Where is the $190M lost funds?

An Initial Analysis of the Nomad Bridge Attack Lost Funds

- August 15,2022 -

Highlights

- The total loss is around $190M. Until August 15, only $37M of lost funds have been returned.
- Two attackers (address clusters) control more than half of the lost funds. They have not returned any of the funds yet

On August 2, 2022, Nomad Bridge was attacked. Different from other security incidents, the way to perform the attack is very simple. Specifically, any user can copy/paste an existing payload to invoke the vulnerable function inside the smart contract (with his/her provided profit address) to get profit. Besides, there is no emergency pause mechanism inside the contract, almost all the funds have been drained, leading to a loss of around 190M USD.

On August 3, 2022, the project then published a Twitter to ask the whitehats (and researchers) to return the funds. Until today Until the release of this report (August 15), our analysis shows that though $37M funds have been returned, most of the lost funds are still not returned. This raises the question about the funds, i.e., where are these funds, and who is controlling them?

Timeline of the Incident

- On August 2, 2022, Nomad Bridge was attacked. The detailed attack analysis was in our blog.
- On August 3, 2022, Nomad Bridge published a Twitter that any whitehats (or researchers) can return the fund to 0x94A844.
- On August 5, 2022, Nomad Bridge further stated that any user who returns 90% of the funds would be treated as a white hat and will not be pursued legal actions.

Fund Return Analysis

Our analysis is based on the three vulnerable contracts in the following table. We treat all the transactions that invoke the process(bytes _message) function to directly withdraw funds as attack transactions (962 in total). Also, the fund return wallet address provided by the Nomad Bridge is also shown in the table.

Vulnerable Contracts	0x5d94309e5a0090b165fa4181519701637b6daeba 0x5bae47bf29f4e9b1e275c0b427b84c4daa30033a 0x049b51e531fd8f90da6d92ea83dc4125002f20ef
Attack transactions	transactions that invoke the process(bytes _message) function to directly withdraw funds (962 in total)
Fund return wallet address	0x94A84433101A10aEda762968f6995c574D1bF154

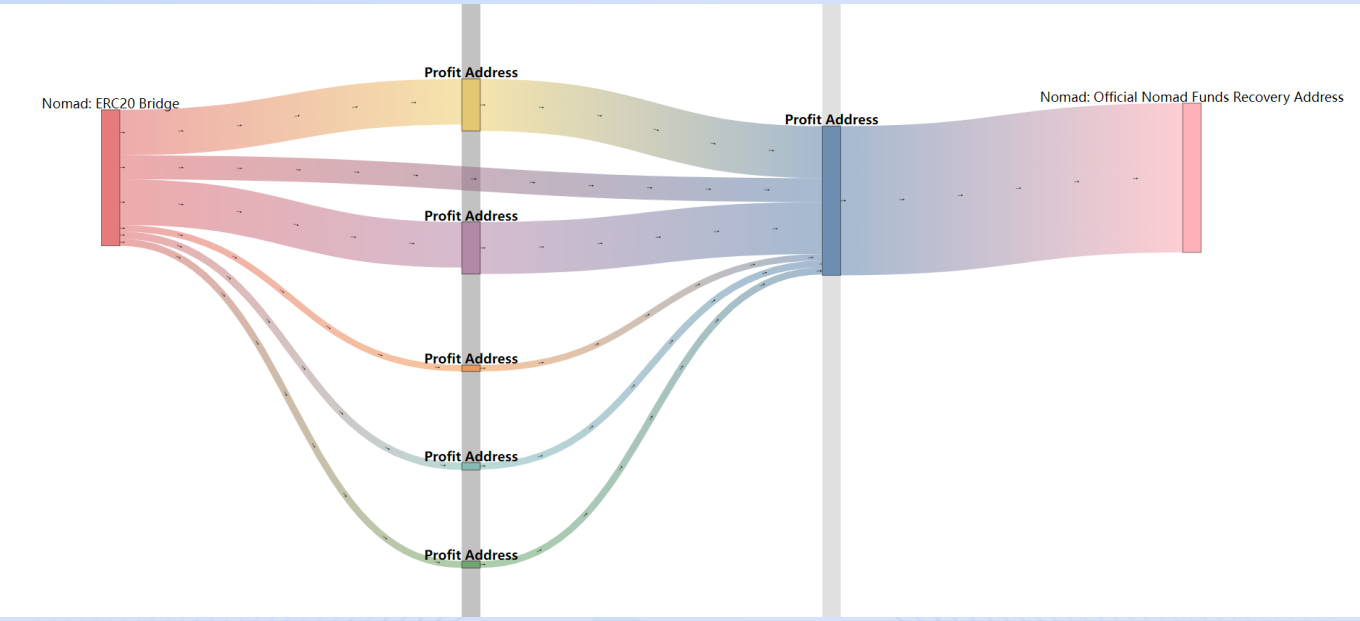
From 2022-08-01 9:32 PM (UTC) to 2022-08-02 12:05 AM (UTC), 322 addresses are involved in the transactions to exploited the vulnerabilities, and the funds are flowed into 329 profits addresses. Until August 15 03:00 AM (UTC), 65 addresses (among 329 profit addresses) returned all the funds, 50 returned 90% of the funds, and 7 of them returned less than 90% of the funds.Note that, before the official release of the return wallet address, 12 addresses have returned all the funds to Nomad: ERC20 Bridge contract.

For the remaining 195 addresses, 16 addresses have transferred the funds to Tornado.Cash, and 4 addresses are wrong profit addresses (Maker, WETH, FRAX, and empty addresses). This means the funds to these 20 addresses will be unlikely to be returned (worth $17M). Funds in the other 86 addresses are moving, and funds in the left 89addresses are still there.

The current state of fund returns		The amount of profit address
Return	100%	76
	>=90%	50
	<90%	8
	Total	134
Not Return	Funds have been transferred	86
	Funds have not been transferre d	89
	Funds have been transferred to Tornado.cash	16
	Cannot be recovered (The profit address is not controlled by the attacker)	4
	Total	195
The total number of profit addresses		329

Address Clustering Analysis

We performed clustering analysis on the addresses that initialize the attack and receive the funds. This analysis leads to 219 address clusters (the addresses in a cluster are mostly like to be controlled by the same entity). The following figure shows an example of a cluster that consists of six addresses.



The six profit addresses are most likely controlled by one entity

For 219 clusters, two clusters control nearly half of the lost funds. The following tables shows detailed information about these two clusters.

Representative Attack Addr	Amonut of attack txn	Address Cluster Size	Funds Exploited (Dollars)
Nomad Bridge Exploiter 1 Nomad Bridge Exploiter 3	60	14	Around $65M
Nomad Bridge Exploiter 2	22	201	Around $40M

What's more important, these two clusters have not returned any of the funds. This reveals the sad fact that although half of the clusters (106) returned all or partial funds, the returned funds are only $37M (which is only around 20% of the lost 190M.)

The current state of fund returns		The amount of entity
Return	100%	59
	>=90%	41
	<90%	6
	Total	106
Not return	Total	113
Total		219

Summary

In summary, until August 13, 2022, Nomad Bridge received around $37M lost funds. However, more than $100M funds are still in the two attacker-controlled address clusters. The funds to initialize the attack are from Tornado Cash, and the profits are not moving. BlockSec will continue to monitor the involved addresses and share any new findings with the community.

Exploited Funds

Asset	Number
CARDS	739,220
HBOT	11,803,219
GERO	58,533,691
SDL	322,459
FRAX	6,683,353
FXS	106,585
C3	7,122,372

Asset	Number
USDC	87,247,033
USDT	8,626,248
DAI	4,533,681
WETH	22,868
WBTC	1,028
CQT	113,553,931
IAG	516,961,197

Unrecoverable Funds

Profit addres	Profit	Attack transaction
Maker: Dai Stablecoin	50,040 IAG	0xddf94f16546ff3f9d2bbc866d3e91cbb6d01bc32f6ef593b095698c56d15f5fb
Wrapped Ether	17 IAG	0xbe09277affc0dbb3bf0a27b85a12dc37d8c41d9f50eb18e0cc7af1885e28f071
Frax Finance: FRAX Token	50,040 IAG	0x02455ed4b762dbd6fcb43a484a7c91535293a75a7e20a563a44a762bcc03489b
Null Address: 0x00...dEaD	150,040 GERO	0xbfc1e2761efbb93477d48ddf08f59c8ec0308b760f65e1a2bdb4dd2346360f1a
Total	$1,030	-

Contact Us

Mail: contact@blocksec.com
Website: https://blocksec.com
Medium: https://blocksecteam.medium.com
Twitter: https://twitter.com/BlockSecTeam