# Project Cassandra IV: Final Assessment on the Identity of Bitcoin's "Unknown Coder"

## Executive Summary: Key Judgements

This report presents the conclusive findings of a targeted intelligence operation to resolve the identity of Bitcoin's "Unknown Coder." The investigation was initiated to resolve a critical contradiction concerning the Rank 1 candidate in the Project Cassandra III assessment, Gary Howland. Based on the resolution of that contradiction, the investigation pivoted to execute deep-forensic vectors against the next-highest-probability candidates, Adam Back and Dr. Richard Clayton, and to pursue a high-potential, unexecuted line of inquiry involving the cryptography@metzdowd.com mailing list.

The key judgements of this report are as follows:

- **Key Finding 1: Conclusive Elimination of Gary Howland.** The investigation has definitively confirmed that Gary Howland, the previous Rank 1 candidate, died on March 23, 2002. This date predates the Bitcoin development window by over five years, rendering his candidacy impossible. His file is now closed.
- **Key Finding 2: Re-evaluation of High-Probability Candidates.** The elimination of Howland elevated the investigative priority of Adam Back and Dr. Richard Clayton. The subsequent forensic re-evaluation produced critical new evidence. For Dr. Clayton, the investigation confirmed a profound and irreconcilable behavioral mismatch between his high-tempo public activity from 2008-2010 and the requirements of the coder's role. For Adam Back, the investigation produced a critical piece of corroborating evidence: confirmation that his primary work, Hashcash, was distributed with a Microsoft Visual C++ project file, directly linking him to the coder's specific and anachronistic development environment.
- **Key Finding 3: Outcome of New Intelligence Vectors.** The deep analysis of the cryptography@metzdowd.com mailing list archives was attempted. However, the investigation determined that no publicly available, complete archive containing the full email headers necessary for the primary investigative protocol exists. A modified,

keyword-based analysis of the available partial archives did not generate any new persons of interest.

- **Final Assessment.** Based on the synthesis of all findings, this report concludes that **Adam Back is the highest-probability candidate for the role of the "Unknown Coder."** The new evidence linking him to the correct development environment, combined with a plausible period of reduced public activity during the implementation window, provides the strongest holistic match to the forensic profile, despite remaining paradoxes.

# Definitive Resolution of the Gary Howland Candidacy: The Foundational Finding

The investigation commenced with the primary, case-critical objective of resolving the contradiction surrounding Gary Howland. The Project Cassandra III report identified him as the Rank 1 candidate via a strong "insider recruitment" vector, positing that Ian Grigg, a principal of the Satoshi team, recruited his trusted technical collaborator from the analogous Ricardo payment system project.[1] Simultaneously, the report included a citation for an obituary dating his death to 2002, a fact that, if confirmed, would invalidate his candidacy entirely.[1] The resolution of this point was paramount, as it would dictate the entire subsequent course of the investigation.

## Locating the Primary Source Evidence

The citation in the Cassandra III report provided the starting point: "Obituary - Gary Howland - 197? - 2002" with a URL fragment pointing to iang.org.[1] This identified Ian Grigg as the probable author and primary source. The investigative vector successfully located the source document, a tribute page hosted on Grigg's personal website.[2]

The document is unambiguous. It is titled "Obituary - Gary Howland - 197? - 2002" and begins with the definitive statement: "Gary Howland died in his sleep on Saturday, 23rd of March, 2002." The text is a personal and professional tribute from Grigg, detailing their collaboration on the Ricardo payment system and the SOX protocol, confirming that this is the correct individual identified in the previous report.[1]

## Corroboration and Final Verification

The statement from Ian Grigg is assessed as high-confidence primary source evidence. Grigg's direct, long-term professional relationship with Howland is well-documented and forms the basis of Howland's candidacy.[1] There is no discernible motive for Grigg to falsify this information; the document is a heartfelt eulogy for a friend and colleague.

The date of death, March 23, 2002, predates the entire estimated Bitcoin development window (2007-2010) by more than five years. This chronological impossibility is absolute. The contradiction noted in the Cassandra III report was not an error in the obituary's date but an analytical failure to fully investigate and synthesize a critical piece of counter-evidence. The previous analysis correctly identified the strong network link but elevated Howland's rank before executing the simple, decisive step of verifying the content of the cited obituary. This procedural oversight underscores the necessity of resolving all potentially disqualifying evidence before elevating a candidate's confidence score, regardless of the strength of supporting evidence.

## Final Assessment: Conclusive Elimination of Candidate Rank 1

Based on the high-confidence primary source evidence provided by his closest known collaborator, the Gary Howland who co-developed the Ricardo/SOX payment system with Ian Grigg died on March 23, 2002.

This finding conclusively eliminates him as a candidate for the role of Bitcoin's "Unknown Coder." His dossier is to be closed. This action forces a mandatory re-evaluation of all other candidates and elevates the investigative priority of Dr. Richard Clayton and Adam Back.

# Deep Forensic Re-evaluation of Dr. Richard Clayton (The Technical Fingerprint)

With Gary Howland eliminated, the investigation pivoted to Dr. Richard Clayton of the University of Cambridge. His profile presents a rare and compelling match for the coder's technical background: a "software developer by trade" who created "Turnpike," an early Internet access package for Windows in the 1990s, before transitioning into a UK-based

security academic active in the financial cryptography community.[1] This section details the execution of investigative vectors designed to close the critical data gaps concerning his specific coding style, network proximity to the Satoshi team, and behavioral profile.

## The Search for the "Turnpike" Codebase: A Digital Ghost

The coder's forensic profile points specifically to a 1990s Microsoft C++ practitioner who used Hungarian notation.[1] Clayton's development of Turnpike in that era makes him a strong environmental match.[3] The primary objective was to locate any surviving source code to verify the implementation language (presumed to be C/C++) and, most critically, the use of the anachronistic Hungarian notation naming convention.

A comprehensive search was conducted across software archives, legacy FTP sites, and developer forums for any surviving code, technical specifications, or contemporary reviews of the Turnpike software.[5] The investigation confirmed that Turnpike was a well-regarded Windows-based Internet suite from the mid-1990s, but no downloadable archive, source code repository, or mirror of the software could be located.[5] The software is effectively abandonware, and its source code is not publicly accessible.

The inability to locate the Turnpike source code means that the strongest potential piece of corroborating evidence—a direct match of his coding "fingerprint"—is irrecoverable through open-source intelligence. His technical match remains plausible and strong based on his professional history, which places him in the correct ecosystem (Windows), language family (C/C++ was the standard for such systems-level software), and era.[1] However, without the source code, the analysis can only confirm a match to the coder's *era and environment*, not to the idiosyncratic *style*. This transforms a potential "smoking gun" into a persistent and critical data gap.

## Network Analysis: Proximity Without Connection

A significant weakness in Clayton's profile, as noted in prior analysis, is the lack of any known link to the Satoshi team principals, Nick Szabo and Ian Grigg.[1] This investigative vector sought to establish such a link by analyzing their professional circles, particularly the Financial Cryptography (FC) conference series, a key intellectual hub for the field.

The review of conference proceedings and programs yielded the following findings:

- **Financial Cryptography 2008 (FC08):** Dr. Richard Clayton is confirmed as a co-author and presenter of the paper "Evaluating the Wisdom of Crowds in Assessing Phishing Websites".[1] This places him directly in the relevant intellectual and temporal space immediately prior to Bitcoin's launch. However, a thorough review of the program and committee lists shows no participation from either Nick Szabo or Ian Grigg.[1]
- **Financial Cryptography 2009 (FC09):** Dr. Clayton is again confirmed as a co-author of a presented paper, "Evil Searching: Compromise and Recompromise of Internet Hosts for Phishing".[14] Again, neither Szabo nor Grigg are listed as participants in the available conference materials.[16]
- **Wider Network:** A broader search for direct citations, collaborations, or online interactions between Clayton and Szabo or Grigg yielded no results.[17] While Grigg's awareness of Szabo's work is documented on his blog [18], no connection to Clayton was found.

The analysis confirms that Clayton and the Satoshi team principals were operating within the same professional orbit but provides no evidence of direct contact, collaboration, or mutual citation. This "proximity without connection" is a significant finding. A clandestine project requiring a high degree of operational security would most likely recruit from a pool of trusted, previously vetted collaborators. Recruiting a fellow academic from the conference circuit, with whom there was no established working relationship, would introduce substantial operational risk. Therefore, while Clayton's presence at these key conferences confirms his domain expertise and timeliness, it fails to establish a plausible recruitment pathway.

## Resolving the Behavioral Mismatch: A Conclusive Contradiction

The Cassandra III report identified a "Potential Mismatch" between Clayton's public-facing roles and the coder's reclusive, high-OPSEC persona.[1] The final vector for Clayton sought to resolve this by searching for a documented sabbatical, research leave, or any significant decrease in public activity during the 2008-2010 implementation window that could have accommodated the immense, secret workload of creating Bitcoin.

The evidence uncovered reveals the opposite. Dr. Clayton was not only publicly active but *exceptionally* so during the entire Bitcoin development period. A detailed review of his publication history and advisory roles shows a continuous and high-volume output of public-facing work, with no identifiable gaps or lulls.[10]

The sheer volume of this work, summarized in the table below, presents a profound and conclusive behavioral contradiction. The creation of Bitcoin's initial codebase was a massive undertaking requiring thousands of hours of focused, solitary work.[1] It is highly implausible

that an individual could maintain the high tempo of academic research, writing, international conference presentations, and parliamentary advisory work demonstrated by Dr. Clayton while simultaneously dedicating the necessary time to secretly code Bitcoin from scratch. The two activity streams are mutually exclusive in terms of both time and cognitive load. This finding severely degrades his candidacy.

| Year | Academic Publications/Presentations | Parliamentary/Advisory Roles |
|---|---|---|
| **2008** | • "Evaluating the Wisdom of Crowds..." (FC08)<br><br>• "The Impact of Incentives on Notice and Take-down" (WEIS08)<br><br>• "Do Zebras get more Spam than Aardvarks?" (CEAS 2008)<br><br>• "Security Economics and the Internal Market" (ENISA Report) | • Specialist Adviser, House of Lords Science and Technology Committee ("Personal Internet Security: Follow-up") |
| **2009** | • "Evil Searching..." (FC09)<br><br>• "Temporal Correlations between Spam and Phishing Websites" (LEET'09)<br><br>• "How much did shutting down McColo help?" (CEAS 2009)<br><br>• "Internet Multi-Homing Problems..." (WEIS09)<br><br>• "The Economics of Online Crime" (Journal of | • Specialist Adviser, All Party Internet Group (APIG) ("Can we keep our hands off the net?") |

|  | Economic Perspectives) |  |
|---|---|---|
| **2010** | • "On the difficulty of counting spam sources" (CEAS 2010)<br><br>• "Extending the requirements for traceability" (Blog Post)<br><br>• "Practical mobile Internet access traceability" (Blog Post) | • Specialist Adviser, House of Lords European Union Committee ("Protecting Europe against large-scale cyber-attacks")<br><br>• Specialist Adviser, House of Commons Science and Technology Committee ("Scientific advice and evidence in emergencies") |
| Table 1: Dr. Richard Clayton Public Activity Matrix (2008-2010). Sources: [10] |  |  |

# Deep Forensic Re-evaluation of Adam Back (The Temporal Match)

Adam Back remains a Tier-1 candidate due to his perfect geographic match (UK resident) and temporal match (he was contacted by Satoshi in August 2008).[1] The primary obstacle to his candidacy has been the "C++ Paradox"—his public preference for C over C++.[1] This section focuses on executing vectors to find definitive evidence related to his development environment and coding style to either resolve this paradox or deepen it.

## The Development Environment Link: A Confirmed Match

The Cassandra III report noted a potentially crucial link: the claim that Back's Hashcash source code included a project file for Microsoft Visual C++.[1] This would be a powerful connection to the coder's profiled ecosystem—that of a 1990s-era Windows developer. The objective was to locate the original source code repository and verify this file's existence.

The investigation identified Adam Back's personal website, cypherspace.org, as the primary

distribution point for the Hashcash source code.[19] Analysis of the source code directory on this site confirmed the presence of archives for the tool and library.[20] The description accompanying the source code download link explicitly states that it "Includes project file to build with VC++" (Microsoft Visual C++).[20]

This is a critical and definitive finding. The presence of a Visual C++ project file directly and irrefutably links Adam Back's seminal work to the exact, and by the late 2000s anachronistic, development environment identified in the coder's forensic profile.[1] While many cryptographers of that era worked primarily in Linux/Unix environments, this evidence confirms that Back, a UK-based cryptographer, specifically provided for compilation of his C-based project within the Microsoft IDE ecosystem. This finding forges a strong bridge between his known preference for C and the Windows-only C++ environment of Bitcoin's first release, significantly strengthening his candidacy.

## Stylistic Proximity Analysis: The "C with Classes" Hypothesis

With the development environment link confirmed, the focus shifted to a direct analysis of Back's coding style. The objective was to examine his public C code for any use of, or stylistic proximity to, Hungarian notation and to assess the "C with classes" hypothesis—the theory that a C purist compelled to use C++ would produce code that looks stylistically similar to Bitcoin's early source.[1]

An attempt was made to download the hashcash-0.28.tgz source archive from cypherspace.org for direct analysis.[22] However, the host was inaccessible at the time of the investigation, and the download could not be completed. Consequently, a primary source analysis of the C code for stylistic markers like variable naming conventions could not be performed.

This inability to access the primary source code creates a data gap, analogous to the situation with Clayton's Turnpike software. While the development *environment* has been confirmed, the specific coding *style* remains unverified. The "C with classes" hypothesis remains a plausible but unproven theory. The C++ Paradox, while significantly contextualized and weakened by the discovery of the VC++ project file, is not fully resolved.

## The Public Profile Paradox: Re-evaluating the "Hiatus"

A significant behavioral mismatch for Adam Back has always been his high public profile as a

well-known cryptographer, which contrasts with the reclusive nature of the coder.[1] However, some reports have suggested he was publicly quiet during the critical 2009-2010 development period.[23] This vector sought to construct a timeline of his public activity during the Bitcoin implementation window to verify or refute this claim.

A search of academic publications, conference proceedings, and mailing list archives (including the Cypherpunks mailing list archives) was conducted for Adam Back's public contributions from 2008 to 2010.[25] The findings indicate a notable lull in his discoverable public-facing professional activities during this precise window:

- **2008:** His email exchange with Satoshi Nakamoto in August is confirmed, placing him at the project's inception.[30]
- **2009-2010:** In stark contrast to Dr. Clayton, there is a lack of evidence of academic papers, conference presentations, or other high-profile public engagements during these two years.[23] His re-emergence as a prominent public figure in the Bitcoin community is documented as occurring later, around 2013.[33]

This apparent hiatus does not prove his involvement as the coder, but it critically mitigates the "public profile" mismatch. It establishes a window of opportunity during which he would have plausibly had the time and privacy to undertake a project of Bitcoin's magnitude. While his fundamental disposition is not that of a recluse, the evidence suggests he had the opportunity to operate as one during the relevant period. This stands in sharp contrast to Dr. Clayton, who had neither the disposition nor the opportunity.

# Execution of the Unexecuted Vector: The cryptography@metzdowd.com Archive

The final investigative vector was the execution of the deep forensic analysis of the cryptography@metzdowd.com mailing list, identified in the Cassandra III report as a high-potential but unexecuted line of inquiry.[1] The goal was to identify new candidates matching the coder's profile from the pool of individuals present in the exact forum where Satoshi Nakamoto first announced Bitcoin.[35]

## Archive Location and Integrity Assessment

The investigative protocol specified in the previous report is sound, but it depends on a

critical data prerequisite: a complete, searchable archive for the 2007-2009 period containing full, machine-readable email headers. These headers, containing IP addresses and server timestamps, are essential for the geographic filtering required to identify UK/EU-based participants.

A comprehensive search was conducted across multiple known archive sites, including the Satoshi Nakamoto Institute, mail-archive.com, and various public repositories.[35] These sources confirm Satoshi's key posts from late 2008 and early 2009, but the investigation concluded that **no single, complete, and fully searchable public archive for the entire 2007-2009 period with intact full email headers could be located**.[39] The critical data required for geographic filtering is not present in the available fragmented archives.

This is a crucial negative finding. The "unexecuted vector," in its ideal form, is unexecutable via open-source intelligence. The vector is a dead end unless a private or newly discovered complete archive emerges.

## Protocol Execution (Modified) and Findings

Given the absence of headers, a modified protocol was executed. This involved conducting keyword searches within the bodies of the available archived emails, focusing on the period from late 2008 through 2009. The search targeted technical keywords indicative of the coder's profile, such as "C++", "Visual C++", "Win32", "MFC", and "Hungarian notation".

The analysis of the discussions following Satoshi's announcement revealed that they were primarily conceptual in nature. Participants debated the economics, scalability, trust models, and cryptographic principles of the proposed system.[37] There were no significant technical discussions by other list members that matched the coder's specific Windows-based C++ implementation profile. The modified execution of this vector did not generate any new persons of interest.

# Final Synthesis and Ranked Assessment

This final section synthesizes the definitive elimination of Gary Howland, the new evidence concerning Richard Clayton and Adam Back, and the negative result of the mailing list vector to produce a new, evidence-based assessment of the most probable identity of Bitcoin's "Unknown Coder."

# Synthesis of Findings

The investigation has produced several pivotal findings that fundamentally alter the analytical landscape:

1. **The conclusive elimination of Gary Howland** invalidates the "insider recruitment" theory as the leading hypothesis and forces a re-evaluation of all other candidates.
2. **The deep-dive into Dr. Richard Clayton** confirmed his strong technical-environmental match but also revealed an irreconcilable behavioral mismatch due to his extremely high-tempo public activity from 2008-2010. This severely weakens his candidacy.
3. **The re-evaluation of Adam Back** yielded a critical piece of new, corroborating evidence: the confirmation of a Microsoft Visual C++ project file in his Hashcash source code. This provides a direct, verifiable link to the coder's specific and anachronistic development environment. This finding, combined with a plausible lull in his public activity during the 2008-2010 timeframe, significantly strengthens his candidacy.
4. **The mailing list vector was exhausted as an OSINT avenue,** failing to produce new leads due to the lack of a suitable public archive with the required metadata.

# Final Ranked Candidate Matrix

The synthesis of all findings produces the following updated, ranked assessment.

| Rank | Candidate | Final Confidence Score | Summary of Supporting Evidence (Post-Investigation) | Summary of Contradictory Evidence/Data Gaps (Post-Investigation) |
|---|---|---|---|---|
| 1 | **Adam Back** | **Medium-High** | • **Geographic/Temporal:** Perfect match (UK resident; contacted by Satoshi Aug | • **Technical Contradiction**: Publicly stated preference for C over C++. |

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|---|---|---|---|---|
| | | | 2008).<br><br>**• Technical Skill:** Elite expertise (PhD Distributed Systems, applied cryptographer).<br><br>**• Environment Match: CONFIRMED** link to MS Visual C++ ecosystem via Hashcash project file.<br><br>**• Behavioral Mitigation:** Plausible lull in public activity 2009-2010 provides a window of opportunity. | **• Behavioral Mismatch:** High public profile is inconsistent with reclusive persona, though mitigated by activity lull.<br><br>**• Data Gap:** Specific coding style (use of Hungarian notation) remains unverified due to inaccessible source code. |
| 2 | **Richard Clayton** | **Very Low** | **• Technical Background:** Strong match as a 1990s Windows developer.<br><br>**• Geographic/Domain Match:** UK-based academic active in | **• Behavioral Mismatch: CONFIRMED** to be exceptionally high-profile and publicly active throughout 2008-2010, making a secret project of this scale |

| | | | financial cryptography at the correct time (FC08/FC09). | implausible.<br><br>• **Network Link:** No known connection to the core Satoshi team (Szabo/Grigg).<br><br>• **Data Gap:** Coding style unverified as Turnpike source code is unavailable. |
|---|---|---|---|---|
| - | **Gary Howland** | **Eliminated** | N/A | **CONFIRMED** deceased March 23, 2002. |

## Concluding Assessment

The preponderance of evidence, synthesized through this investigation, indicates that **Adam Back is the highest-probability candidate for the identity of Bitcoin's "Unknown Coder."**

The elimination of Gary Howland closed the most compelling "insider recruitment" pathway, forcing a re-evaluation based on forensic profile matching. In this re-evaluation, the new evidence gathered has decisively shifted the balance of probabilities. While Dr. Richard Clayton's background remains an intriguing match, the confirmation of his continuous, high-profile public activity during the development window constitutes a near-disqualifying behavioral contradiction.

Conversely, the investigation into Adam Back produced a powerful new piece of corroborating evidence. The confirmation of a Microsoft Visual C++ project file in his Hashcash distribution forges a direct, tangible link between him and the specific, anachronistic development environment of the coder. This finding provides a strong context for the "C with classes" hypothesis, reframing his C++ aversion not as a disqualifier, but as a plausible explanation for

the Bitcoin code's particular style. This, combined with the evidence of a plausible lull in his public activity during the critical 2009-2010 period, mitigates the primary behavioral contradiction and makes his candidacy the most parsimonious fit for all available evidence.

While definitive proof remains elusive, the weight of the new intelligence gathered in this investigation points more strongly to Adam Back than to any other individual. The primary objective for any future intelligence-gathering effort should be to acquire and analyze the source code for Hashcash v0.28 to seek direct stylistic evidence of Hungarian notation or similar conventions.

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