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KIDS COUNT SNAPSHOT

CONNECTING KIDS TO TECHNOLOGY: Challenges and Opportunities

By Tony Wilhelm, Delia Carmen, and Megan Reynolds

INTRODUCTION

As America enters the 21st century, it is clear that technology is infiltrating nearly every facet of our lives. Recent employment projections from the U.S. Bureau of Labor Statistics show that 8 of the 10 fastest growing occupations are computer-related.[1] Technology futurists predict that more sophisticated, innovative technological systems will become common features of nearly every workplace and home.

There are enormous possibilities and opportunities ahead for young workers who possess "21st-century literacy"—that is, the knowledge and skills to take advantage of the new Internet-related technologies.[2]

Because 21st-century literacy is so important, it is imperative that governments, industry, and philanthropic organizations support programs that provide access and training in underserved communities, particularly for young people. Unfortunately, program cuts proposed at the federal level could drastically diminish the ability of neighborhoods to address the digital divide.

How will increased reliance on computers and the Internet affect outcomes for kids in low-income central-city neighborhoods where 84 percent of households with children did not have a computer?[3] For the more than 4 million children who are without a phone in the home,[4] the implications of the digital divide are even more evident.

Despite the rapid increase in computer use and Internet access during the late 1990s, there is still a formidable gap that separates the haves from the have-nots. Generally, children who are already disadvantaged are the least likely to have access to the new technology. Minority children, children living in poor families, and particularly those living in high-poverty neighborhoods are the least likely to have a computer at home or access to the Internet. Schools close some of the gap, but significant disparities remain even after access at school is taken into account.

Because 21st-century literacy is so important, it is imperative that governments, industry, and philanthropic organizations support programs that provide access and training in underserved communities, particularly for young people. Unfortunately, program cuts proposed at the federal level could drastically diminish the ability of neighborhoods to address the digital divide.

In the 2000 *KIDS COUNT Data Book*, we examined the isolation that plagues many low-income families when they are disconnected from economic opportunity, social supports, and the services and organizations established to assist them. Their lack of home Internet access will only deepen that isolation as these opportunities and meaningful connections are increasingly available online only.

This *Snapshot* examines the demographics of the digital divide, discusses some implications of current trends, and highlights a few efforts to bridge the divide and provide a level playing field for all children.

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The ABCs of the Digital Divide

The term digital divide entered our national vocabulary in the mid-1990s in response to the large gap in computer and Internet access separating haves and have-nots. Particularly in the early days, when computers were more expensive and the Web was still the domain of scientists and scholars, it was widely believed that low- and middle-income families would not benefit from these new tools.

Over the years, the costs of having a home computer and an Internet connection have become more affordable to the majority of American families, but there are still a large number of low-income families who are left behind. It is important to recognize, however, that access is just the first step in bridging the gap. Until we address what we are calling the Internet ABCs—Access, Basic training, and Content—the digital divide is likely to remain a permanent feature of American society.

ACCESS

Why Does Access Matter?

Before looking at who has access and who doesn't, we should ask whether children's lack of access to technology in the home is a disadvantage and whether the lack of a computer at home can be overcome by having access to computers at school.

Research has shown that the presence of educational resources in the home—including computers—is a strong predictor of academic success in mathematics and science.[5] Studies have found that having a personal computer at home is associated with higher test scores in reading, even after controlling for income and other factors.[6]

Project TELL, a long-running demonstration research project in New York City, tracked the school performance of disadvantaged and at-risk youth from 1990 to 1997.[7] Students involved in an online learning community—with access to home computers and network availability—substantially outperformed a control group on standardized reading and math tests.

How Widespread Is Access?

Access is the most commonly discussed dimension of the digital divide because it's the easiest to measure: You have a computer at home or you don't; you have access to the Internet or you don't.

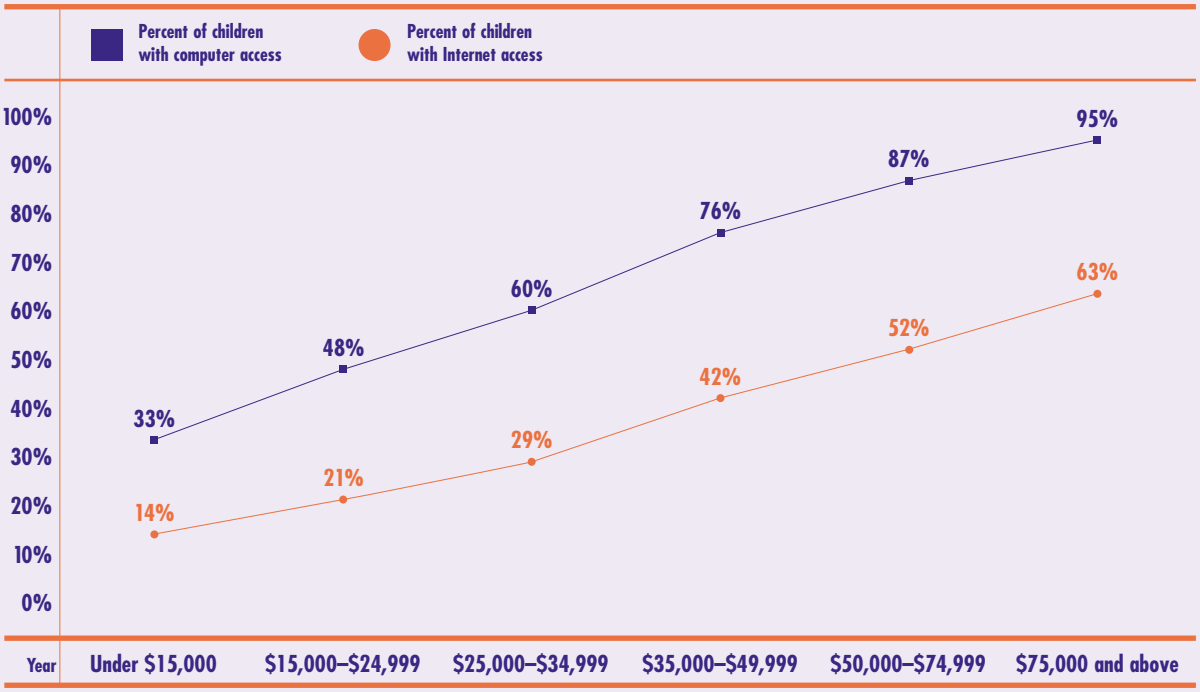
Families with children are more likely than ever to own a computer and be connected to the Internet. All boats are rising, but poor and minority kids are playing catch-up to their more affluent, white peers—both at home and in the classroom. Almost all upper-income households with children have computers, yet only one-third of households with children and a family income of less than $15,000 had a computer in 2001.[8]

Over the past several years, the number of American children with access to information technology has improved. Between 1993 and 2001, the share of all children (ages 3–17) living in households with computers increased from 32 percent to 71 percent.[9] In addition, access to school computers further reduces the number of school-age (5–17) children who have no access to information technology. Data from September 2001 show that about 25 percent of school-age children were able to access computers at school even though they did not have one at home.[10] Nonetheless, 7 percent of teens ages 14 to 17 and 16 percent of kids ages 5 to 9 had no access to computers, either at home or at school.[11]

Access to the Internet is still relatively low—less than 60 percent of kids who have a computer at home also use the Internet at home—but home access to the Internet is expanding even more rapidly than computer availability. Census Bureau data show that 41 percent of children connected to the Internet from home in 2001, compared to only 11 percent in 1997.[12]

FIGURE 1

Percent of Children With Home Computer and Home Internet Use by Family Income: 2001



SOURCE: U.S. Census Bureau, Current Population Survey, September 2001.

Demographics of Access

Despite promising trends in home access to technology over the past 5 years, we are far from providing equal access to computers and the Internet for all kids. Research showing that home access to technology can improve education outcomes for at-risk children makes it even more important that policymakers ensure that these children can take advantage of these powerful tools. As the data below demonstrate, a disproportionate number of the children who have no access to home computers are from low-income and minority families.

Income. Much of the disparity in home computer ownership is due to income: Ninety-five percent of children in households earning $75,000 or more a year had a computer at home in 2001, compared to 33 percent of children in households earning $15,000 or less a year (see Figure 1). Children from homes with higher incomes also have a rate of home Internet access that is more than 4 times that for poor children. Internet connections at home are available to almost 63 percent of children living in households in the highest income category, but to only 14 percent of children in the lowest.

Furthermore, research documents significant differences in the ways that children from various income groups use their home computers. Compared to their wealthier peers, low-income children are less likely to use their home computers for word processing, school assignments, and other standard software applications and more likely to use them for games, according to Henry Becker of the University of California at Irvine.[13] These results confirm that while access is the first barrier to overcome, training in 21st-century literacy skills as well as parental involvement are also necessary to help kids make the most of that access.

Race. Between 1997 and 2001, there were huge increases in the rate of home computer access for black and Hispanic children. The share of black children living in a home with a computer grew from 24 percent in 1997 to 46 percent in 2001, a 92 percent increase. For Hispanic children, home access to a computer more than doubled, from 23 percent in 1997 to 47 percent in 2001. During the same period, the rate for non-Hispanic white children increased by 34 percent.

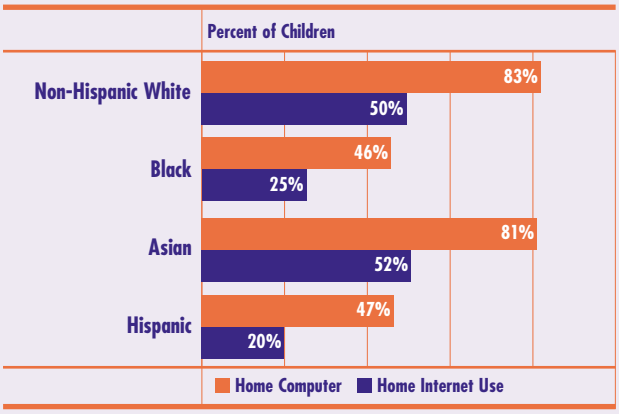
Despite a rapid increase in computer availability for minority children, a large racial gap remains. In 2001, 83 percent of non-Hispanic white children lived in households with computers, compared to only 46 percent of black children and 47 percent of Hispanic children (see Figure 2).

There are similar gaps in access to the Internet at home. Based on data collected in 2001, 50 percent of non-Hispanic white children were able to connect to the Internet at home, compared to only 25 percent of black children and 20 percent of Hispanic children.

While high poverty and lower educational attainment among minority families contribute to their below-average access to home computers and the Internet, they still do not offer a full explanation. According to the Commerce Department's analysis of this issue, "Estimates of what Internet access rates for black and Hispanic households would have been if they had incomes and education levels as high as the nation as a whole show that these two factors account for about one-half of the differences."[14]

FIGURE 2

Home Computer and Internet Use Among Children by Race and Hispanic Origin: 2001



SOURCE: U.S. Census Bureau, Current Population Survey, September 2001.

Family Type. Given the differences in access by income, it is not surprising that 79 percent of children who lived with married parents had access to a home computer, compared to just 49 percent of children who lived with a single mother in 2001.[15] Similarly, children in married-couple families were almost twice as likely to have connections to the Internet (47 percent) as children living with a single mother (27 percent).

Geographic Distribution of the Digital Divide

Geographic fault lines often have been used to characterize the digital divide. For example, when introducing the "E-Rate" program in 1998, national leaders pointed out that these new tools made it possible for a child in the most isolated inner-city neighborhood or rural community to have access to the same world of knowledge at the same instant as a child in the most affluent suburb.[16] While access improved for all children throughout the 1990s, conspicuous inequities and geographic disparities still persist.

Central-city, rural, and suburban area analysis. Census Bureau data indicate that geography is an important factor affecting children's access. In 2000, only 53 percent of children who lived in central cities had access to a home computer, compared to 61 percent of rural children and 73 percent of children living in suburbs. Similarly, only 24 percent of children in central cities use the Internet at home, compared to 29 percent of rural kids and 35 percent of suburban kids.[17]

In its 2001 report, "A Nation Online," the U.S. Commerce Department acknowledged that during the past few years, Internet access increased more rapidly in rural areas

than in central cities. In rural areas, people over the age of 3 who used the Internet from any location jumped from 29 percent in 1998 to 53 percent in 2001.

In contrast to this strong growth in rural areas, central-city residents have not kept pace with national-level increases between 1998 and 2001. The rate of Internet use from any location for people in central cities was only 2 percentage points lower than the national rate in 1998—but by 2001, the divide had grown to 5 points, 49 percent versus 54 percent.[18]

State-by-state analysis. Table 1 shows states ranked by the percentage of households with children that have home Internet access.[19] States range from a high of 69 percent in New Hampshire to a low of 31 percent in Mississippi. There is a striking pattern of low Internet penetration across the South. The 10 states that have 45 percent or fewer households with children able to access the Internet from home are all in the South or Southwest. These states also have low overall rankings for child well-being in the annual *KIDS COUNT Data Book*, due in large measure to high poverty rates.

By contrast, all six states in the New England region have high rates of Internet access. Other states where more than 55 percent of households with children have home Internet access are more geographically diverse, including Alaska, with the second highest access rate (64 percent), followed by Washington (60 percent). The only other states outside the Northeast that have high Internet penetration are Minnesota and Colorado, each at 58 percent, and Utah at 56 percent.

Schools as Access Portals

A 2000 U.S. Census Bureau report on computer and Internet access found that schools help close the technology gap for children who lack computers at home. According to that report, "The net result of the effects schools have in giving computer access across income, racial, and ethnic groups is a leveling of the computer access that children of different groups have compared to what they would have had if home were the only place available for them to use computers."[20] Without school computer access, the gap between high-income children (over $75,000 annually) and low-income children (under $25,000 a year) is 60 percentage points, but schools reduce that gap by two-thirds to 20 percentage points.[21]

Data from the U.S. Department of Education demonstrate that schools have experienced a tremendous increase in Internet access in recent years, growing from only 35 percent of public K-12 schools in 1994 to 98 percent in 2000.[22] While having Internet access at the school level is important, a better measure than school connectedness is how many instructional classrooms include wired computers. At that level, there has been a striking change from only 3 percent of instructional classrooms having an Internet-equipped computer in 1994, to 77 percent of classrooms having one in 2000.[23]

No doubt much of this increase is due to an infusion of federal and local funding throughout the 1990s. While the federal government's 7 percent contribution to overall education spending is relatively small, its share of ed-tech funding is substantial, accounting for 25 percent to 35 percent of all annual K-12 technology funding, depending on the state.[24] By fiscal year 2001, U.S. Department of Education funding for ed-tech programs had risen to $872 million, compared to the $23 million appropriated in 1993.[25] These resources support an array of services, including purchasing computers and software, training teachers, and revamping curriculums.

A change in the nation's telecommunications laws in 1996 also provided new resources for schools. Universal service provisions, traditionally focused on ensuring nationwide phone service at a reasonable cost, were expanded to include discounts on telecommunications services for schools, libraries, and rural health clinics. Included are discounts on phone service, Internet access, internal networks, and

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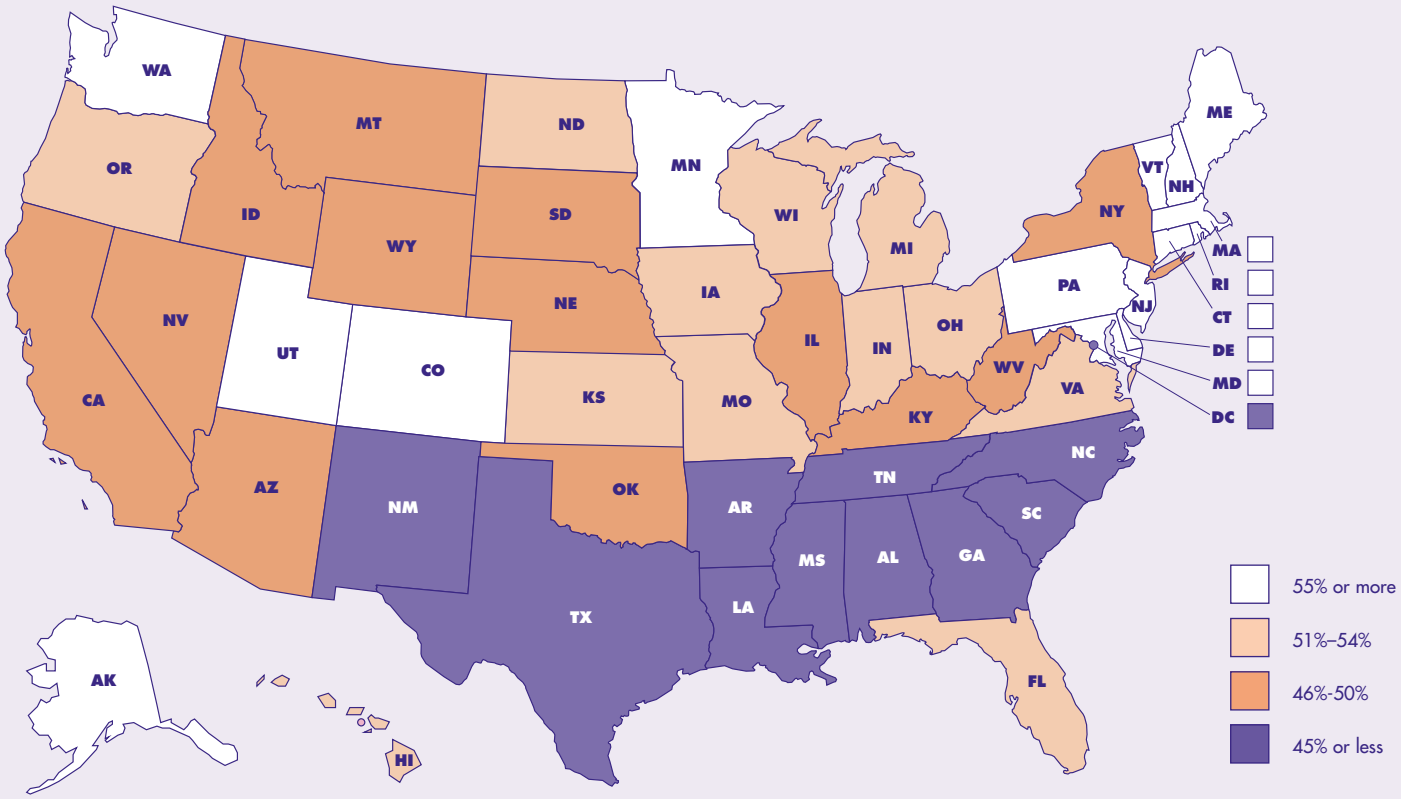
TABLE 1 Percentage of Households With Home Internet Access



Technical infrastructure is critical, but basic training is also necessary to remove barriers—such as low levels of literacy and lack of computer experience—that hinder effective use of technology by underserved youth.

related equipment. Local and long-distance telephone companies contribute funding with fees collected from consumers. In the first 4 years, this "E-Rate" program has provided more than $8 billion in discounts to needy schools.

BASIC TRAINING AND CONTENT

Policy Implications and Innovative Programs

Technical infrastructure is critical, but basic training is also necessary to remove barriers—such as low levels of literacy and lack of computer experience—that hinder effective use of technology by underserved youth. Teacher training is a critical element of effective classroom technology use and must be supported at all levels as a cornerstone of ed-tech policy. Additionally, the availability of high-quality, appropriate content is an essential ingredient, without which we might have high-speed pipes with little of value for consumers on the other end.

Increasingly, states are trying to ensure that students and teachers are computer literate by mandating such proficiency. This is a sensible strategy to help maximize the benefits from the substantial investments in school technology that have been made over the past decade. In 1999, 35 states had passed technology standards for students, and 26 had introduced technology standards for certification and recertification of teachers.

Percent of Households With Children (ages 3–17) Having Home Internet Access (Average 1998–2001)

Rank	State	Percent	Rank	State	Percent
1	New Hampshire	69	25	Indiana	51
2	Alaska	64	28	Wyoming	50
3	Vermont	61	28	South Dakota	50
4	Washington	60	28	Nevada	50
4	Rhode Island	60	31	New York	49
4	New Jersey	60	31	Nebraska	49
7	Minnesota	58	31	Montana	49
7	Connecticut	58	31	Idaho	49
7	Colorado	58	35	Illinois	48
10	Massachusetts	57	35	California	48
10	Maryland	57	37	West Virginia	46
10	Maine	57	37	Oklahoma	46
13	Utah	56	37	Kentucky	46
13	Pennsylvania	56	37	Arizona	46
15	Delaware	55	41	Tennessee	44
16	Oregon	54	41	North Carolina	44
16	Kansas	54	43	Georgia	43
16	Florida	54	44	Texas	42
19	Wisconsin	53	45	South Carolina	41
19	Virginia	53	45	New Mexico	41
19	Iowa	53	45	Alabama	41
19	Hawaii	53	48	Louisiana	37
23	North Dakota	52	49	Arkansas	34
23	Missouri	52	50	Mississippi	31
25	Ohio	51	N.R.	District of Columbia	31
25	Michigan	51		*N.R.=Not Ranked.*	

SOURCE: U.S. Census Bureau, Current Population Survey, December 1998, August 2000, September 2001.

Despite the clear correlation between state poverty rates and computer and Internet access, some states are bucking the odds with innovative programs. Although Florida has the 10th highest child poverty rate, it is ranked 16th in home Internet penetration, as a result of some innovative statewide technology programs, such as putting computers in community centers and providing extra technology investments to low-performing and low-income schools. The Florida Online High School is a unique, accredited diploma-granting institution that provides thousands of students with access to Advanced Placement and other specialized courses not offered in their schools.

A CALL TO ACTION

Throughout the past decade, high-tech companies repeatedly petitioned the federal government to increase the number of skilled workers that they could hire from outside the United States in order to fill vacancies. The shortage of skilled high-tech workers is an indication of just how ill-prepared America is to meet today's changing labor market needs.

Achieving equitable access to technology, and all of the inherent opportunities that it gives young people, will require the highest level of commitment from decision-makers and the public. To reduce or eliminate the digital divide, we must develop and adopt a comprehensive

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KIDS COUNT, a project of the Annie E. Casey Foundation, is a national and state-by-state effort to track the well-being of children in the United States. Visit www.kidscount.org.

The Annie E. Casey Foundation is a private charitable organization dedicated to helping build better futures for disadvantaged children in the United States. Visit www.aecf.org.

Since 1981, the Benton Foundation has worked to realize the social benefits made possible by the public interest use of digital technologies. Through its projects, the nonpartisan organization seeks to advance a public interest vision for the digital age and to demonstrate the value of communications for solving social problems. The Benton Foundation is located in Washington, DC.

national agenda that is fully funded and embraced by government, educators, business leaders, philanthropic organizations, and the public at large. That agenda should be considered as crucial as providing national roads and transportation, Social Security for all citizens, and mandatory childhood immunization.

The following policy recommendations offer a few ways to achieve the critical goal of digital inclusion for all children.

• Encourage support for universal access to information technology, as well as socially beneficial IT applications in underserved communities. Policymakers need to go beyond supporting high-speed Internet access in schools and libraries and extend "E-Rate" discounts to community-based organizations and low-income families. These policies would provide broader opportunities for parents as well as children to hone their computer literacy skills. The Technology Opportunities Program and the Community Technology Centers grant program, which have encouraged the development of innovative demonstration projects that bring emerging technologies to low-income communities, should be expanded.
• Provide resources to states and localities to ensure that all teachers are trained in the effective use of technology. This goal can be accomplished by leveraging state funding with federal ed-tech block grants and by increasing funding for such programs as the Preparing Tomorrow's Teachers to Use Technology program.
• Implement computer literacy training in all schools. This will require the development of standardized courses and curriculums that teach students the practical application of technology in today's world. Department of Education funds have been earmarked to help integrate technology successfully into K-12 classrooms, library media centers, and other educational settings, including adult literacy centers. This funding should be increased to help identify model programs that can be replicated and adopted throughout the country.

By themselves, these policies do not address the many implications of the digital divide, but they would give more children equitable access to the basic ABCs of technology needed to be successful in today's information society.

CONCLUSION

Technology has so transformed the American workplace that young people entering the labor force without significant experience using computers and the Internet will be at a severe disadvantage, and employers who lack technologically trained workers will be handicapped as they compete in an increasingly global economy.

There are several promising practices that could help federal, state, and local agencies close the digital divide. We urge elected officials, policymakers, and business leaders to take a close look at some of these ideas, which we believe can dramatically reduce the digital divide and give every American child access to the technology they need to become effective citizens and workers of tomorrow.

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