The Existential Threat of Climate Change, Nuclear War and Artificial Intelligence

Yash Lenka

Department of Political Science, Diablo Valley College

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Adjunct Professor John Kropf

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Abstract

This research paper examines the available research on climate change, nuclear war and Artificial Intelligence (AI) and how because of human nature, there is a significant probability that these could cause extinction of our humanity. These three areas are different but share a common link; the human factor and as actors, how humans have influenced each of these areas. First the paper looks at climate change, discusses past extinctions and its causes. How the industrial revolution brought capitalism and humans short-term thinking and run for economic gain has impacted the stability of our ecosystem. The Paper analyzes greenhouse gas emission, and how that causes the rise of temperature and if not controlled how it can bring us to our calamity. Next, this paper examines how war has been persistent in our history, an aspect of human existence and provides supporting literature from philosophy and religion. We look at nuclear war as a product of fear between nations because of mistrust instead of cooperation on nuclear projects that could make the world a more peaceful place. This paper examines the nuclear stockpile and if a nuclear war happens how, it can cause mass extinction. Finally, we look at AI as the newest technological advancement, and how the nations of the world are competing to outpace each other without the necessary ethical and regulatory controls to ensure the wellbeing of mankind. We explore how AI can be very dangerous when used in warfare. We also look at the factors if AI is deployed in war, how it can outpace us and why human great values like empathy and compassion will not come into picture.

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Charles Darwin mentioned in The Origin of Species “Man selects only for his own good: Nature only for that of the being which she tends.” It’s like the story of Jekyll and Hyde, which shows the dual nature of man and coexistence of opposing forces within a single individual. It most commonly represents the conflict between good and evil, higher and lower values, or rational and irrational tendencies. Human civilization has grown exponentially in a few hundred years with the start of industrial ages that provided abundant resources leading to the well-being of mankind. Providing a safe environment and enough time for humans to pursue education, religion, and spirituality, the industrial ages ultimately led to higher universal human values and peace on earth. The ideal modern man, like Dr. Jekyll, is well-educated and projects images of the “good” side in human nature, suppressing the conflict that the “evil” side provides. However, as we have seen again and again in our history, when this restraint is much needed of man, he acts like a hypocrite and gives in to the “evil” side for his own comfort. This paper provides a scientific exploration of three distinct aspects: climate change, nuclear war, and the rise of super capable artificial intelligence in warfare. When these aspects are married to the dark side of human nature, it has a greater probability of causing the permanent extinction of mankind. Before diving into individual topics, it will be beneficial to define a few terms that are used throughout this paper. “The baseline extinction rate is the normal rate of species loss due to natural causes, estimated to be about 0.1 to 1 extinction per million species per year. Mass extinction is defined as the loss of approximately three-quarters of Earth's species in a relatively short geological period.” (Nelson, 2024)

Climate Change and Human Extinction

Nature is inherently symbiotic and interdependent. The following story is a great example of this symbiotic relationship. Rapa Nai is the indigenous name for Easter Island, given to it by the Polynesian ancestors who inhabited the land around 700 AD. Benny Peiser in his

research “From genocide to ecocide: the rape of Rapa Nui” gives a detailed explanation of this regional mass extinction due to human impact. Within a period of about 1000 years, Rapa Nui Palm, birds, lizards, insects, and more were lost. Rapa Nui palm, which was indigenous to the island, was overharvested by original Polynesians to build canoes and transport the Moai rock sculptures from place to place. Rats brought by early settlers likely consumed the nuts of the Rapa Nui palm, preventing its regrowth and accelerating its extinction. Rapa Nui Palm, the only palm species endemic to Easter Island, went extinct between 1250-1500 AD. With the loss of palm trees, many species lost their habitats and food sources and started vanishing from the island. The loss of forests led to resource scarcity, which is believed to have contributed to internal warfare and a decline in the quality of life. When Europeans contacted the island, the Polynesian population had already decreased to a couple thousand from the high 15,000. With European invasion, “a series of slave raids and subsequent small pox pandemics in the 1860s further devastated the population, the population was chopped down to a mere 100-odd survivors in 1877” (Peiser, 2005). This small story shows the progression of events and how humans are capable of decimating their environment and, as a result, themselves. Over the next few pages, this paper will cover how humans have exploited the earth and are very likely to cause a sixth mass extinction if they stay on their course.

Our earth has gone through five major mass extinctions. It will prove helpful to explain the causes of these extinctions and see how current changes in climate are leading us to another one. “The End-Ordovician extinction occurred about 443.8 million years ago and is known as the first mass extinction. The extinction was caused by silicate weathering, where 86% of the species went extinct. After the End-Ordovician extinction, it took five million years and species immigration to fully recover biodiversity. The second, End Devonian extinction, had a high species loss at about 70-80% of species. One of the main factors of this extinction was ocean anoxia, which depletes the oxygen in the ocean. After this mass extinction, earth and its oceans took ten million years to recover the ecosystems and biodiversity. The third, End

Permian mass extinction, occurred 252 million years ago and involves the greatest biodiversity loss of all other mass extinction events, in which 95% of species are thought to have gone extinct. In this extinction, there were three phases that were responsible: high carbon emissions, rising temperatures, and ocean acidification. Some individual species started to reappear rapidly; it required about five million years for the reappearance of biodiverse ecosystems and the appearance of the dinosaurs. The End Triassic extinction, 201 million years ago, was caused by volcanic activity, rising temperatures, rising sea levels, and ocean acidification. These effects caused 76% of marine and terrestrial species to go extinct. For about ten million years, there was little biodiversity following the extinction. Finally, 135 million years later, dinosaurs became the dominant species of earth. Lastly, there is the most well-known mass extinction, the End Cretaceous extinction, which occurred 66 million years ago. This extinction was responsible for all the non-avian dinosaur deaths, with 76% of species going extinct. Scientists think an asteroid that hit the Yucatan Peninsula in Mexico is responsible for this mass extinction. Due to blocking of sunlight from the impact of the asteroid sending waves of heat and soot, all dinosaurs went extinct besides the bird species and mammals that gained dominance and survived. For about five million years, terrestrial species and biodiversity ceased to exist; however, three million years later, marine and terrestrial species returned and biodiversity recovered and thrived" (Nelson, 2024)

Now, many scientists are sure that the Sixth mass extinction will happen during this age of Anthropocene, where human activities have significant and lasting effects on Earth's environment and our ecosystem. "Fossils show that anatomically modern Homo sapiens emerged in Africa approximately 300,000 years ago" (Wong, 2017). However, early humans' impact on earth and ecosystem was very minimal and mostly regional until the industrial age started a few hundred years ago. In 1984, the steam engine was invented which ultimately started the industrial revolution. "The year 1784 shows global CO2 emissions of 17.47 million tonnes globally, compared to 1750, which shows global CO2 emissions at 9.31 tonnes

with a steady rise in between. By 1964, CO2 emissions were 10.82 billion tonnes" (Ritchie & Roser, 2024). Capitalism and the Industrial Revolution are deeply intertwined. Capitalist principles like private ownership, free market, wage labor came along with the Industrial revolution. Capitalism leads to significant wealth and power accumulation among a small segment of population. These uber rich people further exploited earth's resources and human labor to make more wealth. With the rise of capitalism, consumerism grew and the early 20th century gave rise to the stock market, which accelerated wealth accumulation for a larger segment of population. For capitalism to prosper it relies on the principle of profit and growth, and it creates a vicious cycle where profit, growth, wealth creation and consumerism are inherently linked with each other. This depleted Earth's natural resources and polluted the atmosphere. "Climate change driven by greenhouse gas emissions is dominant in anthropogenic environmental change. Key greenhouse gasses include carbon dioxide, methane, and nitrous oxide, which are now more abundant than at any time in the past 800,000 years of Earth's history" (EPA, 2024). Since 1750, atmospheric carbon dioxide levels have risen by almost 50% (NASA, 2024). Methane levels have risen up to 2.5 times compared to levels in the 18th century. Since the beginning of the Industrial Revolution, nitrous oxide levels have risen by about 20% (EPA, 2024). These greenhouse gases saw the most of their increase during the 20th century, aligning with the rise of industrial processes and production. As shown throughout history, extinction rates are positively correlated with global temperature change while the main driver of global temperature change is greenhouse gas emissions (Song et al., 2021)". Due to these greenhouse gases, temperatures on earth have increased incredibly fast. "Earth's temperature has risen by an average of 0.11° Fahrenheit (0.06° Celsius) per decade since 1850, or about 2° F in total" (NOAA, Climate Change Impacts). Elements of our ecosystem are deeply connected and they depend on each other. Global warming is just not the temperature rise, but it has significant impact on our forests and mainly on our ocean and oceanic species. "Between 1979 and 2021, the Arctic Ocean lost sea ice at an average of

31,100 square miles, an area the size of South Carolina, per year. Updated October 2022." (NOAA, Climate Change Impacts).

Although Darwin's theories of evolution and natural selection remain widely respected, most species will not have adequate time to endure the destruction of the environment at the hands of humanity. The World Wildlife Fund (WWF) and Zoological Society of London's Living Planet Report claim that "wildlife populations have decreased by an average of 69% in less than 50 years" (WWF, 2022).

These increases in temperature may seem small but have been accelerating rapidly due to greenhouse gases. Global warming, both atmospheric and in the ocean, is incredibly detrimental to species populations, as rapid changes in temperature lead to unstable climatic conditions. "A study by Haijun Song et al. published in Nature predicts that 'a temperature increase of 5.2 °C above the pre-industrial level at present rates of increase would likely result in mass extinction,' It is estimated that with this current rate of global warming, ⅓ of plant and animal species could be driven to extinction by 2070 (Román-Palacios, 2020)."

The video "Six Degrees Could Change the World (2008) - National Geographic Channel", made by Ron Bowman, describes what will happen to mankind when earth's temperature rises each degree and concludes that there will be mass extinction when this rise reaches six degrees. It claims that a six degree fall in temperature created the ice age. Similarly, a grim fate awaits us when the temperature rises six degrees from the current level. Vast regions of earth become unable to support human life due to lethal heat, humidity, or lack of fresh water. The biosphere will undergo dramatic reductions in biodiversity. Methane released from thawing permafrost adds further feedback, potentially locking the planet into a long-term "hothouse" state. The film frames this not as a near-term threat, but as the end point of a trajectory that humanity must avoid preventing a permanent mass extinction.

Nuclear War Leading to Mass Extinction

Recently launched Netflix movie “A house of dynamite” is a suspenseful political thriller that explores the chaos and the difficult path of decision making during a nuclear strike and beautifully portrays how fragile the fate of mankind is if a situation like this happens. The film does a fantastic job showing the unfolding of events from multiple viewpoints, politicians, military and bureaucrats during the final 18 minutes before the impact. This portrays how one decision can change the course of human existence on earth.

This fictional movie may not predict the actual course of events for mankind; however, history shows that there is a great probability that something like this will happen in the near future. Martin Hellman in his essay "On the Probability of Nuclear War” talks about the chance of a nuclear war in our future, "The lower probability per year changes the time frame until we expect civilization to be destroyed, but it does not change the inevitability of the ruin. In either scenario, nuclear war is 100 percent certain to occur" (Hellman, 1985). First World War happened because of a small event combined with escalation caused by a single or small group of human beings. This war caused unfathomable suffering for mankind. However, we as species did not learn from this event and within 30 years a greater and more violent war was raised by Hitler. "Sooner or later, the odds will turn against us. Even if we cut the risks by half every year, we can never get to zero". (Nye, 2022)

Starting with the ancient Greeks till the modern age, our history has seen countless numbers of war. War has been an integral part of many civilizations. If we look at the timeline of history the period of war will override the total period of peace. As Nietzsche (1968) puts it: “The valuation that today is applied to the different form of society is entirely identical with that which assigns a higher value to peace than to war: but this judgment is anti-biological, is itself a fruit of the decadence of life. Life is a consequence of war, society itself a means to war”. After the second world war, the use of atom bombs has been seen as a deterrence for new wars and

mankind has strived for peace and prosperity. However, many thinkers still think this period of peace is an alien concept compared to war as Eric Havelock puts it in his book “man was a fighting animal, or he was no man” (Havelock, 1972).

As human beings many of us follow a certain religion and try to be virtuous. As followers of these various religions, we tend to obey the gospels given by these religions. Many people believe that they will attend heaven by following teaching and practices taught by their religion. We may think war is a product of evil, so religion must denounce it, but looking at history, we find otherwise. Christian leaders justified the Crusades as a form of "holy war" and righteous defense, offering spiritual rewards for participants. The main reasons given were to free Christian people and the Holy Land from Muslim control and to grant forgiveness of sins to those who died in the effort. When we look at Islamic literature, we see the same. “This, O Muslim brothers, is who we are; we slay for our God, our God demands the slaying. I kill; therefore I am.” (Murawiec, 2008). Hindu holy text “the Bhagavad-Gita presents the god Krishna as a charioteer and war counsellor to prince Arjuna on the battlefield and described war as “the field of sacred duty” (Miller, 2004).

The Doomsday clock was created in 1947 by the Bulletin of the Atomic Scientists to visually symbolize how close humanity is to self-destruction from the threat of Nuclear war. “the time of greatest danger—two minutes to midnight—was set in 1953 after US and Soviet hydrogen bomb tests, while the time of least danger, seventeen minutes to midnight, was set in 1991 after the START Treaty was signed and unilateral initiatives on both sides removed many nuclear weapons from “hair-trigger” alert” (Kristensen and Norris, 2013). The Doomsday clock is currently set to 89 seconds to midnight, which is the closest it has ever been. The reason why The Doomsday Clock is set so close, is due to the current Russia-Ukraine and Israel-Hamas war, growth of artificial intelligence, and political instability and aggression caused by tariff wars. These increasing geopolitical tensions between nuclear powers, has led Russia to pull out of the

Nuclear treaty. If these events continue on, then the doomsday clock would be closer to midnight, which in turn increases the probability of the start of a nuclear war.

Only nuclear war has the potential to fully annihilate humanity. We have witnessed the massive destruction that nuclear war can cause, when Little Boy and Fat Man were dropped on Hiroshima and Nagasaki they caused unprecedented destruction through blast, fire and radiation leading to the death of over 2 million people. Xia et al. (2022) estimate that “over 2 billion people could die from nuclear war between Pakistan and India and over 5 billion between Russia and the USA”.

Officially nine Nations in the world, the United States, Russia, The United Kingdom, France, China, India, Pakistan, Israel, and North Korea currently hold nuclear warheads. “The size of nuclear warhead arsenals has been reduced from a combined global peak of over 70,000 in the 1980s, but ~12,512 still exist, with the USA holding 5,244 and Russia holding 5,889” (Kristensen and Korda, 2023). Lots of these warheads are deployed on intercontinental ballistic missiles (ICBM). “Approximately 4,400 warheads nearly half of all stockpiled warheads are deployed on missiles or at bases with operational launchers. Of these, we estimate that roughly 1,800 US and Russian warheads are on high alert atop long-range ballistic missiles that are ready to launch 5 to 15 minutes after receiving an order. (Kristensen,and Norris, 2013). ICBMs are known for their speed and maneuverability, making them difficult to track and intercept. As the movie “A house of Dynamite" shows, even if advanced countries think that they have the capability to destroy any incoming warheads in the sky or space, it’s not always likely.

A nuclear explosion on this scale is only the beginning. The most credible global catastrophe scenario that will result from nuclear war is the climate effect known as a nuclear winter. In these scenarios, “smoke from burning cities, industrial facilities and oilfields enters the upper atmosphere, disrupting sunlight for a period of years and leading to wide-scale crop failures and famine” (ÓhÉigeartaigh, 2025). During nuclear winter, a global climatic cooling event can occur due to widespread amounts of soot into the atmosphere due to fires from the

atomic blasts. This event will block sunlight, therefore decreasing the temperature all over the planet earth and because of this famines or crop failures are certain to occur. When the nuclear winter sets in, people in cities who have survived the initial blast will die from radiation related diseases. Due to shortage of resources and most of the surviving population that is not directly involved with agriculture will perish. In the next stage, surviving humans may turn into nomads and scavenge the earth for resources and widespread chaos and insanity will spread. With quality of life rapidly declining and because of limited resources, the fight for survival will begin, which will impact any remaining human species. As happened in Rapa Nui, this will lead to mass extinction of human species.

Threat of Artificial Intelligence

Artificial intelligence (AI) has been a theme for a lot of dystopian science fiction and movies in the 20th century. In the far future humans see AI as a substitution for themselves. AGI stands for Artificial General Intelligence, which refers to a type of hypothetical AI that possesses the ability to understand, learn, and apply knowledge across a wide range of tasks at a human level. However, the beginning of the 21st century has seen a leap on AI research towards reality. “Leading AI companies such as Google DeepMind, Meta and OpenAI are working toward building these advanced AI systems as part of their broader goal to create AGI. To achieve this goal, they are investing heavily in acquiring data sets, computer chips and data centres” (Murgia 2023).

Artificial intelligence (AI) is the broad field of creating intelligent machines, while neural networks are a core technology within AI that models the human brain to learn from data. “Experts anticipate that with continued scaling, the leading AI models that we are likely to see in five to 10 years — herein referred to as ‘highly capable AI’ — will outperform humans in a variety of economically useful tasks” (Harris, Harris and Beall 2023).

With advancement of AI another reality emerges. The countries that possess ‘highly capable AI’ will dominate the earth. There is already a large disparity that exists today between developed countries in the west and developing and under-developed countries of south Asia and Africa. With the advent of “highly capable AI’, this disparity will widen. “Finally, with limited bargaining power, Global South countries have become economically, environmentally and politically reliant on developed nations” (Armstrong 1981, 401–2). “A further decline in their economic capacity would exacerbate these dependencies, stifling not only their economic development but also critical aspects of development across multiple sectors.” (Abungu, Iradukunda, Cass-Beggs, Hassan, and Sayidali. 2024). This race to be first in AI advancement has already begun. USA launched a 500 billion dollar Stargate Project in 2025 to gain supremacy with AI research. The USA and China military are highly invested in creating humanoid robots and using ‘super capable AI’ in warfare.

What will happen when a country’s government that possesses ‘highly capable AI’ sees threat or simply just wants to assert its supremacy over the rest of the world? “In fact, military AI has already influenced armed conflict in several of these ways. Lethal autonomous weapons systems (LAWS) have already been deployed by various militaries worldwide” (Maas, Lucero-Matteucci and Cooke 2023, 247). “For instance, reports indicate that the Israel Defense Forces (IDF) has been using an AI targeting platform known as ‘the Gospel’, which aids them in identifying and attacking targets” (Feldstein 2024). “Reports also indicate that drone swarms were used by the IDF in Gaza in 2021, and that UAVs (unmanned aerial vehicles) were used by Russia in its 2022 invasion of Ukraine” (Maas, Lucero-Matteucci and Cooke 2023, 247). AI provides the government with technological advancements, such as UAVs or drone swarms that can be used for destructive purposes and cause harm to humans. “Notably, both state and non-

state actors are increasingly adopting AI in armed conflict, a trend that is likely to persist" (Brundage et al. 2018, 38).

In the past, ancient humans used mostly brute force when they fought against each other, for example crossbows, guns, and rocket-propelled grenades (RPGs) were invented. It was easier for humans to eliminate each other, but still humans were primary actors in conflicts. With AI human beings do not need to be actually present while doing lethal action. "The widespread availability of AI systems and AI-enabled weapons makes it easier for more actors to engage in attacks" (Brundage et al. 2018, 18). If humans are not present during the conflict, there is no opportunity to exhibit ethical human virtues like empathy and compassion. Humans have consciousness and values that make us seek greater good. AI, on the other hand, is made up of algorithms and data and can be built with no regard to human value systems.

Humans have physical limits and can't be exposed to certain lethal elements of nature for a long period of time. Whereas humanoid robots exceed humans, in terms of physical limits and can operate in any condition. "Second, autonomous weapons and robots can operate for longer durations and overcome human limitations such as exposure to toxic substances, smoke and challenging terrain, among others" (Hendrycks, Mazeika and Woodside 2023, 40).

Human nature can be less virtuous if autonomous and be tempted to use AI to increase the number and intensity of attacks in warfare. "Third, by increasing psychological distance between actors and their targets, as well as by offering anonymity, AI might encourage more frequent attacks, as it will be difficult to trace these actions back to perpetrators" (Brundage et al. 2018, 19). Also, if there is a mistake in a series of AI decision making attacks the consequence can be huge, resulting in horrific numbers of human deaths. "Lastly, if automated decision-making systems make errors, they could cause a series of quick automated attacks and counterattacks that could cause significant harm to civilians, further amplifying the destructive consequences of armed conflict" (Hendrycks, Mazeika and Woodside 2023, 15).

As countries become more competitive to get the most efficient AI weapon system their results can be more deadly and destructive to the human race and the global environment. “There are likely to be novel and vastly superior technologies, such as fully autonomous weapons, including drone swarms (Verbruggen 2021), and autonomous vehicles, such as submarines, resulting in more severe consequences within shorter time frames” (Feldstein 2024; Hendrycks, Mazeika and Woodside 2023, 13). “For instance, fully autonomous drones could be deployed in larger numbers simultaneously (Feldstein 2024), magnifying their impact within a shorter period. Highly capable AI might also introduce entirely new threats. For instance, it could facilitate the development of novel bioweapons (Hendrycks, Mazeika and Woodside 2023, 6, 7) by leveraging its training in biological research, such as pathogen studies, and expertise in bioengineering or biotechnology” (Egan and Rosenbach 2023). The autonomous nature of AI allows a person with no ability to design, construct or test AI weaponry to actually use it in armed conflict. “In future, such AI may provide individuals who otherwise lack the necessary knowledge or expertise with step-by-step directions on designing, constructing and testing bioweapons with custom features that enhance their deadliness, transmissibility and resistance to treatment” (Hendrycks, Mazeika and Woodside 2023, 7). “Both state and non-state actors could seek to create and use these bioweapons in armed conflict (Roffey 2004, 557), potentially leading to severe consequences, including numerous fatalities” (Juling 2023, 127–28). “Highly capable AI could also result in catastrophic consequences, such as the death of very many humans” (Bengio et al. 2024, 843). “Ultimately, such AI systems may acquire both the motivation and ability to pursue goals that are incompatible with human well-being such as altering the Earth’s environment to facilitate computing speed or actively disempowering humanity to prevent interference with AI goals” (Abungu, Cecil, Iradukunda, Marie Victoire, Cass-Beggs, Duncan, Hassan, Aquila and Sayidali, Raqda. 2024). WIth some imagination one could think of AI causing problems for humanity and the environment by simply

valuing mechanical and mathematical tasks without consideration of man and his world's well-being.

Artificial Intelligence (AI) possesses the ability to become incredibly harmful, if not used carefully or wisely. AI can be more dangerous with many risks, depending on the operator and his intentions or motivations. “Highly capable AI poses a significant risk of exacerbating these conflicts by amplifying their scale, frequency and severity. Experts have already examined how AI could be integrated into armed conflict, noting its potential to enhance it via: → weapons systems, making them more autonomous and superior” (Maas, Matteucci and Cooke 2023). Renowned author Albert Camus once said, “If we continue to develop our technology without wisdom or prudence, our servant may prove to be our executioner.” If we do not create and manage AI with a mirror of our greater values, then it can bring us to the brink of our extinction.

Conclusion

Renowned American astrophysicist Carl Sagan in his 1985 lecture in Glasgow said “Extinction is the rule. Survival is the exception”. Following the development of mankind through our history, this paper, ‘The Existential threat of Climate Change, Nuclear War and Artificial Intelligence (AI)’, concerns itself with the ultimate salvation or ruin of humanity. The duality of human nature makes the ultimate end to mankind uncertain. Are the concerns of climate change, nuclear war and use of AI to be viewed as threats or tools to test the ingenuity of mankind. When we analyze each factor, humans as the missing link could change it for good or bad. Case in point, the greenhouse gases of climate change do offer protection from radiation and trap enough heat for life to exist on earth. The same ecosystem can turn deadly and destroy us if humanity focuses on its selfish desire instead of nurturing the ecosystem that makes our life possible in this ‘Goldilocks planet’. The same way man could use nuclear energy to solve the energy crisis or detonate the warheads and self-extinct us. Finally, mankind can use AI creatively to address complex challenges and create a sustainable, peaceful, and prosperous

world for generations to come. In order to be able to cooperate with others to solve these problems we need to recognize the good values of our own human nature with all its complexities. Let us put our hope in this quote “The bond of our common humanity is stronger than the divisiveness of our fears and prejudices.” (Jimmy Carter, acceptance speech for the Nobel Peace Prize in 2002).

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