



# Addressing Exploit Abuse in EVE Online with Customer Care

Davíð Einarsson  
Senior Project Lead of Player Experience  
CCP Games



# What is EVE Online?

## Core Mechanics

- Player-driven economy
- Skill training
- Single Shard





# EVE Online's vibrant economy

Most items are manufactured by players

- All items are tradeable

Dynamic player-driven market

- Buy / Sell order system
- No central market
  - 1 million daily transactions
- Item value determined by supply & demand



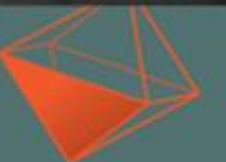


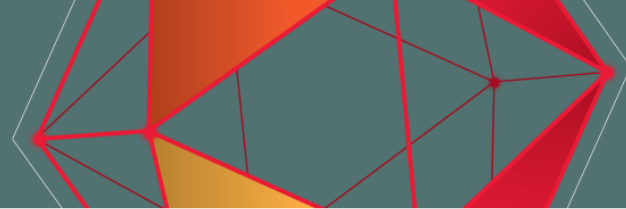


# EVE Online's vibrant economy

## Permanent loss of items

- Any item can be destroyed, or stolen by other players
- Meaningful achievements often come at the expense of your adversary





# Character progression - Skill Training

Unlocks new playstyles and grants bonuses

- Real-time, passive progression - Training continues even while offline
- Training Queue - Skill training scheduling system







# Character progression - Skill

Training Queue 2x

1mo 2mo 3mo 4mo

Amarr Cruiser	17d 20h 15m 25s	■ ■ ■ ■ ■ ×
Jump Drive Calibration	33d 8h 17m 53s	■ ■ ■ ■ ■ ×
Acceleration Control	14d 19h 41m 16s	■ ■ ■ ■ ■ ×
Afterburner	3d 16h 55m 19s	■ ■ ■ ■ ■ ×
Trajectory Analysis	17d 20h 20m 37s	■ ■ ■ ■ ■ ×
Remote Armor Repair Systems IV	1d 8h 47m 14s	■ ■ ■ ■ ■ ×
Capital Repair Systems	33d 10h 50m 19s	■ ■ ■ ■ ■ ×

1,627,060 unallocated skill points.

122D 9H 9M





# Character progression - Skill

## Training

No character classes

- Prerequisite skills

Variable training speed





# Clone States



## Alpha - F2P

1x Training Speed  
Limited Skill Pool  
24-Hour Training  
Queue



## Omega - Paid

~~Access~~  
2x Training Speed  
All Skills Available  
Unlimited Training  
Queue







# The PLEX factor

## PLEX - Pilot's License Extension

- In-game item - Represents Omega game time
  - Can be sold, destroyed and stolen
- Enables Omega upgrade with in-game cash (ISK)
- Enables real money to ISK conversion





# The PLEX factor

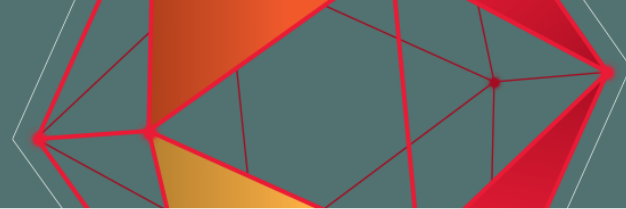
## PLEX - Pilot's License Extension

BO MOORE CULTURE 02.08.14 6:30 AM

**INSIDE THE EPIC ONLINE SPACE  
BATTLE THAT COST GAMERS  
\$300,000**

EVE Online player steals \$45,000 worth  
of ISK in massive investment scam





# Skill Trading

## Skill Extractors / Skill Injectors

- In-game items facilitating trading of skill points
  - Skill Extractors are purchased from CCP
  - Extractors remove 500,000 SP to create an Injector
  - Injectors grant up to 500,000 SP when consumed
- Enables conversion of character progression

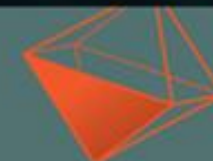


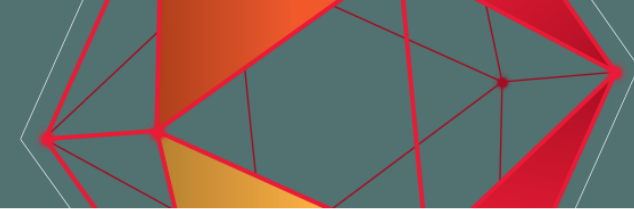




# EVE Online Summary

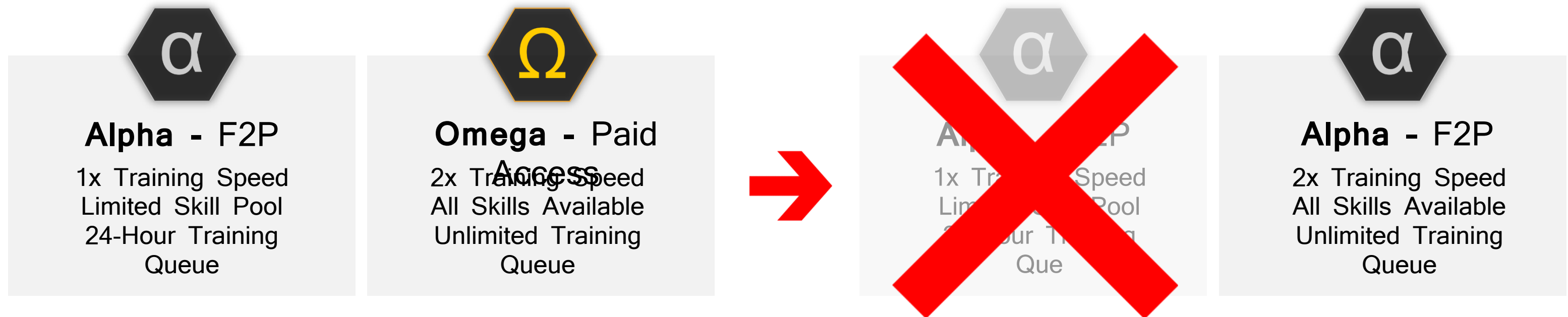
- Importance of the economy
  - Wealth = advantage
- F2P conversion is driven by enhanced progression
- In-game wealth is analogous to progression





# The 'Ghost Training' Exploit


## What is Ghost Training?





# The 'Ghost Training' Exploit

## Repro steps

1. Have an active Omega subscription
  2. Set a long training queue
  3. Lapse to Alpha
  4. Wait, without logging in
  5. Upgrade to Omega prior to logging in
- 

Result: All skill training in step 4 registered as Omega







# The 'Ghost Training' Exploit

## Effect

- Undermines the integrity of the economy
- F2P business model compromised





# The 'Ghost Training' Exploit

## Root Causes

1. Skill Training calculated on log in
2. F2P Implementation bug (CIS)





# The 'Ghost Training' Exploit

## Root Causes - Example 1

Week	January				February				March			
	One	Two	Three	Four	One	Two	Three	Four	One	Two	Three	Four
Actual Clone State	Omega			Alpha					Omega			
Training Credited	Omega			None					Omega			

Last Login

First Login







# The 'Ghost Training' Exploit

## Root Causes - Example 2

	January				February				March			
Week	One	Two	Three	Four	One	Two	Three	Four	One	Two	Three	Four
Actual Clone State	Omega			Alpha					Omega			
Training Credited	Omega											

Last Login

First Login





# The ‘Ghost Training’ Exploit

## Skill Farms

- Characters dedicated to Skill Extraction. Skill points sold on the market for a profit.
- Operated for “free”. Subscription maintained with PLEX.
- Labor intensive, but profitable!





# Timeline

- November 15<sup>th</sup> 2016 - Exploit introduced, F2P launch
- May 2017 - Social media outrage

Spoiler Alert: PLEX are spiking because of the ghost training exploit revealed on reddit last week. Can we get a CSM/CCP comment before this devours the economy? self.Eve  
Submitted 5 months ago \* by coelomate Goonswarm Federation

Here's how you can make 1.2T ISK Per Month For Free, CCPlease fix. self.Eve  
Submitted 5 months ago by Read\_The\_Bug\_Reports ★

TLDR: Letting an Omega expire while training will allow it to continue training at full speed.

- June 2017 - First iteration of fix



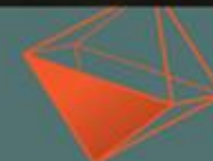




# Stopping abuse

## DB script

- Training queues forcibly paused
- Intended to stop ongoing abuse
- Script did not force a log in event





# Repro steps revisited

## Five easy steps

1. Have an active Omega subscription
2. Set a long training queue
3. Lapse to Alpha
4. Wait, without logging in
5. ~~Upgrade to Omega prior to logging in~~





# Assessment and planning

## Stakeholders discuss next steps

- Immediate commitment to address damage / intentional abuse
- Concrete data not yet available
- Preliminary investigation into skill farms revealed some intentional abuse
- Potential for abuse concluded to be very high





# Assessment and planning

## The „How“

- Automated reversal of trained skills ruled out
  - Inherently risky
  - Negative effect of removing prerequisite skills
- Decision made to manually address damage



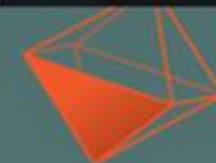




# Assessment and planning

„But why go through all that trouble?“

- Cleaning up a mess we created
- Protecting the integrity of the game
- It was the right thing to do





# Planning the investigation

## Data collection & analysis

- List of beneficiaries





# Planning the investigation

	E	I	J	L	N	O	P
	primaryFullNam	sp_ghost_trained	Characters	sp_extracted	Potential # of injectors	# of injectors extracted	Approx. Potential profit
2							
3	Player #1	1,230,875,975	310	-118,500,000	2,462	237	960,083,260,500
4	Player #2	1,210,847,841	222	-1,015,000,000	2,422	2,030	944,461,315,980
5	Player #3	1,011,081,646	179	-755,500,000	2,022	1,511	788,643,683,880
6	Player #4	694,308,423	196	-1,000,000	1,389	2	541,560,569,940
7	Player #5	406,438,100	132	-240,000,000	813	480	317,021,718,000
8	Player #6	370,932,483	205	-245,000,000	742	490	289,327,336,740
9	Player #7	331,180,968	80	-76,500,000	662	153	258,321,155,040
10	Player #8	242,742,658	27	-223,000,000	485	446	189,339,273,240
11	Player #9	219,249,722	124	-75,000,000	438	150	171,014,783,160
12	Player #10	213,651,247	75	-4,000,000	427	8	166,647,972,660
13	Player #11	164,391,639	72	-165,000,000	329	330	128,225,478,420
14	Player #12	160,876,858	48	-183,000,000	322	366	125,483,949,240
15	Player #13	154,425,397	94	-142,500,000	309	285	120,451,809,660
16	Player #14	137,213,823	62	-399,000,000	274	798	107,026,781,940
17	Player #15	132,124,332	38	-122,000,000	264	244	103,056,978,960
18	Player #16	110,005,314	34	0	220	0	85,804,144,920





# Planning the investigation

## Data collection & analysis

- List of beneficiaries
- Massive amount of SP ghost trained
  - Spread across tens of thousands of accounts, most insignificant



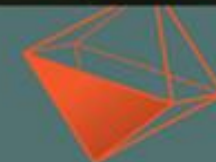




# Planning the investigation

Standard procedure created

- Modelled on our approach to addressing exploit abuse in the past
- Assumption made that beneficiaries exploited on purpose
- Punitive action





# Standard Procedure - Intent evaluated

- Intentional abuse - „Follow the money“
  1. Skillpoints not yet extracted
  2. Skillpoints extracted
- Unintentional benefit - No action
  - Team instructed to keep an eye out for massive benefit
- Importance of context stressed







# Standard Procedure - Action plan

Skill points not yet extracted

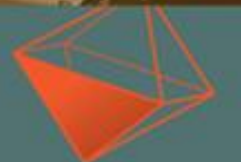
- Farm accounts - Permanent ban
- Main accounts - 14 day, 30 day or permanent ban

Skill points extracted

- Farm accounts - Permanent ban
- Main accounts - 14 day, 30 day or permanent ban
- Confiscation of ISK / Assets

Massive Unintentional benefit

- Cross that bridge if/when we get there





# The Investigation

For the first few days, no action was taken

- Ensuring Consistency - Gave us time to get familiar with the cases
- Turned out to be a very good call







# The Investigation

## Expectations shattered

- Majority benefitted unintentionally
  - In some cases due to the Training Queue pause script
  - Estimated 80-90% of reviewed players
- Some top offenders weren't operating skill farms
- Scale of the benefit too large to ignore





# Standard Procedure - Revisited

Focus shifted to confiscation of benefits

- Bans reserved for very serious abuse

Beneficiaries pro-actively contacted

- Situation explained honestly
- Transparent approach in initial communication
  - # of skill points ghost trained revealed
  - Highlighted potential ISK value of skill points





# Standard Procedure - Revisited

Choice of resolution given to players

1. Confiscation of potential profit in ISK
2. Confiscation of potential profit in asset value
3. Manual removal of skill points with CCP provided Skill Extractors

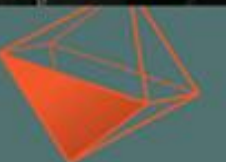




# Investigation - Results

We were met with almost unanimous co-operation

- Number of frustrated players far lower than anticipated
- Success measured
  - CSAT score of 80.95%
  - 21% response rate
  - Overall CSAT in 2017 - 91.16%



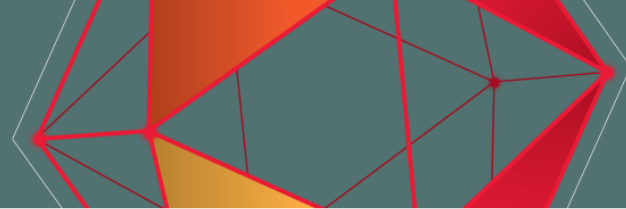




# Investigation - Results

- Honest and transparent approach set the tone for the conversation
- Player's choice of resolution was met with overwhelming appreciation





# Calculating potential profit

$$\text{Potential Profit per } 500,000 \text{ SP} = \left( \frac{740,000,000}{\text{ISK}} - \frac{350,000,000}{\text{ISK}} \right) = \frac{390,000,000}{\text{ISK}}$$

- 500,000 SP = Approximately 8 days of training
- 19.99 USD/EUR of PLEX = 1,432,5000,000 ISK
- 500,000 SP = 390m ISK = ~5.44 USD/EUR





# Sweetening the deal

	A	B	C	E
1	Character Name	Total SP	SP Ghost Trained	# extraction(s) needed - GHOST TRAINED SP
2	Character 1	61,141,391	4,720,544	9
3	Character 2	32,171,310	4,534,435	9
4	Character 3	81,784,228	4,530,787	9
5	Character 4	105,673,232	4,260,142	8
6	Character 5	63,328,588	3,937,798	7
7	Character 6	74,588,064	2,798,645	5
8	Character 7	152,343,085	2,739,376	5
9	Character 8	51,157,351	2,608,204	5
10	Character 9	29,251,297	2,473,287	4
11	Character 10	128,983,987	2,454,422	4
12	Character 11	28,756,936	2,000,410	4
13	Character 12	47,209,014	467,925	0
14	Character 13	7,260,978	119,148	0
15	Character 14	7,364,489	83,498	0

J	K
<b>Total SP Ghost Trained</b>	<b>Total SP GT (500k Increments)</b>
37,728,620	34,500,000
<b>Potential ISK Profit:</b>	29,250,000,000
<b>Profit - 500k Increments:</b>	26,910,000,000





# The investigation in numbers

## Scale

- Users reviewed - 6,036 characters operated by 119 individuals
- Permanent suspensions - 796 accounts operated by 23 individuals

## The Economy

- Value removed from the economy - 8 trillion ISK (8,006,012,824,325 ISK)
- 8 trillion ISK = 111,721 USD / EUR







# Customer Retention & Revenue

- 7 months after the investigation...
  - Retention rate of 57.85%
  - 6,531 Total game time purchases by these 119 individuals
  - 7,456 Months of game time purchased
  - Representing revenue of 139,779 USD / EUR
- High customer lifetime value





# What did we learn?

- Honest & transparent communication equals happy customers
- Importance of first impressions
- Benefits of direct customer involvement in the solution
- Validated importance of engaging with customers





I rarely take the time to compliment someone's services —especially when it relates to a video game. However, Lead GM Lelouch has been exceptional in dealing with me, and I feel that his work should be recognized.

For the past month and a half, I have been working with Lelouche on an almost daily basis. The issue to be resolved was not easy. Over 300 of my accounts had ghost trained as a result of a malfunction in CCP's system. I was not to fault, but regardless, the massive amount of sp that was generated had to be removed from my accounts.

When I was first contacted by Lelouche, the task at hand seemed daunting. I had not extracted most of the sp that was ghost trained, so I didn't have close to 1 trillion isk that could simply be removed from my accounts. I also didn't want to have to log into over 300 accounts, one by one, simply to extract the skill points so that CCP could remove them from the game. After all, this is a game, and if it not enjoyable, it is not worth investing time into it.

Somehow, through multiple back and forth messages, Lelouche and I agreed on a way that could make CCP whole again. Importantly, the resolution did not make me want to uninstall the game. If it were not for Lelouche's professionalism, understanding and reasonableness, I don't know if we could have found a resolution. I am thankful that he was assigned to my case.

Additionally, I would like to point out that Lelouche's messages to me were all extremely well written. They were thorough, concise and intelligible. This is so despite some of the messages involving significant mathematical operations. Lelouche's communications skills are exceptional.

As a whole, I think that Lelouche is an excellent member of the CCP team, and I wish him the utmost success in his career.

Thank you for developing such a wonderful game and, more importantly, such a great community.

**Rating****Good, I'm satisfied**

Exceptionally forthcoming and patient. Exemplary in every noteworthy aspect. If this wasn't a confidential exchange, this would be a prime example of how an employee can go out of their way to simultaneously deal with the aftermath of a company's mistake on an individual level, and project professionalism, confidence \*and\* a feeling of individuality towards a customer, despite a workload which surely warranted taking shortcuts and generalized, prepared responses wherever possible. Also featured: a fair amount of math and logic :)







# Improving Customer Relations & PX

- Improve communication
  - Increased honesty & transparency
  - Taking responsibility
  - Put down the banhammer
- Improve engagement
  - Involve the customer
  - Ask the player for feedback
  - Present choices whenever possible

