

Efficient Methods of One-Night Global Toy Delivery

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Abstract

With the world population now above 8 billion and three-quarters of a billion households to visit thanks to more millennials and zoomers living alone, the task of delivering toys around the world in one night is becoming increasingly difficult. Though an expansion of the naughty-list has attempted to decrease this annual burden, the nice list continues to grow, despite what your grandpa has been saying about younger generations not being as good as his. While I'm not getting any spryer, cutting-edge research from our R&D department manages to make the one-night toy delivery possible without outsourcing to FedEx [1] which would void my contract and I would lose my immortality [2]. This year we have made incremental improvements in the one-night path planning process by implementing NSGA-II, refined the clone genetics, further advanced the Sleigh integrated flight systems, and tuned upgraded from reindeer to Ramjets, switched to a new vigor serum now that we can't source white Rhino horn, and improved our logistical warehouse network by crushing a union. All the 2022 improvements are projected to increase our Time per Household (TPH) from 8.2us up to 11.6us despite the population increase.

Keywords: Christmas, Path Optimization, Traveling Salesman Problem, Cloning, Aeronautical Engineering, Aerial Countermeasures, Supersonic Flight, Super-human speed Vigor Serum, Parcel Delivery, Logistical Operations

1. Introduction

The annual mission to deliver toys in under one night has remained a technological arms race. By minimizing the available TPH through logistical and speed improvements [3] and decreasing the required TPH with a localized gravitational time warp [4], we have avoided the danger of losing the war on Christmas as warned in [2]. In between my time in the localized time warp and the effects of relativity, I am cursed to live +98% of my waking life during Christmas eve. It is a job that I must do or face deadly consequences [2]. With the new advances this year, Christmas may become something that I enjoy again.

2. Background

Though the world population increased ~0.83% this year, the nice list increased 1.23% despite an expansion of the naughty-nice list criteria as shown in appendix A and detailed in [5]. It is not up to Santa Clause to refuse a Child's Christmas wish list. Thankfully, many young children have begun requesting software-based gifts which require little to no logistical support to deliver and only bandwidth and an Xbox Live or Steam account. Though it is extremely rare for a

household to only receive software-based presents as most parents will still request fresh underwear and socks for their children, more adults are getting into Legos again.

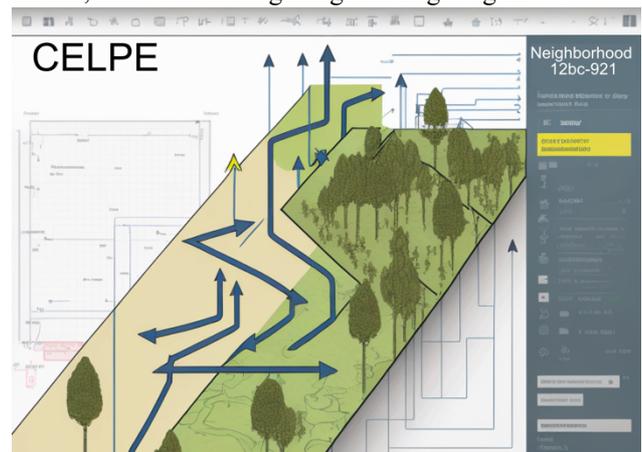


Figure 1: CELPE Screenshot: Neighborhood Level

Even without significant demographic or population changes, planning for global toy delivery is a constantly adapting and improving process to account for decreases in household fireplaces and the ever growing van life. The increase in rural living and van life seen during the pandemic

added an additional two million miles in 2021 alone [6]. New methods and system improvements are tested and refined in our simulation engine Christmas Eve Logistical Path Planning Engine (CELPE) which has been upgraded to incorporate live NOAA data [7] as well as other new process in this paper.

3. Path Optimization: Travelling Salesman Problem

Not a single company in the world has a [Travelling Salesman problem](#) as complex as the Kringle Enterprise delivery problem. Starting and ending in the North Pole, we must deliver presents or coal to all households around the world in under 42 hours from East to West following nighttime. Determining the optimum set of paths between cities, then towns, then individual houses and neighborhoods has proven to be too complicated to brute force even with our North Pole Quantum Computing program [8].

3.1 Multi-Objective Genetic Algorithm Solution

Using a multi-objective genetic algorithm (MOGA) [9] has proposed a solution to the TSP using NSGA-II. This application of the algorithm has been applied to use multiple salesmen which came in handy for the use of the clones to be discussed in section 4. Because of the NP-hard Multiple Traveling Salesman Problem (MTSP) presented by the inclusion of the Santa Clones, brute force search became impossible. Using a two-chromosome mutation method shown in Figure 2, we were able to simulate and solve for an optimum solution to 2022’s projected MTSP for the expected number of viable clones and family household locations.



Figure 2: MTSP GA Mutation Process

As shown in Figure 2, the genetic algorithm works by encoding the order of cities as numbers and splitting them up by Santa N Clone groups. Two chromosomes of numbers act as a Top Parent and a Bottom Parent to which they mix all their stuff together in some nasty algorithmic process with an adequate amount of mutating, gyrating, and rearranging of each Chromosome. The resulting Child then becomes a new parent hopefully with less baggage than the prior. The best children mate again while the worst become incels.

By encoding each M cities, then P suburbs, then O cul-de-sacs or streets into an ordered chromosome to be split between N Santa-clones and then rearranged through multiple

generations of sex, NSGA-II was able to be implemented in CELPE to evolve into an optimum set of paths in under four hours of computing on the North Pole Computing Cluster (NPCC). This was tested with high variability in locations which will be discussed in section 3.2. The path planning process decreased even more once the East-West nighttime following constraints were applied as developed in [10].

3.2 Van Life

Previous research in [11] showed the effects of extreme variability on path optimization when families make last minute decisions to visit in-laws due to guilt or not because of that thing your mother-in-law said to your wife that just felt unforgivable at the time. While the binary nature of this problem is easily accounted for by NSGA-II, it is more computationally taxing when accounting for the increased number of the world population living their best van life.

An initial study constraining the path optimization to the gas tank reach of a Honda Odyssey helped, it still wildly increased the computation time required for an optimization time three-fold. Because those who must fold up their bed if they want to use the stove for a grilled cheese sandwich need the Christmas Spirit more than the rest of us, a more elaborate constraint scheme was developed. We cross-referenced Bureau of Land Management maps of open camping, rest stop areas, and van-life blog posts for local tips on where the parking signs are too complicated to be prosecuted for to create a solution similar to [11] which accounts for the variable locations of van lifers.

4. Cloning Methods

While the perils of biological Santa Clause cloning developed its own issues primarily from Ms. Clause being an unwilling host, and tank bred developing their own issues [12], there was a breakthrough this year involving the misapplication of a teleportation machine.

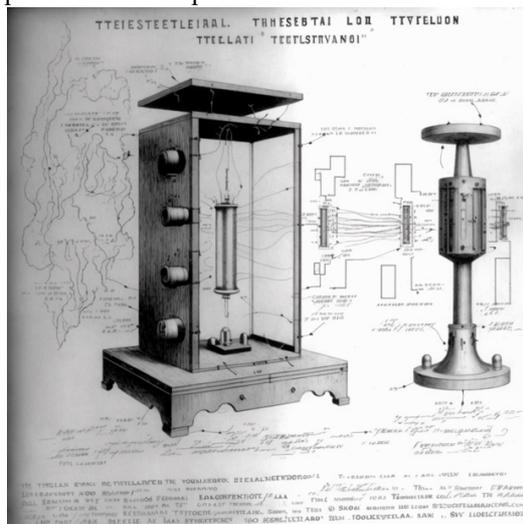


Figure 3: Tesla Cloning Machine

4.1 Tesla Machine

Earlier this year, we discovered a schematic by the late inventor Nicola Tesla. It took twelve days and nights for the elves in our R&D department to decipher the cryptic text Tesla used to encode this invention. Evidentially, it was designed to be used as a transportation device in magicians experiment a long time ago with the inscription to beware of the consequences of its use. After some experiments we could not figure out how to use the device to transport Santa and the sleigh from house to house in our North Pole training and drilling facility. After a few hours of experimentation, a half dozen Santa Clause clones were found frozen to death floating under the ice sheets of the North pole. It didn't transport me; it created a copy to be transported to its icy death. Now I know what Tesla meant by his inscription.

For this to work as a cloning device, we would need to capture each transported Santa Clone before it wakes up and store the Santa body and sleigh until Christmas time. This was accomplished by placing each Santa sedated in water tanks as shown in figure 4.



Figure 4: Santa Clone sedated in a water tank

4.2 Philosophical Concerns

While we collected more and more Santa-Clones, some concerns were raised about whether I was still fully me and the Santa's were fully Santa who could accomplish my annual mission. We weren't sure if I was spreading my essence too thin across these clones or if we were somehow using a real life [Banach-Tarski Machine](#). According to interpretations of the spiritual essence of Santa Clause in [13], my being is simultaneously whole, yet omni-present. We've always been thinking about sending Santa Clones at parallel Latitudes to make the job way easier but never knew how to do it. It looked like we could, but we had to know if we should. The power of Santa Clause in a being without the full spirit of Christmas is [a monster which should not be released on this world](#) [14].

After cross-referencing the metaphysical theories on Santa Clause by Spinoza [15] and then later codified by the Coca-Cola Company [16], we determined that these beings were in fact entirely Santa Clause. A brief experiment with an Elf revealed that when the Tesla machine was applied to a non-infinite creature, the resulting clone really lost its mojo and couldn't even make a slinky, while the Ms. Claus clone knew exactly how to bake those cookies if ya know what I mean.

4.3 Battle Royale

As stated in the contract of 386AD there can only be one Santa Clause [2]. Once these Santa's were truly awake and the job is done, only one would survive to eat Ms. Claus' cookies in celebration of another Christmas accomplished. In order to find the one true Santa Clause, upon returning to the North Pole, we will all land in the North Pole Lacrosse arena to dual till dusk, each armed with four-foot candy canes. The true rite of passage. Thirty Santa's will enter and only one Santa will leave. God, I hope it's me.



Figure 5: Santa Royale Rite of Combat

5. Sleigh Aeronautical Upgrades

As we accomplish every year [17-19], while we are always optimizing the path to visit each home, it still requires an incredible amount of speed, acceleration, and a growing arsenal of countermeasures for the more hostile countries I must visit to survive the journey. If we're delayed even by an hour by intercepting MiG's and I don't fulfill my contract, not only will I be dust by sunup, but all eggnog will disappear off the face of the earth [2]!

5.1 Super Sonic Acceleration

To complete the perilous journey, my sleigh must travel at a supersonic level to cross oceans (Thanks Oceana), but it

must also accelerate to supersonic speeds in fractions of milliseconds. As shown in figure 6, the Santa Sleigh remake v43.8 is now developed to be hypersonic within milliseconds. With an effective sled undercarriage and toy delivery system which meets system requirements specified in [18], it has maintained integrity in the hypersonic wind tunnel out to Mach 11. Though I long for the days of the two-seater sled, the single seat platform has been the only sled that's met the requirements of the world population since industrial farming was invented [21].



Figure 6: Sleigh version v43.8

The primary difference between this model and v43.7 developed in [19] is that we have made the controversial decision to officially transition from a reindeer jet powered platform to a Rams [Ramjet](#) powered platform. We were reaching the theoretical limit of Reindeer power around Mach 8 as their air intake valves not only created too much drag but are far more efficient at higher Mach levels. Thankfully for Dasher, Dancer, Prancer, Vixen, Comet, Cupid, Dunder, Blixem, and Rudolph (if he'll ever get over himself), the Ramjet only works at Mach 3 and therefore I'll still need my old crew to accelerate to that speed.

5.3 G-Suit

Back in the 1600's I was able to handle 8g's no problem. Santa isn't as fit as he used to be and almost crashed into the Himalayas if it wasn't for Dasher pulling up in time back in 1962. I wish I could take these turns easy but there's no way around it, Santa needs some artificial help pulling some high g's or little Johnny isn't getting his foam Minecraft sword. This year we've developed the Santa Clause Flight Suit (SCFS) model 18.2 to incorporate extra air pockets to shove even more blood into my brain on those tough turns. I've been

hitting the squat rack to squeeze those quads and thrust the blood back into my head myself but there's only so much you can do before my chronic heart murmurs takes over. I'm eating cookies from two Ms. Clauses now. We all remember what happened last time I didn't eat her cookies when she asked [22]. As shown in figure 7, the new flight suit doesn't just look good, it's been tested in a joint exercise on a Kringle out boarded Lockheed Martin XFMAS-86.



Figure 7: New Santa Flight Suit 18.2

It might be a few years before we can fit the XFMAS-86 thrust vectoring into the v43.7 model of the sleigh but we've had the same amount of dog fighting as the real XFMAS-86, zero. The suit was able to keep me wide awake through a superhuman amount of maneuvering that would have made Tom Cruise Squeamish, and kept me alert enough to know when to turn to the next neighborhood.

5.4 Aerial Counter Measures

While Christmas is normally a universal night of global peace, some countries do not let their guard down. While we have been able to outmaneuver anything China, Russia, or the US has sent at us since sleigh version v41.2 [23], the evasive maneuvering eats into the average TPH when intercepted. Time is presents! It's best to fool those radars. Using advanced electronic warfare capabilities, we have equipped the v43.7 with a state-of-the-art Jingle-Bell Jammer utilizing [REDACTED] and even some [REDACTED] which can even fool the [REDACTED] system by exploiting its [REDACTED] [REDACTED] problem. I can't go into detail on how that works, or China, Russia, and the US will steal it all!

6. Vigor Serum

Santa doesn't just have trouble keeping awake through the high-G turns, Santa has trouble staying awake during the long stretches across the Pacific and keeping spry enough to fit through Chimney's and maintaining the dexterity to unlock people's windows with a coat hanger and a screwdriver [24]. Since the 1820's it's been getting a lot harder to get in and out of people's homes, especially for a 1600-year-old man. While the vigor serum developed in [25] has been shown historically to keep me alert and agile through the most vicious of house pets, canine or reptilian, we can no longer source the White Rhino horn.

In a new iteration of vigor serum, we have found an alternative to exponentially increase my own energy level without encouraging more poaching. As this is the first year with the Santa-Clones, there isn't enough White Rhino Horn in the world to provide the necessary v28.4 serum.

6.1 Performance Enhancements

Just as the previous v28.4 has enhanced Santa's present delivering ability, the new iteration v29.0 was found in a sample study of N=1 Santa Claus's to increase alertness 29% Jolliness by 12%, Cheerfulness by 18% and Good will by 8.2 Teresa's according to the Kringle physics metrics developed in [26]. Santas (N=1) were additionally able to increase their sit-ups by 5+/-0, pushups by 2+/-0, flexed arm hang by 20+/-0 seconds, V-seat reach by 2+/-0 inches, decrease their shuttle run time by 0.7+/-0 seconds and decrease their mile run time by 28.2+/-0 seconds according to their presidential fitness test results.



Figure 8: Santa after Two doses of v29.0 Serum

6.2 Ingredients

Other than a half gram of fentanyl free Methamphetamine and steroids, the serum v29.0 consists of 10mg of Caffeine, 28mg of Taurine, 16mg of Guarana, and 19mg of Glucuronolactone as recommended by Dr. Mittens Snowball III M.D.

6.3 Side-Effects

There's one thing that isn't changing between v28.4 and v29.0, Santa is going to need an extreme caloric intake only satisfied through milk and cookies. According to the tests on Santa Clauses (N=1), if the subject does not intake at least 1600 calories of highly processed sugar and a half gallon of milk every five minutes they will go into a diabetic coma. It is well advised this year for all households to prepare milk and cookies for Santa's and Santa-Clones or be well prepared with an insulin shot if they hear a loud thud in their living room.



Figure 9: Santa Passed out in a house that didn't leave Milk and Cookies

7. Logistics

Despite the best efforts to create an infinite worm hole bag [27], we are still stuck on vacuum packaging our presents which is a sixty-year-old technology [28]. To equip Santa with enough gifts in the right locations and warehouses, we have infiltrated the amazon warehouse network in exchange for pushing Amazon prime on all children through Mall Santa surrogates.



Figure 10: Elves staging for Christmas Eve in an Amazon Warehouse



Figure 11: Stopping the Manifesto of the EPR Demands

7.1 Elf Bathroom Break Monitoring

Naturally to allow for our elves to become amazon employees, they were required to maintain a certain quality of productivity not previously required by the elves work contract to be eligible for full benefits. To enforce the standard, invasive monitors were used to ensure that elf bathroom and smoking breaks would never exceed five minutes without a direct note from Dr. Snowball for Gastro-intestinal issues. This is all okay because these monitors applied to my own Naughty-Nice list checking and is maintained by elves who are as well monitored by other elves maintaining a KGB style circle of trust.

7.2 Elf Union Busting

When we transitioned to Amazon policies, naturally the elves were not happy. It was the only way for the Elves to interact with the normal Amazon employees according to the contract with Jeff Bezos. After three weeks of the policies, an Anarcho-Communist cell the Elves People’s Republic (EPR) started to organize as a union with even some talk to secure the means of production. While many of the elves were not old enough to remember the troubles of the labor movements in the 1870s [29], I stepped in as seen in Figure 11, to show the folly of their ways. Without centralized capital control of Christmas toy production, owned by the top 1% (me Santa Claus) there would be no incentive to expand toy production and CHRISTMAS WOULD BE OVER!

8. Results and Discussion

As shown in table 1, this may be the first Christmas eve in a long time I don’t come home a shell of a man. Everything is a major upgrade which will drastically decrease how long I’ll be working on Christmas Eve. The percent increase in efficiencies outside of the clones alone will account for more than the increase in world population. The clones might make it feel like only a month or two of work instead of years like it’s been for the last two hundred years.

	TPH Available Decrease	TPH Required
Path Optimization	1.9%	n/a
Clones	2518%	n/a
Aerial Upgrades	2.8%	n/a
Vigor Serum	0.3%	12.3%
Amazon Logistical Network	8.2%	n/a

Table 1: Overall upgrade Expected Performance

Don’t get me wrong I love what I do, but I just think if I’ve had the technology we’ve developed with AI, modern aerial materials, and this delivery network, I might still have the same love for Christmas that I had before the 1340’s when kids started asking for their parents back after the black plague hit Europe.

While I am excited for this Christmas to be the easiest it’s been since the 1700’s, I am deathly afraid of what is going to happen in the battle arena. How will such a violent affair affect my Jolliness? More concerning, am I going to be the one true Santa to emerge from the candy cane battel royale or will I finally taste the peace of death? For the first time since we

didn't know if we could source enough cabbage patch kids to meet the demand of 1983, I am afraid of death. I don't know if I'm ready. It's only the solace that there will be a stronger, faster, fiercer Santa Clause to protect, serve, and eat Ms. Claus' cookies after my potential death that I will gladly enter the slay, deliver the presents, and return with a smile into Tinsel Town Peppermint Lacrosse arena brought to you by Hasbro for a battle to the death. I welcome the fight. Let the best Santa should win.

9. Conclusion

Assuming the clones don't go haywire and ruin 1600 years of Christmas peace on earth in a violent uprising [14], or that the Elves' keep their workers contract, or my v43.8 sleigh doesn't burn up in re-entry after making the intercontinental path between oceans, this is going to be a fantastic Christmas. Last Christmas I slept for a week and a half before I didn't feel burned out. There's no number of self-help books that can make you feel whole after 39 months of waking hours delivering presents in a gravity well on Christmas Eve Time without a break. I just can't wait for January.

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Appendix A: Naughty-Nice List Criteria Expansion

As shown in the below tables, new criteria have been added or adjusted which affects the overall Christmas Point total score.

A.1 Anti-Social Behavior

	Negative NN points
Getting a Tattoo	-28
Participating in an argument on social media	-63
Using proper punctuation when texting a teenager and giving them anxiety	-6
Questioning Santa Clause’s simultaneous divinity and humanity	-18
Not giving a thank you wave or half jogging when crossing the street while a car is waiting for you,	-14
Posting an article online without reading it	-32
Singing Disney songs at karaoke (with the exception of ‘I’ll make a man out of you’)	-2

A.2 Pro-Christmas Spirit Behavior

	Positive NN points
Tell someone to not forget the true meaning of Christmas	+19
Look a supermarket bell ringer in the eye	+27
Turn your front yard into a daily light show	+24
Wearing a fun holiday sweater even if it barely fits	+8
Putting fuzzy antlers on a stranger’s dog	+30
Putting extra rum in the eggnog	+14
Turning up the volume on robotic dancing Santa Clauses	+6

A.3 Pro-Social Behavior

	Positive NN points
Calling your mother	+8
Using a Ukrainian Flag filter	+12
Attend a local city Counsel meeting	+20
Liking our Facebook Page https://www.facebook.com/TheRealJABDE	+763
Following us on Twitter @JABDE6	+655
Joining our Subreddit: https://www.reddit.com/r/ImmaterialScience/	+923