

周报告

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○阅读关于能耗方面的论文

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Minimizing Schedule Length of Energy Consumption Constrained Parallel Applications on Heterogeneous Distributed Systems

会议: ISPA
CCF C类

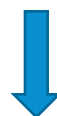
○异构分布式系统中，满足能耗约束前提下，求调度长度最小化。

基本算法还是经典的HEFT

在向上排序确定调度序列后，原文中后继任务的预设值用的是任务的最低功耗，导致最终实现起来结果太悲观。

修改后的后继任务运行的能耗比最低值高，并且也保证了系统是可调度的。
(一种平均分配的策略)

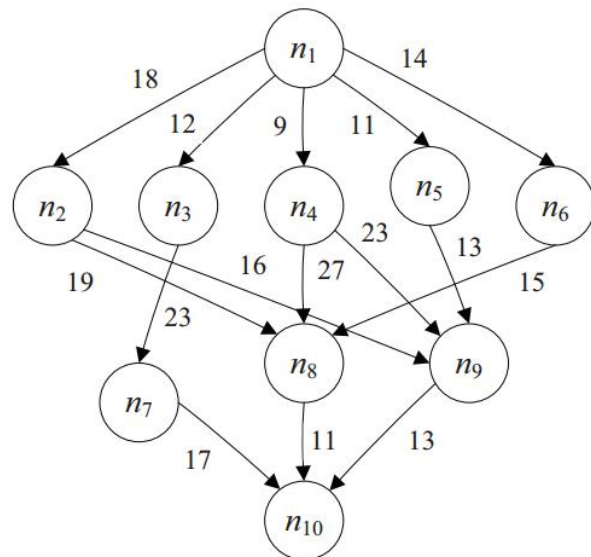
$$E_{\text{given}}(n_{\text{seq}(j)}) = E_{\text{given}}(G) - \sum_{x=1}^{j-1} E(n_{\text{seq}(x)}, u_{\text{pr}(\text{seq}(x))}, f_{\text{pr}(\text{seq}(x))}, hz(\text{seq}(x))) - \sum_{y=j+1}^{|N|} E_{\min}(n_{\text{seq}(y)})$$



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例

n_i	$E_{given}(n_i)$	$u_{pr(i)}$	$f_{pr(i),hz(i)}$	$E(n_i, pr(i), f_{pr(i),hz(i)})$	$AST(n_i)$	$AFT(n_i)$
n_1	13.44	u_3	1.0	9.63	0	12
n_3	20.33	u_3	1.0	20.33	9	28
n_4	18.19	u_2	1.0	6.72	18	26
n_2	19.26	u_1	1.0	10.79	27	40
n_5	10.92	u_3	1.0	10.7	28	38
n_6	13.44	u_2	1.0	13.44	26	42
n_9	5.4385	u_2	0.61	5.3606	56	75.67
n_7	1.3188	u_1	0.33	1.3177	51	72.2121
n_8	0.8874	u_1	0.26	0.8863	72.2121	91.4429
n_{10}	1.8204	u_2	0.26	1.8193	102.4429	129.3660
$E(G) = 80.98 \leq E_{given}(G) = 80.9939, SL(G) = AFT(n_{10})=129.3660$						



前面的任务以最大功耗运行来降低调度长度，后面的任务由于能耗不够，在最低功耗运行。

(贪心算法)

(E=80.9939, SL=129.366)

修改后的能耗分配更加均衡，结果也得到改善。

(E=74.6252, SL=84.0332)

n_i	E_{given}	u_{pr}	f	E	AST	AFT	
n_1	8.5499	3	0.91	8.5051	0.0000	9.8901	
n_3	8.0628	1	0.93	8.0214	21.8901	33.7181	
n_4	8.1888	2	1.00	6.7200	18.8901	26.8901	
n_2	9.8414	3	0.56	9.7932	9.8901	42.0330	
n_5	8.2436	2	0.81	8.2236	26.8901	42.9395	
n_6	8.3925	1	0.86	8.2622	33.7181	48.8344	
n_9	9.3174	2	0.94	9.2597	58.0330	70.7990	
n_7	7.3667	1	1.00	5.8100	48.8344	55.8344	
n_8	8.5112	1	1.00	4.1500	61.0332	66.0332	
n_{10}	12.2487	2	1.00	5.8800	77.0332	84.0332	
				E=	74.6252	SL=	84.0332

下周任务

○ 做实验验证

- 快速傅里叶变换应用和高斯消去应用

○ 准备写篇小论文

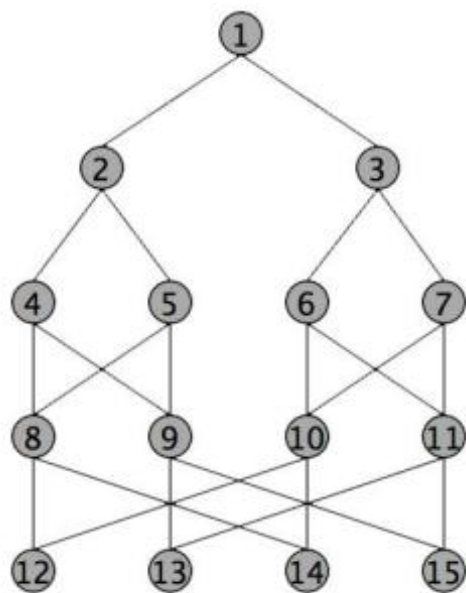


Fig. 5: Example of the fast Fourier transform application with $\rho=4$.

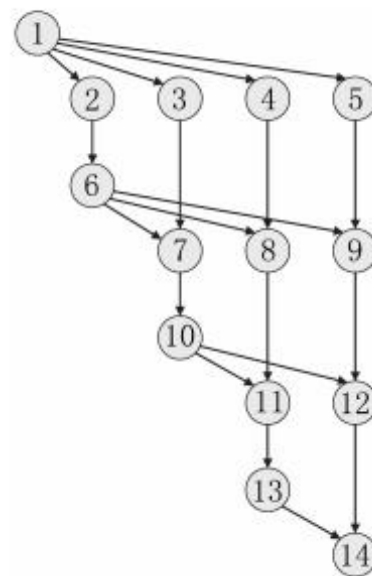


Fig. 6: Example of the Gaussian elimination parallel application with $\rho=5$.



THANKS