesson plans for people of all ages, and many are available online. Readers can take action by fact checking stories themselves, unsubscribing to news from specific outlets, changing the way they use social media, and flagging a story they suspect is made-up.[33]

The ANSAcheck solution takes a different approach. Rather than responding to fake news after-the-fact, this solution authenticates the source of a news story and guarantees "the story came from ANSA."

The ANSAcheck solution

> *"We were attacked in the past when fakes news were tagged as ANSA news. We contributed to the problem because we cannot know who created and published fake news. With ANSAcheck, imposters cannot do that anymore because if it doesn't have an ANSAcheck tag, we didn't publish it."* — Stefano De Alessandri, CEO and managing director, ANSA[34]

About ANSA. The Agenzia Nazionale Stampa Associata (ANSA) was founded as a not-for-profit news cooperative in 1945 after WWII. ANSA was created to serve as an independent news agency, free from the control of the Italian government and private groups. Headquartered in Rome, today it has 36 Italian-based news organizations in the cooperative, with 78 offices around the world.[35] According to the Reuters Institute Digital News Report 2020, ANSA is Italy's most trusted news source.[36]

On average, ANSA transmits 3,700 news stories, 1700 photos, and 60 videos each day to digital platforms, including the Internet, TV broadcasts, and cellular networks.[37] Ninety percent of ANSA's activities are business-to-business (B2B), providing original, professional-based information to the media industry. The remaining 10 percent of its activities are business-to-consumer (B2C) on its website (https://www.ansa.it/), which displays a subset of the news it creates.

Giulio Anselmi is the president of ANSA, while Luigi Contu is the editor-in-chief, and Stefano De Alessandri is the CEO and managing director. De Alessandri, the leader of the ANSAcheck initiative, said ANSA is concerned about fake news. "Fake news is one of the biggest challenges facing traditional media organizations and social media platforms as it undermines the trust they have built with the public and advertisers, undermining their strategic asset that is their reputation," he said. "If we lose trust, we lose everything." [38]

To protect ANSA's reputation, De Alessandri wanted to find a way to prevent fake news from slipping into publication outlets. As a first step, he was looking for a way to avoid imposters, that is, fake news stories that appear to come from by ANSA.

In March 2020, for example, there were at least three imposter stories related to COVID-19. One falsely reported Italy's first death as that of a 24-year-old female. Another announced false homemade COVID-19 cures.[39] And a third falsely reported on the COVID-19 policies by the Italian government. The fake stories were distributed using the ANSA brand, format, and signature.[40] Instances like these prompted ANSA to launch the ANSAcheck project.

The project started in 2019 as a co-created innovation with ANSA serving as the subject lead and EY serving as the technology lead. Giuseppe Perrone, the leader of EY's blockchain initiatives in the Mediterranean, served as EY's leader. De Alessandri said of the collaboration, "We had the perfect combination of knowledge of our media business and knowledge of the technology." [41]

The goal was to provide a guarantee for the origin of an ANSA-created story and for that story to be traced through its entire history of updates and reposts. EY knew that blockchain technologies could provide the tamper-resistant authenticity of the story, provide traceability of the story over time, and allow readers or publishers to verify the story at any point in time. Moreover, EY has taken a unique position among traditional enterprises by advocating for public blockchains that provide open access to all. For that reason, ANSAcheck incorporated the use of the public blockchain platform Ethereum[*]in its solution.

Phase 1: The MVP

Following the best practices for building blockchain-enabled solutions, ANSA and EY served as the **minimal viable ecosystem** (MVE) to create and deploy a **minimal viable product** (MVP).[42] The purposes of an MVP are to test a product with minimal resources, accelerate learning through feedback from early adopters, and start building a brand.[43] ANSA, its customers, and readers would provide feedback to improve the product, such as proposing new features and functionality.

In Phase I, the ANSAcheck was just deployed on ANSA's website.

From a process perspective, the ANSAcheck solution works by assigning a unique hash** ID to an ANSA-created news story. If even one letter in the story is changed, the system will detect that it is not an identical copy to the original story. Stories IDs are batched and posted every 15 to 30 minutes to Ethereum, thereby creating a permanent record of the story on the public blockchain. The blockchain creates a tamper-resistant record that includes the story ID, the transaction ID, the timestamp, and the block number on Ethereum's ledger where the transaction is stored.[44]

Each ANSA story that is secured on the blockchain is accompanied with an ANSAcheck sticker (see Figures 2 and 3) to signal its authenticity to readers. Users can click on the ANSACheck sticker to query the blockchain about the source of the story (see Figures 4 and 5). If ANSA updates the story, another entry is recorded on the blockchain and linked back to the original entry to form a chain of provenance. The solution is registering about 3,000 news stories per day.
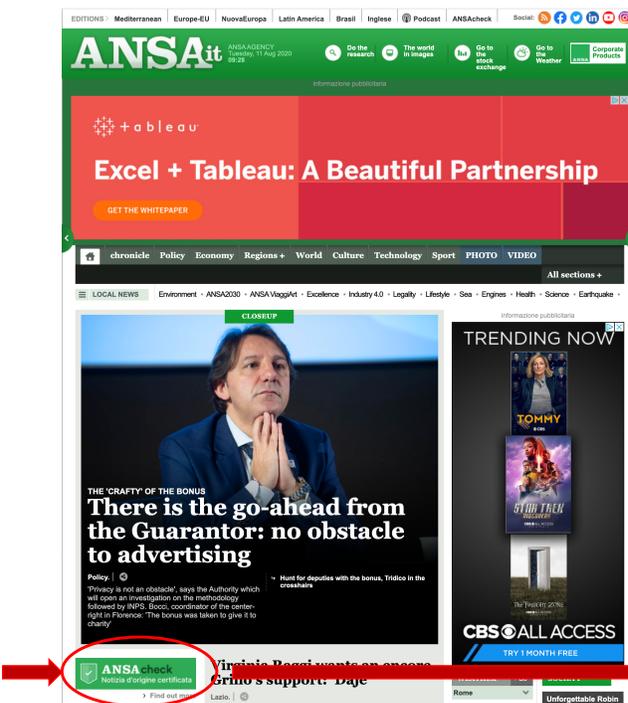
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[*] Ethereum was launched as an open network in 2015. It is supported by Ethereum Foundation, a non-profit organization based in Switzerland, as well as a vast global network of volunteer developers, validator node operators, and users.

** A hash is an algorithm for transforming one input into a different output. Given a specific input, the identical output will always be reproduced. A good hash algorithm makes it practically impossible to determine the input value based on the output value, which is why hashes are called "'one way'" functions. ANSAcheck uses the MD5 hashing algorithm, which always produces a 128-bit output.

Figure 2: ANSAcheck sticker

This sticker appears on all ANSA stories posted on ANSA's website (https://www.ansa.it/)*

Figure 3: ANSA Homepage with pointer to ANSAcheck description (August 11, 2020)
Source: https://www.ansa.it/ (Google translation to English)

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* ANSAcheck is language sensitive, so viewers who translate the website from Italian to another language will not see the specific stickers adhered to each news story; English-translation users will just see an explanation of the ANSAcheck solution as depicted in Figure 3.

Figure 4: Story verification on the blockchain

Source: With permission from EY

When users click on the ANSAcheck sticker, the console viewer displays the transaction details stored on the blockchain. Each story gets a unique ID using MD5 cryptography. In this example, the story headline is *Johnson, I still have a fever, I am staying isolated* and the unique story ID is 5b456347bf699bb9807b742e132c9120. This story was created on April 3, 2020 and the Block ID is AC202004031330.

Blockchain transaction data

Etherscan link

By pressing **VERIFY** the tool will start a real-time data verification by client-side hash calculation, retrieve the hash with the ANSA smart contract getter and compare it.

The verification will be 'animated' offering feedback similar to that of a console application.

ANSA check
Notizia d'origine certificata

CERTIFICATE

BLOCK ID
AC202004031330

BLOCK HASH
d841ff9d464fee3f93ae211f1b63e30 (MD5)

TRANSACTION HASH
0xadc600195857be4f138b1a15b400ee4adf799cae462e3d6abaf1ecca8c52928d

TIME STAMP
03/04/2020 13:34:26 UTC

BLOCK HEIGHT
9799299

VEDI SUL REGISTRO PUBBLICO

Verify news integrity

Informazioni contenute nel blocco

Run verification

AGENZIA ANSA - Iscrizione al Registro della Stampa presso il Tribunale di Roma n. 212/1948 P.I. IT00876481003
© Copyright ANSA - Tutti i diritti riservati

Figure 5: Query of the story on Ethereum via the console

Source: With permission from EY

In this image, users can see where the story is stored on the Ethereum blockchain. The story was added to Ethereum block number 9799299 on April 3, 2020 at 01:34:26 Coordinated Universal Time (UTC). The unique transaction hash is: 0xadc600195857be4f138b1a15b400ee4adf799cae462e3d6abaf1ecca8c52928d. By pressing the verify button on the console, the application performs a real-time verification of the story.

11

EY manages the end-to-end service. Chen Zur, EY's US blockchain practice leader, described the solution as "Notarization as a Service." EY manages the technical complexities of the solution, such as helping clients manage their digital wallets. In a blockchain application, digital wallets serve as the interface to the system. Digital wallets must be safeguarded with best security practices because they store private keys that authorize transactions. For the Ethereum blockchain, the digital wallets also need to maintain enough "ether," the cryptocurrency used to pay small transaction fees for processing and storing a transaction. EY makes sure that clients' digital wallets are funded with enough ether so that there is no disruption of service.*

De Alessandri said Phase I is "not the definitive solution on fake news, but rather the first pass. ANSA is a serious company that employs professional journalists and checks everything that we publish. This first pass does not guarantee the complete accuracy of the contents, rather it guarantees that this piece of news comes from ANSA, not from someone else."[45]

The solution will be enhanced with new features as learning is incorporated from Phase I.

Solution Components

The ANSAcheck solution is comprised of three components: a JavaScript library, the notarization system, and the user interface (see Figure 6).

Each publisher on the platform maintains a private JavaScript library that contains its original news stories. Using EY's OpsChain Traceability solution, JavaScript libraries are connected to the notarization system. The notarization system is responsible for posting the entry on the public Ethereum blockchain and also has a backend system that offers publishers the ability to join the blockchain solution.

Each registered publisher obtains a digital wallet to store their private keys for writing to the Ethereum blockchain. The user interface features a frontend dashboard for news distribution monitoring. This system allows news wire services like ANSA to track reposted news, including third-party reposts.

EY manages the transactions for posting on Ethereum using a smart contract.** The smart contract mitigates the risk of ether's price volatility by postponing the processing of new stories if the current cost of ether is too high. EY also keeps transaction costs low by batching multiple news stories within a single

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* As a public good, the Ethereum network is financed by users who pay a "gas" price to entice validator nodes (called miners) to select their transactions for processing. Users pay the gas price with "ether", which is Ethereum's native cryptocurrency. The price needed to entice miners depends on the computing intensity of the transaction—higher fees are needed for complex transactions because they consume more computing resources than simple transactions; the amount of traffic on the network—higher fees are needed during busier times; and the current value of ether which can fluctuate considerably each day.
** Interested readers may view the smart contract
https://etherscan.io/address/0xdc6b769db419e69c5f163048e880a02986d30376

transaction. Initially, EY was posting a batch of stories every 15 minutes, with an average cost per story of 6 cents. More recently, EY was batching roughly 500-600 new stories every six hours, so the cost per transaction dropped to around 0.006 dollars per story. Ethereum costs drove the decision to reduce the time of notarization. ANSA stories usually come in the news feed before they are launched on the website, giving EY time to register them on the blockchain.

As of October 6, 2020, 532,727 ANSA news stories had been posted on the blockchain. Approximately 72 percent of readers had clicked on the ANSAcheck explanation tab to learn more about it; 38 percent of people who viewed the article actually clicked on the sticker to perform the validation.
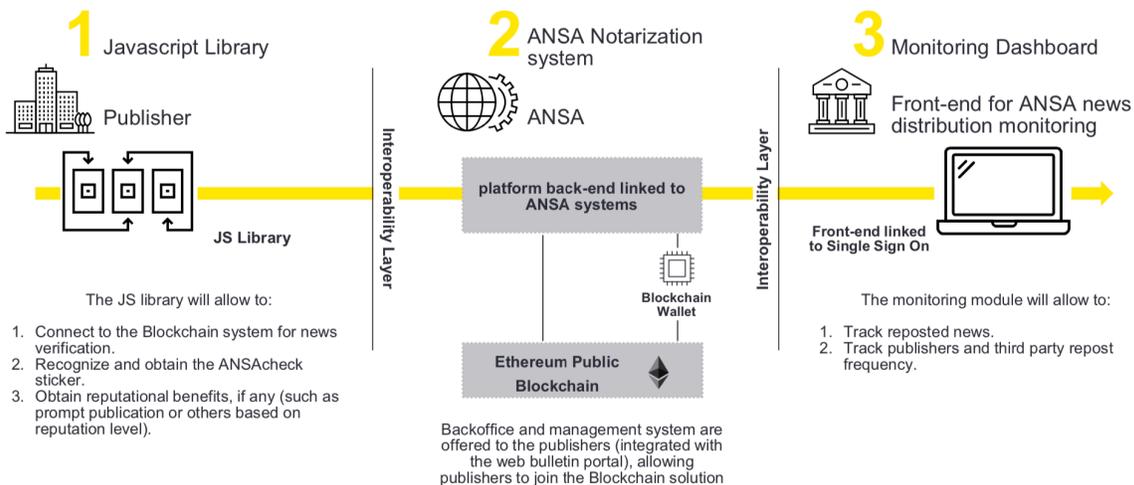

Figure 6: Solution Components
Source: With permission from EY

Phase II: Plans to expand the MVE and MVP

For Phase II, EY and ANSA are inviting other publishers to join the platform. As of September 2020, EY was working with three other Italian publishers who repost ANSA stories. The ANSAcheck solution is expanding its reach not only throughout Italy, but also to other publishers and social media platforms in the US and Europe. Many enterprises, including Facebook, have seen demonstrations of the solution.

EY designed a three-step process to link ANSA with publishers in their ecosystem (see Figure 7). In the first two steps, ANSA publishes and authorizes the story by posting it on Ethereum's blockchain, which was accomplished in Phase I. In the third step, other publishers who want to repost the story with the ANSAcheck verification system will register to use the platform. Publishers then will trigger a transaction

on the blockchain using their private key when they repost a story that has been notarized in the system. In the future, publishers will be able to customize the ANSA sticker to their brand, so it would display, for example, an *Il Corriere della Sera*-branded sticker on the *Il Corriere della Sera* website.

Once a community of ecosystem partners understands the value of Phase I, they next logically ask, "What else can the solution do?" EY plans to add other services to the ANSAcheck solution. EY's Perrone said, "The solution will become more sophisticated in terms of functionality and components, such as fact checking functions, semantic language analysis, and picture data protection."

In the first generation of the solution, a story must be an identical copy of the original—a change to even a single letter will signal that the source is not the original. In the next generation, the solution will provide a measure of overlap, similar to the plagiarism software familiar to many students. This way, publishers who repost a story can add their own commentary while still verifying the original news source.

Tracking the creators of stories, pictures, and videos is another important potential service for recognizing and complying with intellectual property laws. EY also plans to expand the service to authenticate images and videos.
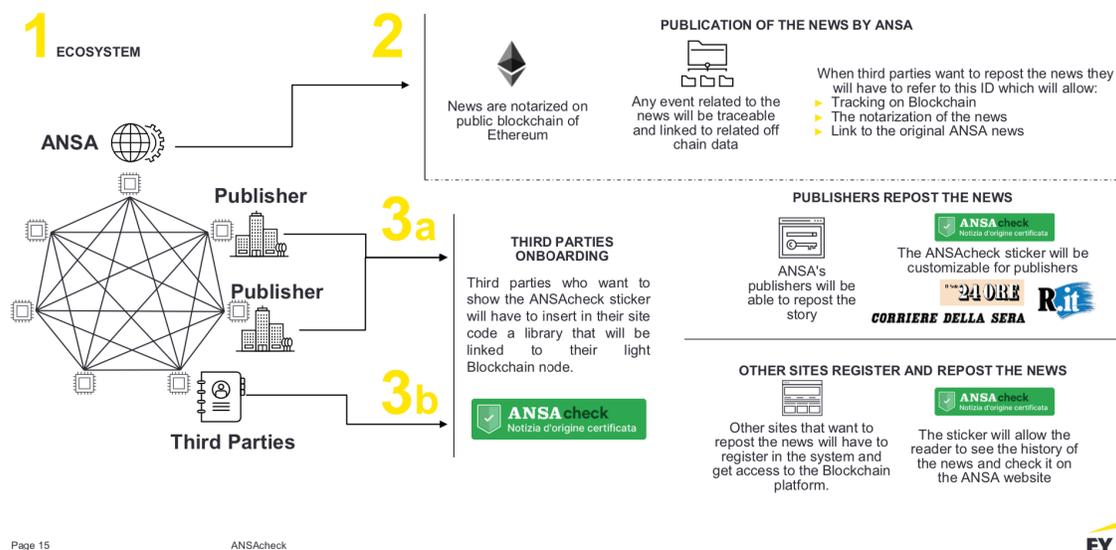

Figure 7: Three-step process for posting and reposting news
Source: With permission from EY

14

Lessons Learned

The ANSAcheck solution offers a number of lessons for other companies seeking to build ecosystem solutions using blockchains as an enabling technology.

1. Traditional enterprises can use public blockchains today.

As of Fall 2020, most traditional enterprises had built first-generation blockchain-enabled solutions on private networks called permissioned platforms, where joining the network is by invitation-only and where only authorized members validate transactions. EY has been a unique voice, advocate, innovator, and early adopter of public networks, according to Paul Brody, head of EY's Blockchain Technology. "Blockchain technology holds tremendous promise to bring in a new era of transparency, accountability, and efficiency in business," Brody said. "I am working to make sure that happens and, in particular, to ensure that open, decentralized and truly public blockchains are successful."

EY foresees that today's private blockchains will migrate to or will interoperate with public platforms once the technologies, standards, regulations, and governance models mature. This view is supported by history. Just as traditional enterprises first adopted intranets before they were comfortable using the Internet, many traditional enterprises may prefer private blockchains until they are more comfortable with public blockchain networks.

Brody and his team have developed a number of open-access innovations that allow private transactions on public blockchains. In 2019, EY launched Nightfall on Github and Baseline, developed with ConsenSys, in 2020.[46] These are a set of protocols that generate confidential transactions on public Ethereum. In essence, EY's idea is a "virtual private blockchain" similar to a virtual private network (VPN) that is connected to the public Internet, but data remains private from anyone not authorized to see the transaction.

It's worth noting that Ethereum—EY's preferred public blockchain network—is undergoing a complete architectural change called Ethereum 2.0. Ethereum 2.0 will be able to process more transactions per second and will reduce electricity consumption, while maintaining or even increasing security. Technically, this will be done by shifting from a proof-of-work to proof-of-stake consensus* algorithm and to allow sharding.**

When asked if EY was nervous about such a huge change, Chen Zur, EY's US blockchain practice leader, replied, "We are not concerned, as I'm sure we will be able to quickly adapt; in my eyes, change is always an opportunity."

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* Proof-of-work makes validator nodes compete for the creation of the next block of transactions in the network, which uses up a lot of electricity; proof-of-stake assigns a validator node based on the node's stake in the work, so it's faster and consumes less electricity than proof-of-work.
** Sharding is division-of-labor protocol that segments the validation process for new transactions in a blockchain network so that not every node validates every transaction. Its purpose is to improve system performance.

2. Select an MVE with one or a few well-respected and well-connected partner(s).

At the Blockchain Center of Excellence, we have seen different approaches to forming a Minimal Viable Ecosystem (MVE), i.e., the minimum number of ecosystem partners that are needed to successfully launch a minimal viable product. The common wisdom suggests that too many founding participants slow development; too few and the solution won't attract other ecosystem members who may fear the founders optimized their own benefits and will hold too much power.

We've concluded that effective MVEs are more about *who* is selected than the *number* of founding partners. Effective MVEs comprise founding member(s) with excellent reputations and with high network centrality. Other potential members who trust the founding member(s) will be more likely to join the application.

For ANSAcheck, ANSA was selected as the MVE. By having a single organization in the MVE, the solution was developed quickly. ANSA is connected to over 35 other publishers who trust and reply upon it. Perrone said, "ANSA as a news agency can involve other partners, editors, publishers, and their social networks to join the platform." Other ecosystem members also understand that ANSAcheck's value increases as the network grows, as tracing a news story across media outlets can only occur when other publishers join the solution. Moreover, other publishers can rebrand the story, so the reputation benefits do not only accrue for ANSA, but for all adopters.

3. Keep the MVP simple so potential adopters see the value without exposing them to a lot of risk.

Blockchains are a set of enabling technologies that can provide a variety of business benefits such as proof that events occurred, automatic execution of agreements among trading partners, and redundant and secure IT infrastructures that are tamper-resistant and always available. But the technology components themselves can be intimidating—cryptography, distributed digital ledgers, native digital asserts, digital wallets, and smart contracts. Enterprises with little experience with blockchain technologies feel more comfortable with initial solutions that are simple to understand both in terms of value potential and risk minimization. A successful minimal viable product (MVP) has enough functionality to attract early adopters without confusing them with too many features and options. ANSAcheck's MVP accomplishes both.

The first version of the ANSAcheck solution is easy to understand—it simply verifies the source of a news story. Any news publisher can understand the value, as all publishers fear the damage imposters can bring to their brand. EY reduces the risks of managing this new technology by offering services for clients so they do not have to become proficient with blockchain technologies to use the service. EY also protects their financial risks by clearing explaining the costs involved in the service.

ANSA chose to educate readers more on what blockchains enable rather than explaining the technical details. Readers do not need to understand all aspects of blockchains, but they do need to understand the notion of a digital notary.

"Readers understand what notaries are in the real world," said Perrone. "They are legal authorities that verify that data are correct. Blockchains are just a digital version of a notary. Readers also need to understand that they can touch the authenticity of the product—they can go see for themselves the source, whether that's a news story, wine bottle, or other asset."

4. Ensure that the solution creates business and social value for each participant type.

As Perrone points out, "It's very important to have a clear understanding of the main benefits for each actor." ANSAcheck adds value to readers, ANSA, and ecosystem partners.

For readers, ANSAcheck will ensure the authenticity of the source of news. Readers can obtain the history of the article by clicking on the verification sticker, which initiates a search on Ethereum to retrieve the records. The solution performs a real-time story verification by hashing the content of the post and comparing it to the hash stored on the blockchain. For now, the service is free for readers. In the future, publishers could bundle verification services in subscription fees.

For ANSA and other publishers who adopt the solution, the system protects its brand from imposters and will allow, for the first time, a way to track reposts. According to Perrone, "ANSAcheck adds value to ANSA by increasing the brand awareness and brand confidence and supporting the creation of a new business model." Additional services, such as tracking the number of reposts and other analytics, will help publishers accurately price their subscriptions and advertising fees.

For ANSA's ecosystem partners of publishers, it helps them become a quality provider of news because they are guaranteed of the story's source.

"This solution could help social media platforms to become reliable as a publisher in the future," De Alessandri said. "They can protect themselves from fake news and enhance their reputations." [47]

Conclusion: Preventing fake news will require many solutions

As of Fall 2020, ANSAcheck had been well received by readers and ecosystem partners, according to De Alessandri.

"The reaction so far has been good," De Alessandri said. "I have received a lot of compliments and interest in this solution. In our country, we were the first to market. Clients appreciate that we are certifying ourselves. We break news, and if we have to correct news, we rectify the news soon after. If we change the news we provided, we register the rectification on the blockchain. We are now more reliable and cautious than we were in the past."[48]

In addition to ANSAcheck, there are other blockchain-enabled solutions deployed or underway. Gartner estimates by 2023, 30 percent of world news (including videos) will rely on blockchain technologies for

authentication.[49] There will likely be multiple blockchain-enabled solutions that provide services such as establishing content authenticity, tracking provenance of content over time, blacklisting imposters, spotting "deepfakes" (content manipulated by artificial intelligence), and tying digital content to the physical world, for example, by tagging the GPS location of a photo.[50]

Some of these blockchain-enabled solutions, such as Poex.io and Po.et, provide a simple "proof of existence" service on the Bitcoin blockchain.[51] Creators of content can hash the content and post the hash on the Bitcoin blockchain to demonstrate when the content first existed. Other projects have more ambitious aims. The DeepTrust Alliance (a 501(c)) is tackling "deepfakes." Kathryn Harrison—the previous director of global product management for IBM Blockchain Platform—started DeepTrust because she believed a coalition of industry, civil society, and services is needed to "create the standards that verify the origins of content to combat digital fakes."[52]

Other solutions are tackling the provenance of visual content, such as the photos that accompany news stories. For example, *The New York Times* is working with IBM as its technical partner on the News Provenance Project (NPP) that aims to protect the authenticity of visual content. In 2019, the NPP conducted interviews to determine how readers decide whether a photo is credible. This research helped to identify several design principles, such as displaying multiple perspectives with their associated source (see Figure 8).[53] Microsoft also launched a deepfake detector for videos and images in September 2020.[54]
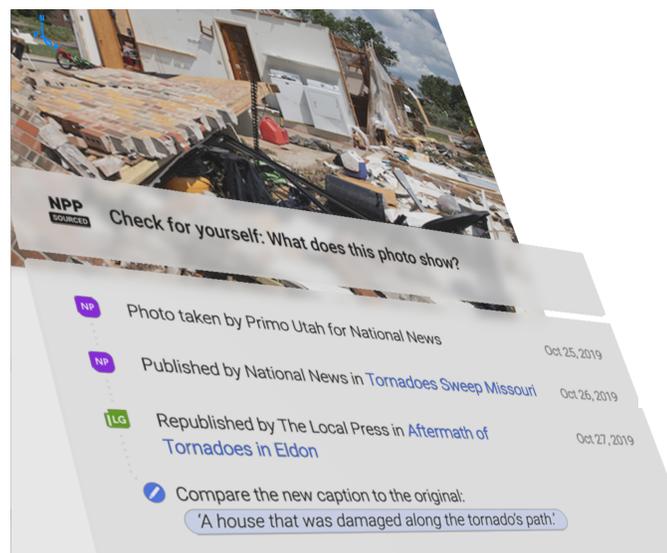

**Figure 8: New Provenance Project design principle of displaying sources
and comparing captions to assess photo credibility**
Source: https://www.newsprovenanceproject.com/about-npp

De Alessandri welcomes such solutions. "We were the first in Italy, but we don't want to be the only adopter," he said. "The value comes to readers, publishers, and journalists when everyone adopts a solution like this. Any tools to defend and enlarge professional information benefits democracy."[55]

About the Blockchain Center of Excellence (BCoE):

The BCoE is housed in the Information Systems Department of the Sam M. Walton College of Business at the University of Arkansas. The BCoE was officially launched by US State Governor of Arkansas, the Honorable Asa Hutchinson, on August 1, 2018. The center's vision is to make the Sam M. Walton College of Business a premier academic leader of blockchain application research and education. The BCoE's case study series is one activity toward achieving that vision.

Acknowledgements:

Thank you to EY and ANSA for their input on this case study. We also thank Stephen Caldwell, Chief Word Architect at Worldbuilders, for his editing services.

Disclosure:

EY has been on the BCoE's Executive Advisory Board since 2019 and is an active participant in the University of Arkansas's blockchain research and events.

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