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Recommended Citation

Garrett, Terence. "Katrina, Rita, Challenger and Columbia: Operationalizing a Knowledge Analytic in NASA and DHS Crises." *Public Voices*, vol. 10, no. 1, 2007, pp. 23–35.

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Katrina, Rita, *Challenger* and *Columbia*: Operationalizing a Knowledge Analytic in NASA and DHS Crises

Terence Michael Garrett

Introduction

The knowledge analytic is based on the reality of organizations that are clearly defined by the people who inhabit them: executives, managers, and workers. Each level of the organization possesses people who have a way of knowing how to do their work. Problems in organizations arise when there is conflict, or incompatibility, of knowledges (plural). Hummel (2006) submits that those at the higher echelons of the organization, the executives, use numbers as power over subordinates. Problems are accentuated with the problem of “forced commensurability” where numbers become more real to the organization than the actual work experienced by the employees (61-2). The higher the level occupied, the more abstract is “the work.” Executives know their jobs in terms of mathematics, i.e., quantities, numbers, deadlines, budgets, and defining their work as such down the scalar chain of the organizational pyramid. Managers take the numbers and attempt to translate them into a usable form to dictate to workers what needs to be done using scientific management techniques. Workers know their work in terms of craftsmanship and first-hand experience that does not always translate into arithmetic form in turn usable for managers and executives (Hummel 2006; Garrett 2004). The knowledge analytic is depicted as...

Executives know the ideal product
Managers know the means as objects

Workers work (Garrett 2001; Hummel 2006).

Case studies of *Columbia*, *Challenger*, Rita and Katrina are useful for examination because the crises emanating from these important and notable events accentuate the organizational conundrum of the knowledge analytic. In the following sections, I will review and analyze

the NASA, DHS, and FEMA in their response to the respective crises in order to yield new insights for public administration organizations.

NASA Crises: *Challenger* & *Columbia* Briefly Explained

NASA has experienced several catastrophes since its inception, however, the *Challenger* and *Columbia* disasters merit extra attention because of the number of lives lost in each event and both were preventable. The *Challenger* space launch and explosion shortly after liftoff by O-ring failure of January 28, 1986 and the *Columbia* re-entry decision and loss due to structural failures caused by foam destruction of protective tiles (sixteen days earlier at liftoff) of February 1, 2003 are notable management failures in addition to their respective mechanical failings. Both tragedies could have easily been avoided had executives and senior managers listened to engineers lower in the organizational pyramid who had the best knowledge concerning their craft: in both instances the structural integrity of the space shuttle.¹

Challenger is well known as a classic example where an engineer, Roger Boisjoly of government contractor – Morton-Thiokol, refused to sign off on the launch decision even after pressure placed on him by management within his organization and from the Marshall Space Flight Center. Management, in this case preoccupied with deadlines, costs, and numbers, wanted to launch the shuttle with a colder than normal ambient air temperature. Boisjoly responded that the cold weather would lead to the O-rings not sealing properly and he “was asked to support my position with data, and I couldn’t support my position with data” (Presidential Commission on the Space Shuttle *Challenger* Accident, 1986, Vol. IV, pp. 664-667). NASA Management eight hours prior to the actual launch decided to go ahead with it anyway. Boisjoly strenuously objected and refused to sign the pre-launch paperwork citing concerns over the failure of the rubber O-ring to expand properly between the solid rocket booster segments in previous cool temperature launches that allowed “blow-by” of hot gases potentially causing an explosion (Garrett 2001, p. 69). Boisjoly’s fears were realized the next day when the *Challenger* exploded immediately after liftoff.

Columbia offers further insight into the failings of the NASA organization, especially at the executive and management levels. The shuttle exploded upon reentry into the earth’s atmosphere sixteen days after its launch. The mechanical cause for failure was from foam fragments that hit near the intersection of the wing and the main body of the craft that fatally weakened the surface area tile allowing for intense heat to burn through the structure. NASA engineers had repeatedly agitated in meetings, calls and email messages for management to examine via satellite the physical structure of where they believed the foam had struck. According to the Columbia Accident Investigation Board (CAIB), there were eight opportunities that management missed in order to deal with the tile damage (Garrett 2004, p. 393; CAIB Report 2003, p. 167). NASA managers such as Shuttle Program Director Ron Dittmore and NASA Mission Management Team Manager Linda Ham, feeling pressure from higher level NASA executives, refused to use scarce agency resources to examine the potential damage, citing cost overruns for the use of an Air Force satellite and a possible risky space walk. The agency managers: (1) did not have a contingency plan for a re-entry emergency, (2) thought nothing could be done in the event of such an emergency, and (3)

exhibited a lack of “safety-consciousness” where “bureaucracy and process trumped thoroughness and reason” (Garrett 2004, p.394; CAIB 2003, p.181). As in *Challenger*, management failure to recognize the importance of those who know the work best, the engineers, led to tragedy – the deaths, as before, of seven astronauts.

NASA Postscript: *Challenger*, *Columbia* Redux *Atlantis* and *Discovery*

The launch of *Discovery* brought about once again some of the worst fears from the NASA organization. Five pieces of foam, one piece weighed 0.9 pounds, fell at launch and if the largest piece had struck the shuttle, the result could have been the same as in the *Columbia* mishap (Schwartz, August 19, 2005). Over two years had passed since *Columbia* and “NASA engineers were surprised and disturbed when a one-pound chunk of foam broke free from this ramp area despite years of efforts to eliminate or reduce foam shedding” (Leary, December 16, 2005). The foam problem has not been resolved and the shuttle program has continuously delayed future scheduled flights of *Atlantis* and *Discovery*. NASA administrator, Michael Griffin, has asked Congress for more money as “the shuttle program will have to spend \$3 billion to \$5 billion more than planned to fly 19 more flights before the program ends in 2010” in addition to its annual budget in excess of \$16 billion (Leary, December 16, 2005). Is this déjà vu’ for the NASA organization?

The 2005 Hurricane Season: Katrina & Rita

The 2005 Atlantic hurricane season was one of the worst in history. Hurricane Katrina was one of the most disastrous with about 1,400 people dead,ⁱⁱ 3,200 still missing,ⁱⁱⁱ and 2 million victims^{iv} from the August 29, 2005 storm. The economic damages from the storm are still being tallied as the storm initially hit portions of Louisiana, Mississippi, and Alabama. Hurricanes are normal in the sense that the region has experienced them during “prime” hurricane season, which typically runs June 1 to December 1 each year. Increased technology and ability by the National Hurricane Center meteorologists have allowed for more early warning capability and predictability for the size and strength of hurricanes and where they may make landfall. By the time the storm hit New Orleans and the immediate Gulf Coast area, warnings had been issued several days before Monday, August 29, 2005.

The problem for public administration stems from the fact that government officials – federal, state, and local, and non-profit organizations (e.g., the Red Cross, etc.) were stymied by a lack of leadership, primarily from the federal agency that in the past usually heads and coordinates evacuation, relief and recovery efforts – the Federal Emergency Management Agency (FEMA). This leadership void was further exacerbated by partisan differences between the president’s administration, governors, and the mayor of New Orleans, respectively. States in the region tried to take the lead for aiding their respective citizens. Louisiana Governor Kathleen Blanco declared a state of emergency on Friday, August 26, 2005 and Governor Haley Barbour did the same the next day in Mississippi.^v Both governors attempted to

mitigate the scope of the hurricane's impact but their efforts, and those of local government entities, were lessened by federal inaction and lack of initiative. The conflict between government officials is captured by this exchange in *The Washington Post*:

Behind the scenes, a power struggle emerged, as federal officials tried to wrest authority from Louisiana Gov. Kathleen Babineaux Blanco (D). Shortly before midnight Friday, the Bush administration sent her a proposed legal memorandum asking her to request a federal takeover of the evacuation of New Orleans, a source within the state's emergency operations center said Saturday.

The [president's] administration sought unified control over all local police and state National Guard units reporting to the governor. Louisiana officials rejected the request after talks throughout the night, concerned that such a move would be comparable to a federal declaration of martial law. Some officials in the state suspected a political motive behind the request. "Quite frankly, if they'd been able to pull off taking it away from the locals, they then could have blamed everything on the locals," said the source, who does not have the authority to speak publicly (Roig-Franzia & Hsu, September 5, 2005, p. A1).

The mayor of New Orleans, Ray Nagin, complained that the state and federal help he had requested was ridiculously slow in coming. In addition to the inept response to his request for help, Nagin lamented the fact that people who were basically trying to survive were being castigated as thieves and looters:

I am telling you right now: They're showing all these reports of people looting and doing all that weird stuff, and they are doing that, but people are desperate and they're trying to find food and water, the majority of them.

Now you got some knuckleheads out there, and they are taking advantage of this lawless – this situation where, you know, we can't really control it, and they're doing some awful, awful things. But that's a small majority of the people. Most people are looking to try and survive. (Robinette, September 2, 2005)

The governors and the mayor had to deal with the aftermath of Katrina without much initial help from the federal government. Rather, the feds were primarily concerned with obtaining power and embarrassing state and local officials – from the perspective of the governor and mayor of New Orleans' office. In addition to the lack of aid, the mayor of New Orleans had to deal with a caricature of victims who had become "looters" when the reality was that he, and the people in the city, saw people trying to survive an awful situation.

The reorganization efforts by the Bush administration after 9/11 led to FEMA being placed under the auspices and organizational control of the Department of Homeland Security. As such, there was confusion as to who would be in charge in the event of a national calamity the size of Hurricane Katrina. Unfortunately for all involved, the decision to appoint a “Principal Federal Official” was made by DHS Secretary, Michael Chertoff, who in turn appointed FEMA Director Michael Brown who was unsure of whether he was in charge, even after the memo was received from Chertoff.^{vi} By the time Katrina hit the area, it was too late and thousands of residents were left stranded on their rooftops as the levees broke under the pressure of the storm surge of a category four hurricane. Thousands more residents evacuated to the Superdome and other city facilities only to arrive and find no food, water, transportation, or medical services available for several days after the initial landfall. All of this occurred despite the fact that federal, state and local officials engaged in a “preparedness exercise” the previous year dubbed “Hurricane Pam.”^{vii} By nearly every measure and analysis, the overall government response to Hurricane Katrina has been judged a disaster.

Hurricane Rita made landfall four weeks later on the border of Texas and Louisiana on September 24, 2005. Apparently the Bush administration was not going to allow a repeat performance of the debacle during Katrina. According to VandeHei and Balz (September 25, 2005), “Bush’s government was on war footing for Rita’s arrival: The Pentagon moved 500 active-duty troops to the region and put 27,000 National Guard soldiers on standby. Navy ships were positioned nearby, and the Federal Emergency Management Agency, whose performance immediately after Katrina symbolized the federal government’s mistakes, sent in helicopters, supplies and rescue teams” (A 20). Houston and Galveston, cities initially in the path of Rita, had been mostly evacuated though there was a tremendous problem of traffic jams with evacuees running out of gas and abandoning their vehicles on the interstates and other highways out of the cities. Rita had nowhere near the same impact as Katrina in terms of casualties (though there were a few as a result of the evacuation) but caused the Bush administration to take note of the importance of domestic natural disasters as compared to the impact of terrorist actions.

On the political front, material aid and support may have been more forthcoming in Texas because of the president’s political connections and history with the state as its governor. Governor Rick Perry (R) was the Lieutenant Governor during George W. Bush’s second term as governor of Texas. Partisanship has its limits as there is no way to prove that partisan political connections led directly to better agency coordination between the feds and the state of Texas for Hurricane Rita.

The Legacy of the Pyramid and Having It Both Ways: Executive Level Rational Detachment Leading to Disaster in Crisis Management

“Management decisions made during Columbia’s final flight reflect missed opportunities, blocked or ineffective communications channels, flawed analysis, and ineffective leadership.”
– Source: *The Columbia Accident Investigation Board Report*, August 2003, p. 170.

“The [CAIB] board’s conclusion that the present shuttle is not inherently unsafe is based on conjecture and not an objective investigation.... The shuttle launch system has an unacceptable catastrophic failure rate of one in 57 flights.” – Source: Don Nelson, retired aerospace engineer at NASA, in the *Houston Chronicle*, Sunday, 9/21/03.

“Can I quit now? Can I go home?” – Michael Brown, FEMA Director, Monday, 9/28/05 – Source: *The Washington Post* 12/23/05.

“We are extremely pleased with the response that every element of the federal government, all of our federal partners, have made to this terrible tragedy.” – Source: Michael Chertoff, Secretary, Department of Homeland Security -Wednesday 8/31/05.

“Brownie, you’re doing a heck of a job.” – President George W. Bush, Friday, September 2, 2005 – Source: White House 9/2/05.^{viii}

One of the keys to understanding the knowledge analytic with regards to the executive/management separation of knowledge during Katrina is exemplified by the following exchanges between National Hurricane Center (NHC) Director, Max Mayfield, Michael Brown, ex-FEMA Director, Frances Fragos Townsend, Presidential Homeland Security Advisor, Michael Chertoff, Department of Homeland Security (DHS) Secretary and President George W. Bush regarding whether New Orleans was sufficiently ready to withstand a category four or five hurricane:

“I don’t think anyone can tell you with confidence right now whether the levees will be topped or not, but that’s obviously a very, very great concern,” Mayfield said.

After the storm, Bush said, “I don’t think anyone anticipated the breach of the levees,” and Chertoff agreed.... Bush, who participated in the FEMA briefing on August 28, assured other officials that everything was under control. “I want to assure the folks at the state level that we are fully prepared to not only help you during the storm, but we will move in whatever resources and assets we have at our disposal after the storm to help you deal with the loss of property. And we pray for no loss of life, of course,” he said (CNN.com -“Transcript Shows...,” March 2, 2006).

We see here that the NHC Director told President Bush and DHS Secretary Chertoff that Hurricane Katrina could potentially be a huge disaster for the New Orleans Gulf Coast area. An interested “hands-on” president, seen publicly appearing to be attentive to the briefing he was receiving before the hurricane hit landfall, was the image that the White House wanted to project. However, the responsibility for the failed response presents another image that the president and his senior leadership wanted to shift to an underling, in this case, FEMA Director Michael Brown. DHS Secretary Chertoff seemingly accepts responsibility for the

mistakes that were made regarding the incident, but pinpoints most of the blame on Director Brown, with the help of the Presidential Aid, Frances Townsend:

“It was the president who acknowledged the response to Hurricane Katrina was insufficient, and it was the president who first sought the lessons learned,” said Townsend.... Responding to a draft House report that said the administration disregarded warnings of Katrina’s threat to New Orleans and that Bush was slow to become engaged, Townsend said, “I reject outright any suggestion that President Bush was anything less than fully involved.”

... Chertoff acknowledged that the government waited too long, until after Katrina make landfall, to mobilize troops, vehicles and aid needed to rescue and remove victims from New Orleans, adding to deaths and suffering. He said that under his watch, federal emergency plans and command of the crisis that killed more than 1,300 people broke down. “I am accountable and accept responsibility for the performance of the entire department, good and bad.”

...Townsend and Chertoff condemned former FEMA director Michael D. Brown, who testified to the Senate on Friday that the administration mishandled domestic preparedness by overemphasizing terrorism. The result, he and state emergency managers have said, has taken money and focus away from natural disasters, FEMA and state responders.

Taking aim at Brown, Townsend said one can learn from experience or “become bitter and lash out, trying to find someone, anybody, to blame, and unfortunately we have seen that already.” She added: “We cannot attempt to rewrite history by pointing fingers or laying blame.”

Chertoff also attacked Brown, with whom he had feuded since becoming secretary six months before Katrina hit.

Three days after Brown told senators that he went straight to the White House and did not call Chertoff the day of Katrina’s landfall because it would “have wasted my time,” Chertoff said: “There is no place for a lone ranger in emergency response.” He added that the cost “is visited on too many innocent people.”

In [an] email statement, Brown called Chertoff’s criticism “disingenuous” and said he saw vindication in vows to boost money and staff for FEMA. “Personal attacks on me by Secretary Chertoff are simply an attempt to ignore the information I gave to department leadership throughout my tenure regarding FEMA’s marginalization,” Brown said (Hsu 2006, A1).

These examples of discord exemplify the executive leadership style of the Bush administration regarding the Katrina disaster. Apparently sensitive to the poor response to Hurricane Katrina, President Bush used the subsequent Hurricane Rita event to demonstrate that he was in command of the situation. Arriving at the U.S. Northern Command post in Colorado on September 25, 2005, Bush explained, “I’ve come here to watch NORTHCOM in action, to see firsthand the capacity of our military to plan, organize and move equipment to help the people in the affected areas,” placing Bush’s government on a “war footing for Rita’s arrival” in response to the poor showing of Hurricane Katrina (VandeHei and Balz 2005, A 20). Executive leadership is now being exhibited in a domestic national emergency on par with the leadership with the war on terrorism.

Discussion and Implications for the Knowledge Analytic

We have seen in these case studies a failure of executive level leadership by the NASA and DHS organizations. With *Challenger* and *Columbia*, executive level obsession with numbers and deadlines drove the NASA organization in the cases of *Challenger* and *Columbia* to launch and reentry, respectively, against the advice of those who know the most about the shuttle systems; the engineers. In both instances, the knowledge possessed by engineers at the working level was ignored and the result was the deaths of seven astronauts in each event. Ultimately, as a direct result of the *Challenger* disaster, Roger Boisjoly was eventually shunned and castigated by his employer, Morton-Thiokol, leading to his resignation. In *Columbia*, Linda Ham and Ron Dittmore were blamed by the CAIB for failing to heed the warnings of NASA engineers, though clearly pressure was being exerted from higher levels in the NASA organization for them not to take the advice from below. With hurricanes Katrina and Rita, executive level obfuscation, bureaucratic turf fighting, and indecision led public officials and administrators to neglect the affected areas of the Gulf Coast by not implementing a plan to help the people of the region to escape safely and securely in a timely manner, thus amplifying the magnitude of the disaster. FEMA Director Brown – and middle manager – took much of the blame for the colossal failure of Katrina.

The Bush administration and Congress’s commitment to the “war on terrorism” meant the redesign of a whole new federal bureau – the Department of Homeland Security (DHS) – ostensibly to keep Americans safe from terrorists. The Federal Emergency Management Agency was folded into the umbrella of the 170,000+ member DHS in order to spend more scarce resources fighting al Qaeda, the Taliban, and other assorted terrorist organizations – as well as nation-states that supported terrorism such as Iraq. This action led to another bureaucratic layer and more inertia and indecisiveness on the part of policy makers. Once again, as in the instance of NASA, DHS and the Bush administration ignored the advice from lower level participants – for example, governors in the states, meteorologists, and their eventual scapegoat, Michael Brown.^{ix} Besides the political machinations that occur in government especially exhibited in light of such a colossal failure as Hurricane Katrina, the organizational response led by the executives at DHS and FEMA demonstrate the obsession with power, control and its tool – numbers – that is key to the idealism of executive

knowledge in the knowledge analytic. The monetary cost of mobilization of resources to the Gulf Coast region, compounded by other governmental expenses such as the War in Iraq, gave pause to decision makers to go forward with evacuation and relief efforts.

With NASA the central problem was between the engineers and their managers. President George W. Bush and DHS Secretary Michael Chertoff, in the case of Hurricane Katrina, represent the executive level hindering FEMA Director Michael Brown in terms of allowing him to coordinate the FEMA organization and to mobilize resources. Bush and Chertoff were absorbed with numbers, deadlines and power – with the problem of DHS protecting the public and the fact that resources were shifted from potential domestic disasters to “terrorist” ones – and this led to FEMA immobility, in addition to the new layer of bureaucracy created by the reorganization. Obsession with numbers by the executives, in this case shifting scarce resources and reorganization, deprived FEMA and its director with the tools, authority and resources to take action that had been part and parcel of their mission prior to Katrina. State, local and nonprofit organizations were unable to help move people from affected areas prior to the hurricane's arrival and were prevented from doing so by federal authorities in charge when they ostensibly took command of the operations. Also, once it became clear that the disaster was going to be worse than President Bush and Secretary Chertoff imagined, i.e., the hurricane had already landed on August 29, 2005, FEMA Director Brown was put in charge of the relief and evacuation efforts after the fact. The organizational pyramid allows executives to get away with placing all the blame on Brown. Similarly, the CAIB placed the blame on Linda Ham and Ron Dittmore for failing to take action for the Columbia mishap, even though pressures came from above (the executive level).

The knowledge analytic captures the propensity of organizations, especially exhibited when managers have to really manage, to place pressure from the top of the organizational pyramid to the bottom. The victims of executive level ineptitude are rarely the executives themselves. Rather, those who pay exist in the bowels of the organizational structure and those who receive the government's services (or not).

Executives are clearly involved in the pressures of numbers and deadlines, even to the point of appointing some unfortunate manager or director to assume the brunt of public, government commission, or congressional criticism because of their own failure or causing a subordinate to be fired as a means for a sacrifice that the public demands as retribution for the failings of the bureau. One may reasonably ask whether this is the ultimate design for the organizational pyramid. Besides the obvious partisan divisions, the lack of concern for knowledge possessed by lower level participants, in this case the governors and mayor, was missed in the events surrounding Hurricane Katrina by the executive level – Secretary Chertoff and Director Brown and their primary concern over the numbers – i.e., how large should my budget be? How can I assume more power *vis a' vis* my opponents in the Bush administration? And after the incident, how can I blame the other guy for organizational leadership failure? These political issues, compounded by an obsession with numbers and power, constitute the loss of sense as to what the DHS and FEMA were ostensibly created to do in the first place – protect the public from domestic disasters and terrorist actions.

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Endnotes

¹ See Garrett (2001, 2004) for a more thorough examination of the *Challenger* and *Columbia* crises.

² See Lipton's article in *The New York Times* - "Republicans' Report on Katrina Assails Response" February 13, 2006. At this point the number of deaths is an estimate with some victims still unaccounted.

³ As of January 18, 2006 this many people were still not found. See Roberts "More Than

3,200 Still Missing from Katrina,” in *Yahoo News*, Wednesday, January 18, 2006.

⁴ See Hsu’s *Washington Post* article “House Report Cites Hurricane Failures” February 16, 2006. In the House report, all levels of government were cited as “a failure of initiative.”

⁵ See “Katrina Timeline” at <http://www.thinkprogress.org/katrina-timeline> for a good synopsis and chronology of events.

⁶ See the U.S. Department of Homeland Security “Memorandum for Distribution” dated August 30, 2005. DHS Secretary Chertoff “appoints” Michael Brown, Undersecretary for Emergency Preparedness and Response, as the Principal Federal Official (PFO) for the response and recovery operations of Hurricane Katrina under the “guidance” provided in the National Response Plan. The roles and duties of the PFO include:

- Ensuring overall coordination of Federal domestic incident management activities and resource allocation on scene;
- Ensuring seamless integration of Federal incident management activities in support of State, local, and tribal requirements;
- Providing strategic guidance to Federal entities and facilitating interagency conflict resolution, as necessary, to enable timely Federal assistance to State, local, and tribal authorities;
- Serving as a primary, although not exclusive, point of contact for Federal interface with State, local, and tribal government officials, the media, and the private sector for incident management;
- Providing real-time incident information, through the support of the on-scene Federal incident management structure, to the Secretary of homeland Security through the homeland Security Operations Center and the Interagency Incident management Group, as required; and
- Coordinating the overall Federal public communications strategy at the State, local, and tribal levels.

Secretary Chertoff goes on to state ‘The PFO does not impede nor impact the authorities of other Federal officials to coordinate directly with their department or agency chain of command or to execute their duties and responsibilities under law. I am confident that Under Secretary Brown will provide the leadership necessary to ensure an effective and efficient incident response. I request that you provide him your fullest measure of support in the execution of these important responsibilities.’ The memo is then distributed, too, to all of the cabinet level department secretaries and the EPA Administrator. The memorandum is signed and dated *one day after* Hurricane Katrina made landfall.

⁷ See Jordan’s “Pre-Katrina Warnings Not Heeded,” in *Yahoo News*, 1/24/06. The exercise assumed that a Category 3 hurricane would hit New Orleans that “would overwhelm the New Orleans area with flood waters, killing up to 60,000 people and destroying buildings and

roads. State and federal officials were concluding Pam’s findings when Katrina, an actual Category 4 storm, roared ashore on Aug. 29.”

⁸ Farmer (1995) notes the importance of language and how Public Administration is portrayed to the public. These quotes were selected for the snapshot of time and space as they capture some of the essence of their thinking of the executives who uttered them, reflecting the reality of the situation as they perceive it.

⁹ Brown was a former Arabian horse show manager in Oklahoma City and Republican partisan.

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